PROJECT MANUAL

FOR:

PHASE 2 BOND IMPROVEMENTS

at
Briarcliff Manor MS/HS
Todd Elementary School

Briarcliff Manor UF SCHOOL DISTRICT
Village of Briarcliff Manor, Westchester County

NEW YORK STATE EDUCATION DEPARTMENT NUMBER:

S.E.D. No. 66-14-02-02-0-004-023 (MSHS)
66-14-02-02-0-002-021 (ES)

B.B.S. PROJECT NUMBER:

21-274c (HSMS)
21-274d (ES)

DATE:

ISSUE FOR BID: NOVEMBER 17, 2022

BBS

ARCHITECTS
LANDSCAPE ARCHITECTS
ENGINEERS

244 EAST MAIN STREET
PATCHOGUE
NEW YORK 11772
T. 631.475.0349
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(BRANCH CONTACT)
187 WOLF ROAD, SUITE 205
ALBANY
NEW YORK 12205
T. 518.621.7650

www.BBSARCHITECTURE.COM

ARCHITECTS CERTIFICATION

THE UNDERSIGNED CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE, INFORMATION, AND BELIEF, THE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE, THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE, THE CONSTRUCTION STANDARDS OF THE EDUCATION DEPARTMENT, NEW YORK STATE DEPARTMENT OF LABOR RULE 56, EPA AND AHERA REQUIREMENTS.

Lawrence Salvesen, A.I.A. Lic. No. 020623

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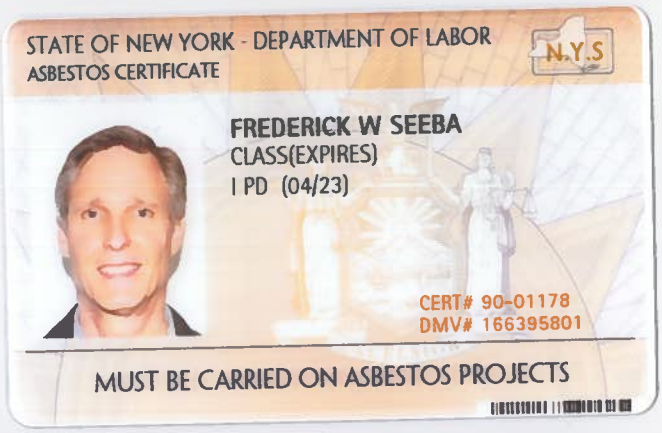
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PROJECT DIRECTORY

Architects/Engineers:	BBS Architects, Landscape Architects and Engineers, P.C. **(BRANCH CONTACT)** 187 Wolf Road – suite 205 Albany, NY 12205 (518) 621-7650
Superintendent of Schools:	Dr. James Kaishain Superintendent of Schools 45 Ingham Road, Briarcliff Manor 10510 (914) 432-8116
Business Official:	John Brucato Asst. Supt. of Finance & Operations 45 Ingham Road, Briarcliff Manor 10510 (914) 432-8116
Director of Facilities	Kenneth Baviello 45 Ingham Road, Briarcliff Manor 10510 (914) 432-8112
Construction Manager:	Savin Engineers Bob Firneis 3 Campus Drive, Pleasantville, NY 10570 (914) 769-3200


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
FREDERICK W SEEBA
CLASS(EXPIRES)
I PD (04/23)
CERT# 90-01178
DMV# 166395801
MUST BE CARRIED ON ASBESTOS PROJECTS

New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

BBS Architects, Landscape Architects and Engineers P.C.

244 E Main Street

Patchogue, NY 11772

FILE NUMBER: 06-0559
LICENSE NUMBER: 28654
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 02/14/2022
EXPIRATION DATE: 02/28/2023

Duly Authorized Representative – Frederick Seeba:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

CONDITIONS OF THIS CONTRACT

A. Before attempting to deliver materials to the site, the Contractor shall inform the Owner's Representative so that arrangements can be made for places of entrance and inspection of materials being delivered.

B. The Contractor shall provide written guarantee of the complete installation to be free from defects in materials and workmanship in accordance with Section 01700. Any portion of the work judged inferior shall be replaced by the Contractor at no additional cost to the Owner.

C. The Contractor shall maintain operational exits, exit lights, danger signs, open trench markings, fire emergency equipment, night lights, and proper storage facilities for equipment and materials as directed through the length of the Contract.

D. The Contractor shall be totally responsible for general site clean up and removal of all materials and equipment related to this Contract at the end of the Contract.

E. The Contractor shall take over and maintain the site immediately after receiving the order to start work. Provide protection of property and utilities until work of the Contract is complete and accepted. The Contractor shall be responsible for the safety of any adjoining property, including paving, utility mains, pipes conduit, etc., and shall, at his own expense, protect and maintain same in at least as good a condition as that in which they were found.

F. All seeded areas, pavements, walks, curbs, and approaches shall be kept clear at all times and, if disturbed by this construction work, shall be repaired and restored with materials to match existing.

G. Before commencing any work, the Contractor shall verify all coverage, and conditions prevalent at the job sites. If no discrepancies are found, the contractor shall report all corrections in writing. If no corrections are brought to the attention of the School District and the Architect/Engineer before starting installation, the Contractor will be totally responsible for this installation providing complete coverage of the area designated.

H. Upon completion of the work, the Contractor shall furnish as-built drawings showing the exact locations of every new item.

I. It is assumed that Contractor's prices are based on scope of work complete and as confirmed by site(s) inspections prior to bidding.

J. Contractor shall be responsible for all incidental electric and plumbing work required to complete work under this Contract.

K. All repair and patching work shall be done in a professional manner. The Contractor shall take care to match new and existing surfaces and materials as closely as possible for a continuous finish where duplication is impossible.

L. Equivalents: Where, in these specifications, kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal, and the Contractor may select one of those items.

If the Contractor desires to use any kind, type, brand, or manufacturer of material other than those named in the specifications as the basis of the bid, the Contractor shall indicate in writing with the bid, within 72 hours after the bid, or prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified items, and submit information describing in specific detail wherein it differs from the quality and performance required by the base specifications and such other information as may be required by the Owner. The Contractor may, at any time, propose to use in the work an equivalent item in lieu of that specified with no change in the bid amount.

M. All prospective bidders shall be required to provide proof of demonstrated competence and experience in this type of work as outlined in these specifications, and each bidder must submit names and addresses of previous jobs completed by his firm, which involved the type of work outlined in the specifications. Bidders are required to complete the “Statement of Bidders Qualifications” form contained herein and submit it with their bids.

N. At least three letters of reference for this type of work completed in the last five years shall be provided upon request, with pertinent company names and addresses of the firms for which the work was done indicating type of work, scope of work, and complete work. The district has the right to verify these letters as well as examine other aspects of the bidder’s work record.

O. As is usual with capital project payments, the district will retain five percent of each payment issued on verified requisitions for payment submitted by the Contractor. This retainage total will be paid upon satisfactory completion of all the work.

P. The maximum gross weight of vehicles used shall not exceed 2,500 lbs. per wheel in the area of playgrounds and athletic fields. The equipment shall be equipped with flotation type tires. On the front lawns, the pounds per square inch exerted on the turf-grass shall not exceed 15 lbs. per square inch and on the back athletic area shall not exceed 32 lbs. per square inch.

Q. The Contractor shall be required to conform to all OSHA requirements regarding Lock-out/Tag-out procedures. This shall include, but not be limited to, disconnecting the power to any equipment to be serviced via a disconnect switch or breaker, locking out this power source, and tagging this lockout with appropriate wording as per OSHA requirements. This shall apply to any power source associated with this project.

R. Certificate of Occupancy: During construction, school district personnel shall monitor the occupied portion of any school building to assure that it complies with the minimum requirements necessary to maintain a Certificate of Occupancy.

S. Complaints: Boards of Education and BOCES shall follow procedures established under Section 155.4 (d) (7) for the investigation and disposition of complaints relating to health and safety received as a result of construction and maintenance activities.

T. Health and Safety Committee: Boards of Education and BOCES shall establish procedures for involvement of the health and safety committee to monitor safety during school construction projects.

U. Emergency Plan: The district emergency plan shall be updated to reflect any changes necessary to accommodate the construction process.

V. Fire Drills: Fire drills shall be held to familiarize students and staff with temporary exits and revised emergency procedures.

W. Notification: Boards of Education and BOCES shall establish procedures for notification of parents, staff, and the community in advance of a construction project of $10,000 or more.

X. Fire and Hazard Prevention: The following shall be strictly enforced:

1. During construction, daily inspection of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment, and debris do not block fire exist or emergency rescue windows.

2. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

Y. Radon: Districts shall take responsibility to be aware of the geological potential for high levels of radon and test and mitigate as appropriate.

Z. Post Construction Inspection: The school district or BOCES shall provide the opportunity for a walk-through inspection by the Health and Safety committee members to confirm that the area is ready for occupancy.

AA. Some of the proposed work may require various contractors to enter crawlspace or pipe tunnel areas, and/or access plenum spaces associated with the existing ceiling and wall systems (typical throughout). Please be advised that these spaces contain asbestos containing and/or asbestos contaminated materials. Any disturbance of said materials may result in the release of airborne asbestos fibers, therefore potentially creating a hazardous condition to the workers.

In accordance with 40 CFR Part 763, all contractors associated with this project are warned of the presence of the asbestos containing, and potentially asbestos contaminated materials within these spaces, and the potential hazard associated with the disturbance of these materials. Each contractor is required to have workers “certified and licensed to work in an asbestos hazard environment” to fulfill their contract requirements in these areas as part of their base bid. Per NYCRR 56, any person who may potentially disturb friable or non-friable asbestos during the course of any employment shall possess a valid restricted handler – allied trades certificate and shall have such certificate, or a copy thereof, in his or her possession at all times while working on the project. This person shall be aware of the health hazards of asbestos and take appropriate precautions to avoid any ACM, PACM or asbestos material disturbance throughout the course of their work. Abatement of any quantity of ACM, PACM or asbestos material is not allowed by this person under any circumstance.

The contractor shall notify the owners representative when work will be undertaken in these areas so that an independent monitoring firm can be available to monitor the activities within these spaces.

END OF SECTION

Invitation to Bidders

BOARD OF EDUCATION
Briarcliff Manor Union Free School District

General Contractor Work (GC-1)
Mechanical Contractor Work (MC-1)
Plumbing Contractor Work (PC-1)
Electrical Contractor Work (EC-1)
General Contractor Work (GC-2) (Single Prime Contract)

PUBLIC NOTICE: is hereby given for separate sealed bids for: **Phase 2 Bond Improvements at Briarcliff Manor MS/HS and Todd Elementary School.** Bids will be received by the School District, on **Wednesday December 14, 2022 at 2:00 P.M. in the District Office - 45 Ingham Road, Briarcliff Manor, New York, 10510,** and at said time and place publicly opened and read aloud.

The Contract Documents may be examined at the Office of the Architect, **BBS Architects, Landscape Architects and Engineers, P.C., 187 Wolf Road, Albany New York,12205 (518-621-7650);** however **t**he Contract Documents may only be obtained thru the Office of **REV, 330 Route 17A Suit #2, Goshen New York 10924 (877-272-0216)** on **November 17, 2022.** Complete digital sets of Contract Documents shall be obtained online (with a free user account) as a download for a **non-refundable fee of Forty-Nine ($49.00) Dollars** at the following websites: www.bbsprojects.com or www.usinglesspaper.com under 'public projects'. Optionally, in lieu of digital copies, hard copies may be obtained directly from REV upon a **deposit of One Hundred ($100.00) Dollars** for each complete set. **Checks for deposits shall be made payable to the DISTRICT, BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT** and may be uncertified. All bid addenda will be transmitted to registered plan holders via email and will be available at the above referenced websites. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs. Plan holders who have obtained hard copies of the bid documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with the printer for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda. The bid deposit for hard copies will be returned upon receipt of plans and specifications, in good condition, within thirty days after bid date, except for the lowest responsible bidder, whose check will be forfeited upon the award of the contract.

The Contract will be awarded to the lowest responsible bidder or the proposals will be rejected within 45 days of the date of opening proposals. Bids shall be subject, however, to the discretionary right reserved by the School District to waive any informalities, accept or reject any alternatives, reject any proposals and to advertise for new proposals, if in its opinion the best interest of the School District will thereby be promoted.

Each bidder may not withdraw his bid within 45 days after the formal opening thereof. A bidder may withdraw his bid only in writing and prior to the bid opening date.

A Prebid walk through will be held at the High School **November 17, 2022** at **3:30pm** at the High School Main Entrance. A Prebid walk through will be held at the Todd Elementary School **November 17, 2022** at **4:30pm** at the main entrance.

BY ORDER OF THE
BOARD OF EDUCATION
Briarcliff Union Free School District
Dated: **November 4, 2022**

INSTRUCTIONS TO BIDDERS

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19. Condition of Work Operations
20. Required Bid Information

1. DOCUMENTS (ISSUANCE AND RESTRICTIONS)

A. Bid documents may be examined at the applicable office of the Architect, BBS Architects, Landscape Architects & Engineers, P.C., 244 East Main Street, Patchogue New York or 187 Wolf Road, Albany New York between the hours of 9 a.m. and 4 p.m. daily except Saturdays, Sundays, and holidays.

B. A deposit, refundable in accordance with the Invitation to Bidders, is required for each set of Bid Documents.

C. Bid documents are comprised of all bid-related documents including, but not limited to, the Invitation to Bidders, Instructions to Bidders, Supplementary Information to Bidders, if any, Bid Proposal Forms, Addenda issued prior to the bid date, and the Contract Documents. Contract Documents consist of the form of Agreement between the Owner and the Contractor, other documents enumerated in the Agreement between the Owner and the Contractor ("the Agreement"), Conditions of the Contract (General, Supplementary and other conditions or provisions), Drawings, Specifications and all addenda issued prior to execution of the Contract and modifications issued after execution of the Contract.

2. QUALIFICATIONS OF BIDDERS

A Bidder must present information and/or documentation proving that:

A. It has the financial capability to produce and execute the project within the time periods specified;

B. It possesses a minimum of five years continuous experience as a firm doing business under the same name, engaged principally as a contractor for the Work proposed.

C. It has completed at least five similar projects, listing type and scope of work, names and addresses of owners and dates of Contract completion (the Owner has the right to verify the documentation as well as examine other aspects of the Bidder's work record);

D. It can provide tabulation of equipment and facilities at its disposal to do the proposed Work;

E. It has a current bonding capacity to accommodate proposed Work

F. It has the experienced staff and technical organization necessary for the Project;

G. It maintains an office with full-time employees in a commercial space;

H. It intends to complete at least 25 percent of the Work with its own forces (General Conditions, Mobilization, etc. will not count toward the 25 percent;

I. It is not currently involved in bankruptcy proceedings;

J. It is licensed to perform the Work it is bidding on in the jurisdiction the Work will take place; and

K. It has the insurance required by the Contract Documents to protect the Owner or is able to obtain the required insurance.

L. The Bidder must provide a complete Schedule of Values on an AIA form G703. This Schedule must be revised and resubmitted until satisfactory to the Architect. All project phases, activities and work items must be broken out individually with lines for both labor and materials. In addition to this and to the required retainage, the Schedule of Values must be structured with the following values:

General Conditions:	5% of overall contract value
Bonds and Insurance:	4% of overall contract value
Submittals:	1% of overall contract value
Punch List:	3% of overall contract value
Commissioning (if applicable):	TBD based on specific project
Closeout and O&M Manual:	2% of overall contract value

M. The Bidder is required to complete and submit the “Statement/Proof of Bidder’s Qualifications” form contained herein.

N. It is assumed that in preparing this bid, the Bidder has already compiled this information, and that it is being made available for reference with completing this package. All information contained above must be submitted to the Architect prior to award of the Contract. Failure to provide this information may result in disqualification of the Bidder.

3. COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

A. Bidder must comply with applicable federal, state, and local laws as well as all ordinances, rules, and regulations affecting the Work.

B. The provisions of General Municipal Law, Section 103A, as it relates to refusal to testify or sign a waiver of immunity against prosecution and the submittal of bids and transactions with the State of New York, or a political subdivision thereof, governs work under this contract.

C. Wage rates as determined by the New York State Department of Labor pursuant to the labor laws of the State of New York apply to all Work under this Contract.

D. In accordance with the requirements of General Municipal Law § 103-g, the Bidder is required to include with its bid either (1) the 'Certification of Compliance with the Iran Divestment Act" or (2) the form entitled "Declaration of Bidder's Inability to Provide Certification of Compliance with the Iran Divestment Act."

4. SINGLE PRIME CONTRACTS **(NOT APPLICABLE)**

A. Where the project cost does not exceed $1,500,000 and the Owner has decided to solicit bids from one general contractor, the Bidder must submit with its bid a separate sealed list that names each subcontractor that the Bidder will use to perform Work on the Contract, and the agreed-upon amount to be paid to each, for: (A) plumbing and gas fitting; (B) steam heating, hot water heating, ventilating and air condition apparatus and (C) electric wiring and standard illuminating fixtures.

After the low bid is announced, the sealed list of subcontractors submitted with the low bid will be opened and the names of the subcontractors will be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each will require the approval of the Owner, upon a showing presented to the Owner of legitimate construction need for the change, which will be open to public inspection. Legitimate construction need includes, but is not limited to, a change in project specifications, a change in material costs, a change to subcontractor status as determined pursuant to New York Labor Law § 222(2)(e), or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. The sealed list of subcontractors submitted by all other bidders will be returned to them unopened after the Contract award.

5. EXAMINATION OF DOCUMENTS AND SITE

A. Bidder must visit sites of proposed Work and be fully familiarized with conditions as they exist, as well as the character of the operations to be carried on under the proposed Contract.

B. Bidder must make all necessary on-site investigations so as to understand facilities, difficulties, and restrictions attending the execution of the Work including access to and conditions of the Work sites and properties.

C. A Bidder will be presumed to have visited the site prior to submission of a proposal and to have familiarized itself with surface and subsurface conditions, existing structures and any and all conditions that may in any way affect the Work. Failure to have so acted will in no way relieve a Bidder from its obligation to perform the proposed Work for the consideration set forth in its bid.

D. At the time of the opening of bids, each Bidder will be presumed to have read and to be thoroughly familiar with the Drawings and Contract Documents, including all addenda. The failure or omission of any Bidder to receive or examine any form, instrument or document will in no waive relieve any Bidder from its obligation to perform the proposed Work for the consideration set forth in its bid.

E. If, prior to the submission of its bid, a Bidder fails to notify the Architect in writing of the existence of any condition, ambiguity, inconsistency or error in any of the Contract Documents, or to a conflict between provisions in any Contract Document and provisions of applicable laws, regulations, ordinances, or codes, its bid will be conclusively presumed to have been based upon the interpretation of the ambiguity or inconsistency, or the directions correcting the error or conflict which may subsequently be given by the Architect.

6. AMBIGUITIES, INTERPRETATIONS, AND ADDENDA

A. No oral interpretations, instructions, or explanations of the Bid Documents will be given prior to the opening of the bids. Discrepancies, ambiguities, or doubts as to the intent of a Bid Document should be communicated to the Architect in writing for interpretation.

B. Interpretations of, clarifications of, amendments to or corrections to the Bid Documents will be made in writing in the form of addenda forwarded to each person to whom or each entity to which Bid Documents have been issued and will become part of the Bid Documents. Each Bidder must acknowledge receipt on the Bid Proposal Forms. Replies issued in any other manner will not be binding. The Architect will not be responsible for oral clarifications.

7. PRE-BID CONFERENCE

A. When indicated in the Invitation to Bidders, a pre-bid conference will be held, at which time the Architect will have a representative available to respond to questions regarding the Bid Documents.

B. Addenda clarifying pertinent questions or concerns raised at the pre-bid conference, requiring modification of the Bid Documents, will be issued for the record and become part of the Bid Documents.

C. Notice as to the time and place of the pre-bid conference is stated in the Invitation to Bidders.

8. BASIS OF BID – PERFORMANCE AND QUALITY STANDARDS

A. GENERAL: To establish performance and quality standards for the products, materials, and equipment required in the Work, the Contract Documents detail performance criteria, or specify two or more items or materials which are presumed to be equal. This method of establishing a level of quality is not intended to exclude products that are equivalent in quality, performance, appearance, and function to those specified.

B. EQUIVALENTS: The Bidder may propose to use in the Work an equivalent item in lieu of that specified with NO CHANGE to the Bid Amount. The Bidder, proposing to utilize this equivalent procedure, must provide a detailed descriptive submission of the proposed material, equipment, or method being offered as equal to those specified, including an explanation of all deviations from the product specified in the Contract Documents. The Bidder is responsible to prove equality and, in that regard, must supply all additional information requested by the Architect, as well as pay for any required testing to support these claims. Further, the Architect is to be the sole judge of product equivalency for the purpose intended, considering equality, workmanship, aesthetics, services, maintenance, economy, and reliability of operation.

If the Bidder has used equivalents as the basis of the bid, the "Proposed Equivalent Form", which is included in the Project Manual following the Bid Proposal Form, must be submitted as an attachment to the Bid Form or within 72 hours after the bid or prior to the award of the Contract. This form may be reproduced, if necessary, for a full listing of equivalents to be considered. This does not exclude the Bidder from submitting equivalents after the award of Contract. The intent of this process is that, if the Bidder is already aware of an equivalency submission, the risk of acceptance can be reduced by verifying equivalency and, therefore, the bid price prior to award. The risk of whether proposed equivalents are accepted is borne by the Bidder.

C. SUBSTITUTIONS: For consideration by the Owner, the Bidder may propose to use in the Work substitute items in lieu of those specified, which do not meet the project performance and quality criteria, and can be furnished and installed at a reduced cost (credit) to the Owner with no impact on the Work being done by others.

1. Proposed substitutions must be submitted with the bid or within 72 hours after the bid or prior to the award of the Contract, on the Proposed Substitution Form, which is in the Project Manual following the Proposed Equivalent Form. The Bidder must list any and all deviations from the Contract Documents as well as the corresponding credit amount to be deducted from the Base Bid Proposal if the substitution is accepted by the Owner. This does not exclude the Bidder from submitting a substitution for consideration after the award of the Contract.

2. Substitutions cannot be used as the basis of the bid, they must be listed separately and will be evaluated on a case by case basis. All base bid amounts must be based on the specified materials or acceptable equivalents.
3. In no way will the proposed substitutions influence the successful bidder selection process. Substitutions may not be used to arrive at the lowest qualified bid amount.
4. If a substitution is accepted, the Bidder must coordinate the installation of the substitute and make all associated changes required. The Bidder also waives any claim for additional cost associated with the substitute which becomes apparent before, during, or after installation. The Bidder agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution.

9. PREPARATION, IDENTIFICATION, AND SUBMISSION OF PROPOSAL

A. Bidders must submit triplicate copies of the Bid Proposal Forms (one marked 'Official Tender' and others marked 'Copy'), properly signed and completed in every respect pursuant to these Instructions to Bidders, in an opaque, sealed envelope plainly and prominently marked:

"Sealed Bid for (Project Name) _____

Bid Date _____, 20___, by (Name/Address of

Bidder)."

B. Attached to the Bid Proposal Forms envelope, Bidders must submit Bid Security pursuant to Paragraph 10 of these Instructions to Bidders.

C. All bids will be held for a period of 45 calendar days after their receipt and opening, during which time the Owner has the right to enter into a contract, and the bid securities of the three lowest bidders will be held until the execution of the Contract.

D. The Owner reserves the right to reject any or all bids proposals and to waive any or all informalities, defects or irregularities in the bid proposals. The Owner reserves the right to make partial awards based on low bids for each item or may select to award on total low bid.

E. Once the Bid Proposal Forms have been submitted in the sealed envelope, there can be no alterations or amendments; external markings or separate supplementary information will, in no way, affect the sealed bid information. Any necessary adjustment to the proposal must be made prior to its submission and be part of the enclosed sealed bid.

F. All costs in connection with preparation and submission of bid proposals shall be borne by the Bidders.

G. A Bidder must submit promptly, upon request of the Owner or Architect, documentary evidence as to its financial, technical, and practical ability to carry out the Work.

H. A Bidder may withdraw its bid, either in person or by telegraphic or written request, at any time prior to the scheduled closing time for the receipt of bids. Negligence on the part of the Bidder in preparing its bid confers no right for the withdrawal of the bid after it has been opened.

10. BID SECURITY

A. Each bid must be accompanied by bid security of not less than five percent (5%) of the amount of the bid (including base bids and alternates), which may be a certified check, cashier's check, bank draft, or bid bond executed by a Surety Company authorized to do business in the State of New York and made payable to the Owner.

1. Bid Security must be submitted in a separate sealed envelope clearly identifying the company and project as well as the name and address of the Surety Company.

2. Each bond must be accompanied by a Power of Attorney, giving names of Attorneys-in-fact, and the extent of their bonding authority. All bonds must be countersigned by a resident Agent and with a Surety Company or Corporation meeting the following qualifications:

a. Surety must be licensed to do business in the State of New York.

b. Surety must be listed on the current U.S. Treasury Department Circular 570 entitled "Companies Holding Certificates of Authority" from the Secretary of the Treasury under the Act of Congress approved July 30, 1974 (6 U.S.C., Sec. 6-13), as Acceptable Sureties on Federal Bonds.

c. The Surety must be rated as equal to "A-" or better as to "Policy Holder Ratings" by "Best's Key Rating Guide."

d. The bonding limit for each Bidder cannot exceed the amount listed on the above referenced U.S. Treasury Department List for the Surety issuing the bond.

e. All Surety companies are subject to approval and may be rejected by the Owner without cause, in the same manner that bids may be rejected.

f. In the event any of the requirements outlined herein are not complied with, the Owner will have the right to reject the bid.

B. Bid security will be returned to all except the three lowest bidders, after formal analysis and evaluation of bids. No bid will be held beyond the 45-day period stipulated above.

C. Remaining bid security will be returned to bidders after Owner and the successful bidder have executed the Agreement and the Owner has received and approved performance and payment bonds.

D. If the Agreement has not been executed within the specified period of time after the bid opening, the bid security of any Bidder will be returned upon its request, provided it has not been notified of acceptance of its bid prior to the date of its request.

11. RECEIPT AND OPENING OF BIDS

A. Bids will be received up to the time and at the location indicated for the opening in the Invitation to Bidders, after which they will be visibly opened and read aloud, and the contents made known to all interested parties present. Each Bidder assumes the risk of any delay in the mail or in handling of mail by employees of the Owner or others.

12. MODIFICATION OR WITHDRAWAL OF PROPOSAL

A. Bid may not be modified after it has been deposited with Owner.

B. Bid may not be withdrawn after time set for receipt of bids.

C. Withdrawn bid may not be resubmitted.

D. Bid withdrawn after opening of bids will result in forfeiture of bid security.

13. DISQUALIFICATION OF PROPOSAL

A. The Bidder acknowledges the right of the Owner to reject any or all bids. The Owner reserves the right to reject any or all bids proposals and to waive any or all informalities, defects or irregularities in the bid proposals.

B. Bid may be disqualified and rejected under any or all of the following conditions:

1. If the Bidder fails to furnish the required bid security, or to submit data required by the Contract Documents, or if the Bid is in any way incomplete or irregular.
2. If the Bid has not been deposited at the designated location prior to the date and time for receipt as indicated in the Invitation to Bidders and these Instructions to Bidders.
3. If there is reason to believe that a Bidder has submitted more than one bid for the same project.
4. If there is reason to believe that collusion exists among Bidders.
5. A Bidder’s failure to establish to Owner's satisfaction:

a. Proof of ownership, control, or ability to procure necessary plant and equipment to commence the Work at the time prescribed and thereafter prosecute and complete at the rate, or within the time specified.

b. That Bidder is not already obligated by prior commitment to other work as to likely delay start, prosecution, or completion of the Work required by the Contract Documents.

c. That Bidder proposes to use reliable and responsible subcontractors or suppliers.

14. AWARD OF CONTRACT

A. The Contract will be awarded to the lowest qualified responsible Bidder, provided its bid is reasonable and it is in the best interest of the Owner to accept.

B. Owner may determine the lowest bid by adding one base bid to other base bid(s) and/or by adding to or deducting from those base bid(s), additive or deduct alternates, or substitutions, if any, which the Owner elects to accept after the opening of bids.

C. The Owner reserves the right to make partial awards based on low bids for each item or may select to award on total low bid.

15. EXECUTION OF AGREEMENT

A. The Agreement will be prepared by Owner.

B. The Agreement must be executed in triplicate within ten calendar days after notification of award at which time the successful contractor must deliver to the Owner all the necessary counterparts of the Agreement in the form set forth in the Bid and Contract Documents.

C. Performance and payment bonds must be submitted in the form of A.I.A. Document A312, covering performance as well as labor and material payment and extended for the period of time stipulated in Article 11 of the General and/or Supplementary General Conditions, "Bonds and Insurance". An executed bond must be issued by a surety company licensed in New York State.

D. At the time of execution of the Agreement and prior to the start of construction operations, the successful bidder must furnish documentation in the form and amounts required by the provisions of the Contract Documents that set forth the insurance requirements.

E. The successful bidder must submit Schedule of Values, as per A.I.A. Form G702A and provide breakdown of costs.

F. The successful Bidder, upon its failure or refusal to execute and deliver the required documentation, including but not limited to the Agreement and required bonds and proof of insurance within ten calendar days after the Bidder received notice of the acceptance of its bid, will forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with its bid.

16. TAXES AND PERMITS

A. Material purchased for use in the construction of buildings owned by the Owner are exempt from Federal excise and State sales taxes when the materials are incorporated into and become part of the completed improvement.

B. Materials, appliances, tools, equipment, or fuel costs which do not become part of the completed improvement will be subject to all applicable taxes.

C. The Owner is not subject to Federal Tax on transportation of property.

D. Local Building Permit will not be required.

E. Exemption certificates will be furnished by Owner for purchases of materials where material is to be incorporated into Work, upon receipt of a copy of the supplier's invoice showing items, net prices, and federal excise tax separately.

17. SUBCONTRACTOR'S LISTING

For multiple prime contracts, a listing of all subcontractors and major material suppliers (including address, telephone number, and name of individual to contact) whose services are proposed to be employed on the project must be submitted within 15 calendar days after signing of the Agreement.

18. TIME OF COMPLETION

A. Bidder shall agree to start work on _____, and complete within the number of calendar days specified in the Form of Proposal. Project must be completed by _____

19. CONDITIONS OF WORK OPERATIONS

A. Work under the Contract must be executed and pursued without interruption of or interference with the Owner's operations.

B. Work operations, access to buildings, and extent of movement of personnel within buildings must be coordinated with and limited by Owner.

C. Contractor must notify Owner in writing at least 24 hours in advance to advise of intended Work operations to be scheduled and receive approval prior to starting Work.

20. REQUIRED BID INFORMATION:

A. In addition to any other information/documentation required by these Instructions to Bidders or other Bid Documents, the following information/documentation must be submitted with each bid to be considered a complete and responsive bid. Failure to include any required document in the bid submission may lead to disqualification or rejection of a bid, at the sole discretion of the Owner.

1) Bid Proposal Form

2) Proposed Equivalent Form

3) Proposed Substitution Form

4) List of Subcontractors – Provide in a sealed envelope along with bid. (If a Single Prime Contract - See Paragraph 4(A) of these Instructions to Bidders).

5) Iran Divestment Act Forms (Certification of Compliance or Declaration of Inability), signed and notarized

6) Bid Bond/Security

7) Information/documentation required by Paragraph 2 of these Instructions for Bidders and the Statement/Proof of Bidder's Qualifications Form.

END OF SECTION

FINAL REPORT OF ENVIRONMENTAL SERVICES

Performed at:

BRIARCLIFF MIDDLE/HIGH SCHOOL
444 PLEASANTVILLE ROAD
BRIARCLIFF MANOR, NY 10510

Prepared for:

Briarcliff Manor Union Free School District
45 Ingham Road
Briarcliff Manor, NY 10510

Prepared by:

WSP USA Solutions, Inc.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
Tel. (914) 747-1120

Project No. 31403475.004
Final Submission Date: September 21, 2021

September 21, 2021

Mr. Anthony Bauso
Assistant Director of Facilities Operations & Maintenance
Briarcliff Manor Union Free School District
45 Ingham Road
Briarcliff Manor, NY 10510

Subject: **Final Report of Environmental Services**
Briarcliff Middle/High School
444 Pleasantville Road
Briarcliff Manor, NY 10510

Dear Mr. Bauso:

WSP USA Solutions, Inc. has completed a material inspection at the Briarcliff Middle/High School located at 444 Pleasantville Road, Briarcliff Manor, NY 10510. The inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) as part of the BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

WSP USA SOLUTIONS, INC.



Craig Napolitano, CHMM
Vice President, Emergency Management & IH Services

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1.0 EXECUTIVE SUMMARY

WSP USA Solutions, Inc. has performed a material inspection for the presence or absence of Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) at the Briarcliff Middle/High School located at 444 Pleasantville Road, Briarcliff Manor, NY 10510. The intent of this inspection was to screen for ACM, LBP and PCBs that may be impacted during the BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School.

Stephen Gruber, Nicholas Colonni and Nicholas Casale of WSP performed this inspection on August 10, 13, 18 and 26, 2021. Mr. Gruber is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-42557) and is licensed New York State EPA as a Lead Inspector (Cert# LBP-I-I219874-1). Mr. Colonni is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 14-18092) and is licensed New York State EPA as a Lead Inspector (Cert# LBP-I-I208881-1). Mr. Casale is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-25789) and is licensed New York State EPA as a Lead Inspector (LBP-I-I207478-1)

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM, LBP and PCB materials may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School:

A. ASBESTOS-CONTAINING MATERIAL

Analytical results of the bulk samples collected on 08/10/21, 08/13/21, 08/18/21 and 08/26/21 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Tar (Black) at base of AHU Kerb**
- **Joint Compound (Tan) associated with Gypsum Board**
- **Cementitious Material (White) at Roof Drain Bowl**

The following materials **contain asbestos as per 2019 AHERA Report**

- **12”x12” White VAT w/ Gray Marble and Mastic**
- **12”x12” White VAT w/ Gray Specks and Mastic**
- **Mastic to 12”x12” Light Blue w/ Dark Blue VAT**
- **Mastic to 12”x12” Light Salmon w/ Dark Salmon VAT**
- **Sheetrock (Joint Compound Only)**
- **Mudded Joint Packing**
- **Transite Table Top Beneath Hood (Not Affected by SOW)**
- **Pipe Elbows**
- **Ceiling Plaster, White Coat (Girls Locker Room Shower) (Not Affected by SOW)**

Analytical results of the bulk samples collected on 08/10/21, 08/13/21, 08/18/21 and 08/26/21 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Brick Mortar, Grey
- Brick Mortar, Pink
- Stone Mortar, Grey
- Tar (Black) on Foil Paper on Air Handling Units
- Caulking (Grey) on Skylight Panel
- Caulking (Beige) on AHU
- Pitch Pocket Sealant (Grey)
- Pitch Pocket Sealant (White)
- Vent Pipe Sealant (Grey)
- Caulking (Black) at Metal Façade Panels
- Caulking (White) at Metal Cap Flashing
- Expansion Joint Caulking (Grey) on Wall
- Gypsum (White) Roof Deck Material
- Fiberboard (Brown) Under EPDM Roofing
- Perlite (Tan) Insulation Under EPDM Roofing & Epoxy Roofing
- Fibrous insulation (Brown) Under EPDM Roofing
- Felt Paper (Black) Under EPDM Roofing
- Sealant (white) on Square Exhausts
- Caulking (Black) at Square Skylight Panels
- Caulking (Black) at Metal Cap / Stone Wall
- Caulking (White) on Foil Paper AHU Seams
- Spray-On Fire Proofing on Beams
- Yellow Adhesive associated with Carpet Flooring
- 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with Carpet Flooring
- Gypsum Board (White)
- Joint Compound associated with Gypsum (White)
- 2’ x 4’ Suspended Ceiling Tiles (White)
- Gypsum Board (White)
- Gypsum Board (Grey)
- Joint Compound associated with Gypsum Board (Yellow)
- Mortar associated with Cinder Block Walls
- Sidewalk Brick Expansion Joint Caulking (Grey)
- Mortar associated with Terrazzo Floor
- White Expansion Joint Caulking
- Mortar (Grey)associated with Block Wall
- Black Mastic associated with 12” x 12” VFT
- 12” x 12” Speckled Brown VFT
- Door Frame/Expansion Joint Caulking (Grey)
- Felt Paper (White) associated with Foam Insulation

The following materials **did not contain Asbestos as per 2019 AHERA Report:**

- Ceiling Plaster, Brown Coat (Girls Locker Room Shower)

- Mastic to 12”x12” Floor Tile, Black (Hall outside Loading Dock)
- 12”x12” Floor Tiles, White (Hall outside Loading Dock)
- Mastic to 4” Cove Base, Yellow (Hall outside Loading Dock)
- Drywall, White (Hall outside Loading Dock)
- Drywall, Gray (Custodians Office & Restroom)
- Mastic assoc. with Cork Board, Brown (Custodians Office)
- Cork Board, Brown (Custodians Office)

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **Purple Paint to Wood Wall (Rooms 100, 103 & 104)**
- **Red Paint to Fiberglass Pipes (1st Floor, Hallways & Various Rooms)**

Lead was **not detected** in the following tested combinations via XRF readings:

- Black Paint on Metal Pipe (Roof G)
- Red Paint on Metal Door (High School, Cafeteria)
- Red Paint on Metal Door Frame (High School, Cafeteria)
- Yellow Paint on Gypsum Wall (High School, Cafeteria)
- Yellow Paint on Brick Wall (High School, Cafeteria)
- Red Paint on Metal Window Frame (High School, Cafeteria)
- White Paint on Cinder Block Wall (Boiler Room)
- Blue Paint on Metal Cyclonetic to Boiler Component (Boiler Room)
- Gray Paint on Concrete Boiler Footing (Boiler Room)
- Red Paint to Metal Door Frame (Room 134)
- Red Paint to Metal Door (Room 134)
- Black Paint to Vinyl Cove Base (Lockers by Room 133)
- Blue Paint to Metal Lockers (Lockers by Room 133)
- Blue Paint to Metal Bathroom Partition (G. Toil by Room 132)
- White Paint to Gypsum Ceiling (G. Toil by Room 133)
- Light Blue Paint to Metal Radiator (G. Toil by Room 133)
- Yellow Paint to Metal Vertical I Beam (Room 131)
- Black Paint to Wood Door Frame (Room 131)
- Yellow Paint to Gypsum Wall (Room 131)
- Black Paint to Metal Seats (Auditorium)
- Black Paint to Wood Bench (Auditorium)
- White Paint to Metal Railing (1st Floor, Stairs near Room 110)
- White Paint to Gypsum Ceiling (1st Floor, Stairs near Room 110)
- Gold Paint to Metal Conduit (1st Floor, Stairs near Room 110)
- Red Paint to Metal Sill (1st Floor, Stairs near Room 110)
- Yellow Paint to Gypsum Wall (Hall near Room 110)

- White Paint to Gypsum Ceiling (Chorus Room)
- Red Paint to Gypsum Wall (Chorus Room)
- Red Paint to Wood Handrail (Chorus Room)
- Red Paint to Metal Beam (Maresca Center)
- White Paint to Gypsum Wall (Maresca Center)
- Blue Paint to Gypsum Wall (Room 110)
- Red Paint to Wood Base Molding (Corridor by Room 110)
- Purple Paint to Metal Door Frame (Room 100)
- Purple Paint to Metal Vertical Beam (Room 100)
- White Paint to Metal Door Frame (Room 100)
- Purple Paint to Gypsum Wall (Room 102)
- Blue Paint to Cinder Block Wall (Room 121)
- Teal Paint to Gypsum Wall (Room 96)
- Blue Paint to Gypsum Wall (MS Cafeteria)
- White Paint to Metal Radiator (Room 90)
- Yellow Paint to Gypsum Wall (Room 210)
- Gray Paint to Gypsum Wall (2nd Floor, Hallway by Elec.)
- Black Paint to Wood Wall (MS Gym)
- Yellow Paint to Cinder Block Wall (Hall by HS Gym)
- White Paint to Metal Ceiling (Lockers by Room 113)
- Red Paint to Metal Ductwork (Lockers by Room 113)
- Purple Paint to Metal Beams (Lockers by Room 113)
- Black Paint to Wood Skylight (Lockers by Room 113)
- White Paint to Metal ceiling (Lockers by Room 113)
- Tan Paint to Metal Ductwork (MS Cafeteria)
- Tan Paint to Metal Ceiling (MS Cafeteria)

C. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Window/Louver Caulking (Pink) (Exterior)
- Caulking (Gray) associated with Skylight (Roof G)
- Caulking (Beige) associated with AHU (Roof A)
- Caulking (Black) associated with metal façade panels (Exterior)
- Caulking (White) on metal cap flashing (Roof B & G)
- Expansion joint caulking (Gray) at Brick Wall (Roof K & Exterior adj. Art Rm 134)
- Caulking (White) associated with ductwork (Roof G)

- Caulking (Black) associated with square skylight panels (Roof G)
- Caulking (Black) associated with metal cap flashing (Roof B)
- Sidewalk/Brick Expansion Joint Caulking (Gray) (Exterior)
- White Expansion Joint Caulking (Fuel/Oil Tank Enclosure)
- Expansion Joint Caulking (Brown) (Exterior)

2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS

A. ASBESTOS-CONTAINING MATERIAL

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater then 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25th, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25th 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore,

if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method “Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples” must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each “negative” (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a "non-friable" material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is Atlas Environmental Lab Corp located at 255 West 36th Street | New York, NY 10018. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 500092-0)
- New York State Environmental Laboratory Approval Program (Lab No. 11999)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 208306)

B. LEAD-BASED PAINT

Painted surfaces within the space equivalents in the scope of work were identified and grouped together by component type, substrate and visible color. In similar fashion, the inspection continued in each space equivalent with the identification of unique combinations of component, substrate and visible color. A random representative area of each unique combination was sampled and tested. For each of these designated components, an area on the component was chosen which represents the paint on that building component. During the inspection, components that are accessible surfaces, friction surfaces, impact surfaces, or have deteriorated paint was identified.

The readings of paint surfaces were taken using Heuresis Pb200i XRF Lead Paint Spectrum Analyzer. The Heuresis method of measurement is based on the spectrometric analysis of lead K-shell X-ray fluorescence within a controlled depth of interrogation. The Heuresis Analyzer uses a Co-57 radioactive source and an advanced, solid-state, room temperature, radiation detector to generate and detect the x-ray fluorescence spectrum of a painted surface. The spectrum is then analyzed by a microprocessor to eliminate the effects of substrate and other factors such as scattering to allow an accurate determination of the amount of lead on a surface. The Heuresis automatically analyzes spectrometric data in real time and differentiates the lead signal from the spectrum. The x-ray fluorescence properties are determined through calibration process and are used for automatic substrate correction and calculation of the lead content of a painted surface.

For quality control, the XRF instrument was calibrated using a U.S. Department of Commerce National Institute of Standards and Technology (NIST) Level III 1.0 mg/cm2 lead based paint film. For each calibration, three (3) XRF readings were taken on the paint film. The average of these three (3) readings was then subtracted from the known lead content in the paint film. The difference was compared with an Environmental Protection Agency (EPA)-approved tolerance range. Such calibration procedures were conducted at the start and at the end of the workday.

C. POLYCHLORINATED BIPHENYLS (PCBs)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.

The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is aroclor.

Polychlorinated biphenyls (PCBs) are regulated pursuant to the United States Environmental Protection Agency Code of Federal Regulations (40 CFR Part 761) and the Toxic Substances Control Act (TSCA – 15 U.S.C. 2605). These regulations require certain testing and reporting requirements to determine management, recycling and disposal options for PCBs.

3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT

The areas inspected for ACM materials that may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School. Locations surveyed include:

- Roofs
- Exterior, Façade
- Interior, 1st & 2nd Floor, Various Locations

A. ASBESTOS-CONTAINING MATERIAL

Materials examined during the WSP this inspection included:

- Brick Mortar, Grey
- Brick Mortar, Pink
- Stone Mortar, Grey
- Tar (Black) on Foil Paper on Air Handling Units
- Caulking (Grey) on Skylight Panel
- Caulking (Beige) on AHU
- Pitch Pocket Sealant (Grey)
- Pitch Pocket Sealant (White)
- Vent Pipe Sealant (Grey)
- Caulking (Black) at Metal Façade Panels
- Caulking (White) at Metal Cap Flashing
- Expansion Joint Caulking (Grey) on Wall
- Gypsum (White) Roof Deck Material
- Fiberboard (Brown) Under EPDM Roofing
- Perlite (Tan) Insulation Under EPDM Roofing & Epoxy Roofing
- Fibrous insulation (Brown) Under EPDM Roofing
- Felt Paper (Black) Under EPDM Roofing
- Sealant (white) on Square Exhausts
- Tar (Black) at base of AHU Kerb
- Caulking (Black) at Square Skylight Panels
- Caulking (Black) at Metal Cap / Stone Wall
- Caulking (White) on Foil Paper AHU Seams
- Spray-On Fire Proofing on Beams
- Yellow Adhesive associated with Carpet Flooring
- 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with Carpet Flooring
- Gypsum Board (White)
- Joint Compound associated with Gypsum (White)
- 2’ x 4’ Suspended Ceiling Tiles (White)

- Gypsum Board (White)
- Joint Compound (Tan) associated with Gypsum Board
- Gypsum Board (Grey)
- Joint Compound associated with Gypsum Board (Yellow)
- Cementitious Material (White) at Roof Drain Bowl
- Mortar associated with Cinder Block Walls
- Sidewalk Brick Expansion Joint Caulking (Grey)
- Mortar associated with Terrazzo Floor
- White Expansion Joint Caulking
- Mortar (Grey)associated with Block Wall
- Black Mastic associated with 12" x 12" VFT
- 12" x 12" Speckled Brown VFT
- Door Frame/Expansion Joint Caulking (Grey)
- Felt Paper (White) associated with Foam Insulation
- Pipe Elbows

Analytical results of the bulk samples collected on 08/10/21, 08/13/21, 08/18/21 and 08/26/21 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Tar (Black) at base of AHU Kerb**
- **Joint Compound (Tan) associated with Gypsum Board**
- **Cementitious Material (White) at Roof Drain Bowl**

The following materials **contain asbestos as per 2019 AHERA Report**

- **12"x12" White VAT w/ Gray Marble and Mastic**
- **12"x12" White VAT w/ Gray Specks and Mastic**
- **Mastic to 12"x12" Light Blue w/ Dark Blue VAT**
- **Mastic to 12"x12" Light Salmon w/ Dark Salmon VAT**
- **Sheetrock (Joint Compound Only)**
- **Mudded Joint Packing (Not Affected by SOW)**
- **Transite Table Top Beneath Hood (Not Affected by SOW)**
- **Pipe Elbows**
- **Ceiling Plaster, White Coat (Girls Locker Room Shower) (Not Affected by SOW)**

Analytical results of the bulk samples collected on 08/10/21, 08/13/21, 08/18/21 and 08/26/21 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Brick Mortar, Grey
- Brick Mortar, Pink
- Stone Mortar, Grey
- Tar (Black) on Foil Paper on Air Handling Units
- Caulking (Grey) on Skylight Panel
- Caulking (Beige) on AHU
- Pitch Pocket Sealant (Grey)

- Pitch Pocket Sealant (White)
- Vent Pipe Sealant (Grey)
- Caulking (Black) at Metal Façade Panels
- Caulking (White) at Metal Cap Flashing
- Expansion Joint Caulking (Grey) on Wall
- Gypsum (White) Roof Deck Material
- Fiberboard (Brown) Under EPDM Roofing
- Perlite (Tan) Insulation Under EPDM Roofing & Epoxy Roofing
- Fibrous insulation (Brown) Under EPDM Roofing
- Felt Paper (Black) Under EPDM Roofing
- Sealant (white) on Square Exhausts
- Caulking (Black) at Square Skylight Panels
- Caulking (Black) at Metal Cap / Stone Wall
- Caulking (White) on Foil Paper AHU Seams
- Spray-On Fire Proofing on Beams
- Yellow Adhesive associated with Carpet Flooring
- 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with 12”x12” Black Vinyl Floor Tiles
- Yellow Adhesive associated with Carpet Flooring
- Gypsum Board (White)
- Joint Compound associated with Gypsum (White)
- 2’ x 4’ Suspended Ceiling Tiles (White)
- Gypsum Board (White)
- Gypsum Board (Grey)
- Joint Compound associated with Gypsum Board (Yellow)
- Mortar associated with Cinder Block Walls
- Sidewalk Brick Expansion Joint Caulking (Grey)
- Mortar associated with Terrazzo Floor
- White Expansion Joint Caulking
- Mortar (Grey)associated with Block Wall
- Black Mastic associated with 12” x 12” VFT
- 12” x 12” Speckled Brown VFT
- Door Frame/Expansion Joint Caulking (Grey)
- Felt Paper (White) associated with Foam Insulation

The following materials **did not contain Asbestos as per 2019 AHERA Report:**

- Ceiling Plaster, Brown Coat (Girls Locker Room Shower)
- Mastic to 12”x12” Floor Tile, Black (Hall outside Loading Dock)
- 12”x12” Floor Tiles, White (Hall outside Loading Dock)
- Mastic to 4” Cove Base, Yellow (Hall outside Loading Dock)
- Drywall, White (Hall outside Loading Dock)
- Drywall, Gray (Custodians Office & Restroom)
- Mastic assoc. with Cork Board, Brown (Custodians Office)
- Cork Board, Brown (Custodians Office)

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **Purple Paint to Wood Wall (Rooms 100, 103 & 104)**
- **Red Paint to Fiberglass Pipes (1st Floor, Hallways & Various Rooms)**

Lead was **not detected** in the following tested combinations via XRF readings:

- Black Paint on Metal Pipe (Roof G)
- Red Paint on Metal Door (High School, Cafeteria)
- Red Paint on Metal Door Frame (High School, Cafeteria)
- Yellow Paint on Gypsum Wall (High School, Cafeteria)
- Yellow Paint on Brick Wall (High School, Cafeteria)
- Red Paint on Metal Window Frame (High School, Cafeteria)
- White Paint on Cinder Block Wall (Boiler Room)
- Blue Paint on Metal Cyclonetic to Boiler Component (Boiler Room)
- Gray Paint on Concrete Boiler Footing (Boiler Room)
- Red Paint to Metal Door Frame (Room 134)
- Red Paint to Metal Door (Room 134)
- Black Paint to Vinyl Cove Base (Lockers by Room 133)
- Blue Paint to Metal Lockers (Lockers by Room 133)
- Blue Paint to Metal Bathroom Partition (G. Toil by Room 132)
- White Paint to Gypsum Ceiling (G. Toil by Room 133)
- Light Blue Paint to Metal Radiator (G. Toil by Room 133)
- Yellow Paint to Metal Vertical I Beam (Room 131)
- Black Paint to Wood Door Frame (Room 131)
- Yellow Paint to Gypsum Wall (Room 131)
- Black Paint to Metal Seats (Auditorium)
- Black Paint to Wood Bench (Auditorium)
- White Paint to Metal Railing (1st Floor, Stairs near Room 110)
- White Paint to Gypsum Ceiling (1st Floor, Stairs near Room 110)
- Gold Paint to Metal Conduit (1st Floor, Stairs near Room 110)
- Red Paint to Metal Sill (1st Floor, Stairs near Room 110)
- Yellow Paint to Gypsum Wall (Hall near Room 110)
- White Paint to Gypsum Ceiling (Chorus Room)
- Red Paint to Gypsum Wall (Chorus Room)
- Red Paint to Wood Handrail (Chorus Room)
- Red Paint to Metal Beam (Maresca Center)
- White Paint to Gypsum Wall (Maresca Center)
- Blue Paint to Gypsum Wall (Room 110)
- Red Paint to Wood Base Molding (Corridor by Room 110)

- Purple Paint to Metal Door Frame (Room 100)
- Purple Paint to Metal Vertical Beam (Room 100)
- White Paint to Metal Door Frame (Room 100)
- Purple Paint to Gypsum Wall (Room 102)
- Blue Paint to Cinder Block Wall (Room 121)
- Teal Paint to Gypsum Wall (Room 96)
- Blue Paint to Gypsum Wall (MS Cafeteria)
- White Paint to Metal Radiator (Room 90)
- Yellow Paint to Gypsum Wall (Room 210)
- Gray Paint to Gypsum Wall (2nd Floor, Hallway by Elec.)
- Black Paint to Wood Wall (MS Gym)
- Yellow Paint to Cinder Block Wall (Hall by HS Gym)
- White Paint to Metal Ceiling (Lockers by Room 113)
- Red Paint to Metal Ductwork (Lockers by Room 113)
- Purple Paint to Metal Beams (Lockers by Room 113)
- Black Paint to Wood Skylight (Lockers by Room 113)
- White Paint to Metal ceiling (Lockers by Room 113)
- Tan Paint to Metal Ductwork (MS Cafeteria)
- Tan Paint to Metal Ceiling (MS Cafeteria)

C. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Window/Louver Caulking (Pink) (Exterior)
- Caulking (Gray) associated with Skylight (Roof G)
- Caulking (Beige) associated with AHU (Roof A)
- Caulking (Black) associated with metal façade panels (Exterior)
- Caulking (White) on metal cap flashing (Roof B & G)
- Expansion joint caulking (Gray) at Brick Wall (Roof K & Exterior adj. Art Rm 134)
- Caulking (White) associated with ductwork (Roof G)
- Caulking (Black) associated with square skylight panels (Roof G)
- Caulking (Black) associated with metal cap flashing (Roof B)
- Sidewalk/Brick Expansion Joint Caulking (Gray) (Exterior)
- White Expansion Joint Caulking (Fuel/Oil Tank Enclosure)
- Expansion Joint Caulking (Brown) (Exterior)

4.0 INSPECTION RESULTS

A. ASBESTOS-CONTAINING MATERIAL

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed Roof Replacement project at the Briarcliff Middle/High School. The following suspect materials were sampled and analyzed for asbestos content by WSP:

4.1 Table 4.1 – Suspect Materials Inspected

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
WSP Sampled on 08/10/2021, 08/13/2021, 08/18/2021 & 08/26/21			
A	Exterior	Brick Mortar, Grey	NAD
B	Exterior	Brick Mortar, Pink	NAD
C	Exterior	Stone Mortar, Grey	NAD
D	Roof B & G	Tar (Black) on Foil Paper on Air Handling Units	NAD
E	Roof G	Caulking (Grey) on Skylight Panel	NAD
F	Roof A & B	Caulking (Beige) on Skylight Panel & AHUs	NAD
G	Roof F, G & H	Pitch Pocket Sealant (Grey)	NAD
H	Roof E & F	Pitch Pocket Sealant (White)	NAD
I	Roof H & J	Vent Pipe Sealant (Grey)	NAD
J	Exterior	Caulking (Black) at Metal Façade Panels	NAD
K	Roof G	Caulking (White) at Metal Cap Flashing	NAD
L	Roof K	Expansion Joint Caulking (Grey) on Wall	NAD
M	Roof A	Gypsum (White) Roof Deck Material	NAD
N	Roof A, B, F, H & K	Fiberboard (Brown) Under EPDM Roofing	NAD
O	Roof F, G & J	Perlite (Tan) Insulation Under EPDM Roofing	NAD
P	Roof K & H	Fibrous insulation (Brown) Under EPDM Roofing	NAD
Q	Roof G	Felt Paper (Black) Under EPDM Roofing	NAD
R	Roof C	Sealant (white) on Square Exhausts	NAD
S	**Roof A, B, E & G**	**Tar (Black) at Base of AHU (Air Handling Unit) Curbs under EPDM Roofing**	**7.4% Chrysotile**

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
T	Roof G	Caulking (Black) at Square Skylight Panels	NAD
U	Roof B	Caulking (Black) at Metal Cap / Stone Wall	NAD
V	Roof B & G	Caulking (White) on Foil Paper AHU Seams	NAD
W	Air Handling Room (MS)	Spray-On Fire Proofing on Beams	NAD
X	Music Room 90	Yellow Adhesive associated with Carpet Flooring	NAD
Y	Auditorium (HS)	12”x12” Black Vinyl Floor Tiles	NAD
Z	Auditorium (HS)	Yellow Adhesive associated with 12”x12” Black Vinyl Floor Tiles	NAD
AA	Auditorium (HS)	Yellow Adhesive associated with Carpet Flooring	NAD
AB	Library (MS) & Art Room 121 (HS)	Gypsum Board (White)	NAD
AC	Library (MS) & Art Room 121 (HS)	Joint Compound associated with Gypsum (White)	NAD
AD	Throughout	2’ x 4’ Suspended Ceiling Tiles (White)	NAD
AE	**Chorus Room 108 & Maresca Center**	**Gypsum Board (White)**	**Asbestos Contaminated**
AF	**Chorus Room 108 & Maresca Center**	**Joint Compound (tan) associated with Gypsum Board (White)**	**1.1% Chrysotile**
AE	**1st Floor & 2nd Floor, Various Rooms**	**Gypsum Board (White)**	**Asbestos Contaminated**
AF		**Joint Compound (tan) associated with Gypsum Board (White)**	**1.1% Chrysotile**
AG	Band Room 131	Gypsum Board (Grey)	NAD
AH	Band Room 131	Joint Compound associated with Gypsum Board (Yellow)	Trace (<1%) Chrysotile
AI	**A-Wing & C-Wing Ceiling Above Boys & Girls Toilets**	**Cementitious Material (White) at Roof Drain Bowls**	**4.1% Chrysotile**
AJ	Interior – Throughout	Mortar associated with Cinder Block Walls	NAD
AK	Exterior – Throughout	Sidewalk Brick Expansion Joint Caulking (Grey)	NAD
AL	Stairs	Mortar associated with Terrazzo Floor	NAD
AM	Fuel Tank/Electrical Enclosure - Outside Wall	White Expansion Joint Caulking	NAD
AN	Interior – Throughout	Mortar (Grey) associated with Block Wall	NAD

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
AO	1st Floor, Various Rooms	Black Mastic associated with 12" x 12" VFT	NAD
AP	1st Floor, Various Rooms	12" x 12" Speckled Brown VFT	NAD
AQ	Exterior	Door Frame/Expansion Joint Caulking (Grey)	NAD
AR	Roof G	Felt Paper (White) associated with Foam Insulation	NAD
-	Boiler Room	Metal Ceiling	Non-Suspect
-		Fiberglass Insulated Pipes & Ducts	Non-Suspect
-	Exterior at Stage Exit	Metal handrail (No Caulking)	Non-Suspect
-		Concrete Ramp	Non-Suspect
-	M.S & H.S Front Entry Vestibules	Metal doors with foam window glazing	Non-Suspect
-	M.S. Cafeteria	Metal Ductwork (No Insulation)	Non-Suspect
-		Metal Ceiling	Non-Suspect
As Per 2019 AHERA Report			
01 & 02	**1st Floor, Various Rooms – HS Stairs (4), Maresca Center, A-Wing Hallway (Locker Area) C-Wing Hallway (Locker Area)**	**12"x12" Floor Tile (White w/ gray marble/specks) and Associated Mastic**	**ACM**
03	**Interior, Various Rooms**	**Mastic to 12"x12" Floor Tile (Light Blue w/Dark Blue VAT)[1]**	**ACM[1]**
04	**Interior, Various Rooms**	**Mastic to 12"x12" Floor Tile (Light Salmon w/Dark Salmon VAT)[1]**	**ACM[1]**
08	**A-Wing & C-Wing Ceiling Above Boys & Girls Toilets**	**Pipe Elbows**	**ACM**
08	**1st Floor, Interior, Various Rooms**	**Pipe Elbows[1]**	**ACM[1]**

Bold = Positive for ACM NAD = No Asbestos Detected NA/PS = Not analyzed/ positive sample

4.2 CONDITION AND FRIABLITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

Table 4.2 – Condition and Friability Assessment

Location	Material	Quantity	Friability	Condition	Notes
Roofs A, B, E & G	**Tar (Black) at base of AHU Curbs (Under EPDM Roofing)**	**900 SF**	**Non-Friable**	**Good**	
Chorus Room & Maresca Center	**Joint Compound (tan) associated with Gypsum Board**	***See Notes**	**Friable**	**Good**	*Quantity to be impacted TBD by SOW
1st & 2nd Floor, Various Rooms	***Joint Compound (tan) associated with Gypsum Board**	***See Notes**	**Friable**	**Good**	
HS Stairs (4)	**12"x12" Floor Tile (White w/ gray marble/specks) and Associated Mastic**	**920 SF**	**Non-Friable**	**Good**	1st & 2nd Floor, 230SF per stairway
Maresca Center	**12"x12" Floor Tile (White w/ gray marble/specks) and Associated Mastic**	**1,800 SF**	**Non-Friable**	**Good**	
A-Wing Hallway (Locker Area)	**12"x12" Floor Tile (White w/ gray marble/specks) and Associated Mastic**	**6,200 SF**	**Non-Friable**	**Good**	
C-Wing Hallway (Locker Area)	**12"x12" Floor Tile (White w/ gray marble/specks) and Associated Mastic**	**5,950 SF**	**Non-Friable**	**Good**	
A-Wing & C-Wing Ceiling Above Boys & Girls Toilets	**Cementitious Material (White) at Roof Drain Bowl**	**20 SF**	**Friable**	**Good**	5 SF Per Location (4 drains)
	Pipe Elbows	**20 LF**	**Friable**	**Good**	At radiator Pipes & (4 drains)

Condition Definitions:
Good: None/Minimal apparent damage to ACM
Fair: Up to 10% localized damage or up to 25% of the entire ACM is damaged
Poor: Over 10% localized damage or over 25% of the entire ACM is damaged

4.3 SAMPLE ANALYSIS TABLE

Laboratory analysis results, in tabular form, are included in Appendix A.

B. LEAD-BASED PAINT

The lead Inspection involved a thorough visual examination of all accessible areas impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School. The following suspect surfaces were tested for lead content:

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
WSP Surveyed on 8/10/2021						
1	Calibration Check @ 1.0	---	---	---	---	**1.0**
2	Calibration Check @ 1.0	---	---	---	---	**1.0**
3	Calibration Check @ 1.0	---	---	---	---	**1.0**
4	Calibration Check @ 0.0	---	---	---	---	0.0
5	Calibration Check @ 0.0	---	---	---	---	0.1
6	Calibration Check @ 0.0	---	---	---	---	0.1
7	Calibration Check @ 1.0	---	---	---	---	0.9
8	Calibration Check @ 1.0	---	---	---	---	**1.1**
9	Calibration Check @ 1.0	---	---	---	---	**1.0**
10	Calibration Check @ 0.0	---	---	---	---	0.0
11	Calibration Check @ 0.0	---	---	---	---	0.0
12	Calibration Check @ 0.0	---	---	---	---	0.0
13	Roof G	Pipe	Black	Metal	Good	0.1
14	Calibration Check @ 1.0	---	---	---	---	**1.1**
15	Calibration Check @ 1.0	---	---	---	---	**1.1**
16	Calibration Check @ 1.0	---	---	---	---	**1.1**
17	Calibration Check @ 0.0	---	---	---	---	0.0
18	Calibration Check @ 0.0	---	---	---	---	0.0
19	Calibration Check @ 0.0	---	---	---	---	-0.1

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
WSP Surveyed on 8/26/2021						
1	Calibration Check @ 1.0	---	---	---	---	**1.1**
2	Calibration Check @ 1.0	---	---	---	---	**1.1**
3	Calibration Check @ 1.0	---	---	---	---	**1.1**
4	Calibration Check @ 0.0	---	---	---	---	0.0
5	Calibration Check @ 0.0	---	---	---	---	0.0
6	Calibration Check @ 0.0	---	---	---	---	-0.1
7	High School Cafeteria	Door	Red	Metal	Good	0
8	High School Cafeteria	Door Frame	Red	Metal	Good	0.2
9	High School Cafeteria	Wall	Yellow	Gypsum	Fair	0.1
10	High School Cafeteria	Wall	Yellow	Brick	Fair	0.2
11	High School Cafeteria	Window Frame	Red	Metal	Good	0.2
12	Boiler Room	Wall	White	Cinderblock	Good	0.1
13	Boiler Room	Cyclometric to Boiler	Blue	Metal	Good	0.1
14	Boiler Room	Boiler Footing	Gray	Concrete	Good	0.1
15	Room 134	Door Frame	Red	Metal	Good	0.1
16	Room 134	Door	Red	Metal	Good	0.0
17	Lockers by 133	Cove Base	Black	Vinyl	Fair	0.2
18	Lockers by 133	Lockers	Blue	Metal	Fair	0.1
19	Girls Toilet by 132	Bathroom Partition	Blue	Metal	Fair	0.0
20	Girls Toilet by 132	Ceiling	White	Gypsum	Good	0.1
21	Girls Toilet by 132	Radiator	Light Blue	Metal	Good	0.1
22	Room 131	Vertical I Beam	Yellow	Metal	Good	0.5
23	Room 131	Door Frame	Black	Vinyl	Fair	0.3
24	Room 131	Wall	Yellow	Gypsum	Good	0.2
25	Auditorium	Seats	Black	Metal	Good	0.2

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
26	Auditorium	Bench	Black	Wood	Good	0.0
27	Stairs near 110	Railing	White	Metal	Good	0.4
28	Stairs near 110	Ceiling	White	Gypsum	Fair	0.1
29	Stairs near 110	Conduit	Gold	Metal	Good	0.7
30	Stairs near 110	Sill	Red	Metal	Good	0.0
31	Hall near 110	Wall	Yellow	Gypsum	Good	0.1
32	Chorus Room	Ceiling	White	Gypsum	Good	0.2
33	Chorus Room	Wall	Red	Gypsum	Good	0.1
34	Chorus Room	Handrail	Red	Wood	Good	0.0
35	Maresca Center	Beam	Red	Metal	Good	0.5
36	Maresca Center	Wall	White	Gypsum	Fair	0.1
37	Room 110	Wall	Blue	Gypsum	Good	0.2
38	Corridor by 110	Base Molding	Red	Wood	Good	0.2
39	Room 100	Door Frame	Purple	Metal	Good	0
40	**Room 100**	**Wall**	**Purple**	**Wood**	**Good**	**1.2**
41	Room 100	Vertical Beam	Purple	Metal	Good	0.5
42	Room 100	Door Frame	White	Metal	Fair	0.1
43	Room 102	Wall	Purple	Gypsum	Good	0.1
44	Room 121	Wall	Blue	Cinderblock	Good	-0.1
45	Room 96	Wall	Teal	Gypsum	Good	0.2
46	MS Cafeteria	Wall	Blue	Gypsum	Good	0.1
47	Room 90	Radiator	White	Metal	Good	0.2
48	Room 210	Wall	Yellow	Gypsum	Fair	0.1
49	Hallway by 2nd FL MS Electrical Room	Wall	Gray	Gypsum	Good	0.0
50	MS Gym	Wall	Black	Wood	Good	-0.3
51	Hall by MS Gym	Wall	Yellow	Cinderblock	Good	-0.1
52	Hall by HS Gym	Wall	Yellow	Wood	Good	0.1
53	Lockers by 113	Ceiling	White	Metal	Good	0.1
54	Lockers by 113	Ductwork	Red	Metal	Good	0.6
55	**Lockers by 113**	**Pipe**	**Red**	**Fiberglass**	**Good**	**1.0**
56	Lockers by 113	Beam	Purple	Metal	Good	0.4
57	Lockers by 113	Skylight	Black	Wood	Good	0

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
58	Lockers by 113	Ceiling	White	Metal	Good	0.1
59	MS Cafeteria	Ductwork	Tan	Metal	Good	0
60	MS Cafeteria	Ceiling	Tan	Metal	Fair	0
61	Calibration Check @ 1.0	---	---	---	---	**1.1**
62	Calibration Check @ 1.0	---	---	---	---	**1.1**
63	Calibration Check @ 1.0	---	---	---	---	**1.1**
64	Calibration Check @ 0.0	---	---	---	---	0
65	Calibration Check @ 0.0	---	---	---	---	0.1
66	Calibration Check @ 0.0	---	---	---	---	0

C. PCB-CONTAINING MATERIAL

The PCB Inspection involved a thorough visual examination of all areas that may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School. The following suspect materials were tested for PCB content:

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	PCB CONTENT (PPM)
A	Exterior	Window/Louver Caulking (Pink)	ND
B	Roof G	Caulking (Gray) assoc. w/ skylight	ND
C	Roof A & B	Caulking (Beige) assoc. w/ AHU	ND
D	Exterior	Caulking (Black) assoc. w/ Metal façade panels	ND
E	Roof B & G	Caulking (White) on Metal Cap Flashing	ND
F	Exterior	Expansion Joint Caulking (Gray) at Brick Wall	ND
G	Exterior	Sidewalk/Brick Expansion Joint Caulking (Gray)	ND
H	Roof G	Caulking (White) assoc. w/ ductwork	ND
I	Roof G	Caulking (Black) assoc. w/ square skylight panels	ND
J	Roof B	Caulking (Black) assoc. w/ metal cap flashing	ND

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	PCB CONTENT (PPM)
K	Fuel/Oil Enclosure – Outside Wall	White Expansion Joint Caulking	ND
L	Exterior	Expansion Join Caulking (Brown)	ND

Bold = Positive for PCB ND = No PCB Detected

5.0 AREAS NOT ACCESSIBLE

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Building Envelope: No destructive sampling was performed on the building envelope. It should be assumed that asbestos, lead and PCB containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

6.0 CONCLUSIONS AND RECOMMENDATIONS

ACM and LBP have been identified in this inspection that may be impacted as part of the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School. These materials reported in Section 3.0 of this report, may require complete removal prior to the start of the BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project.

No PCB was identified in this inspection that may be impacted as part of the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School.

The ACM, LBP & PCB inspection was conducted at the request of Briarcliff Manor Union Free School District for the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Briarcliff Middle/High School. Any change in the scope of work will require further investigation to accurately classify any additional ACM, LBP or PCBs resulting from the modified or updated scope of work.

7.0 REPORT CERTIFICATIONS

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of WSP's efforts for the environmental inspection work for the Briarcliff Middle/High School.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of WSP's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which WSP is unaware and has not had the opportunity to evaluate.

The conclusions presented in this report are professional opinions solely upon WSP's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:



Stephen Gruber
NYS DOL Inspector

Reviewed by:



Craig Napolitano, CHMM
Vice President, Emergency Management & IH Services

APPENDIX A:
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM

APPENDIX A
SAMPLE ANALYSIS RESULTS IN TABULAR FORM
BRIARCLIFF HIGH/MIDDLE SCHOOL
444 PLEASANTVILLE ROAD
BRIARCLIFF MANOR, NY 10510

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
WSP Sampled on 08/10/2021 8/13/2021 & 08/18/2021					
A	01	Exterior – North	Brick Mortar, Grey	NAD	NAD
	02	Exterior - South		NAD	NAD
B	03	Exterior - North	Brick Mortar, Pink	NAD	NAD
	04	Exterior - South		NAD	NAD
C	05	Exterior - Northeast	Stone Mortar, Grey	NAD	NAD
	06	Exterior – Northwest		NAD	NAD
D	07	Roof B	Tar (Black) on Foil Paper on Air Handling Units	NAD	NAD
	08	Roof G		NAD	NAD
E	09	Roof G	Caulking (Grey) on Skylight Panel	NAD	NAD
	10			NAD	NAD
F	11	Roof A	Caulking (Beige) on AHU	NAD	NAD
	12			NAD	NAD
G	13	Roof H	Pitch Pocket Sealant (Grey)	NAD	NAD
	14	Roof G		NAD	NAD
H	15	Roof E	Pitch Pocket Sealant (White)	NAD	NAD
	16	Roof F		NAD	NAD
I	17	Roof H	Vent Pipe Sealant (Grey)	NAD	NAD

Bold = Positive for ACM
NAD = No Asbestos Detected
N/A = Not Applicable
NA/PS = Not analyzed/ positive sample

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
I	18	Roof J	Vent Pipe Sealant (Grey)	NAD	NAD
J	19	Roof K	Caulking (Black) at Metal Façade Panels	NAD	NAD
	20	Roof G		NAD	NAD
K	21	Roof G	Caulking (White) at Metal Cap Flashing	NAD	NAD
	22			NAD	NAD
L	23	Roof K	Expansion Joint Caulking (Grey) on Wall	NAD	NAD
	24			NAD	NAD
M	25	Roof A	Gypsum (White) Roof Deck Material	NAD	NAD
	26			NAD	NAD
N	27	Roof A	Fiberboard (Brown) Under EPDM Roofing	NAD	NAD
	28	Roof B		NAD	NAD
O	29	Roof J	Perlite (Tan) Insulation Under EPDM Roofing	NAD	NAD
	30	Roof F		NAD	NAD
P	31	Roof K	Fibrous insulation (Brown) Under EPDM Roofing	NAD	NAD
	32	Roof H		NAD	NAD
Q	33	Roof G	Felt Paper (Black) Under EPDM Roofing	NAD	NAD
	34			NAD	NAD
R	35	Roof C	Sealant (white) on Square Exhausts	NAD	NAD
	36			NAD	NAD
S	**37**	**Roof G**	**Tar (Black) at Base of AHU Curb**	**7.4% Chrysotile**	**NA/PS**
	38			**NA/PS**	**NA/PS**
T	39	Roof G	Caulking (Black) at Square	NAD	NAD

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NAD = No Asbestos Detected
N/A = Not Applicable
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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
T	40	Roof G	Skylight Panels	NAD	NAD
U	41	Roof B	Caulking (Black) at Metal Cap / Stone Wall	NAD	NAD
	42			NAD	NAD
V	43	Roof G	Caulking (White) on Foil Paper AHU Seams	NAD	NAD
	44			NAD	NAD
O	45	Roof J	Perlite (Tan) Insulation Under Epoxy Roofing	NAD	NAD
W	46	Air Handling Room (MS)	Spray-On Fire Proofing on Beams	NAD	NAD
	47			NAD	NAD
	48			NAD	NAD
X	49	Music Room 90	Yellow Adhesive associated with Carpet Flooring	NAD	NAD
	50			NAD	NAD
Y	51	Auditorium (HS)	12”x12” Black Vinyl Floor Tiles	NAD	NAD
	52			NAD	NAD
Z	53		Yellow Adhesive associated with 12”x12” Black Vinyl Floor Tiles	NAD	NAD
	54			NAD	NAD
AA	55		Yellow Adhesive associated with Carpet Flooring	NAD	NAD
	56			NAD	NAD
AB	57	Library (MS)	Gypsum Board (White)	NAD	NAD
	58	Art Room 121 (HS)	Gypsum Board (White)	NAD	NAD
AC	59	Library (MS)	Joint Compound associated with Gypsum (White)	NAD	NAD
	60	Art Room 121 (HS)	Joint Compound associated with Gypsum (White)	NAD	NAD

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N/A = Not Applicable
NA/PS = Not analyzed/ positive sample

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
AD	61	Chorus Room 108	2' x 4' Suspended Ceiling Tiles (White)	NAD	NAD
	62	Maresca Center		NAD	NAD
AE	63	Chorus Room 108	Gypsum Board (White)	NAD	NAD
	64	Maresca Center		NAD	NAD
AF	**65**	**Chorus Room 108**	**Joint Compound associated with Gypsum Board (White)**	**1.1% Chrysotile**	**NA/PS**
	66	**Maresca Center**		**NA/PS**	**NA/PS**
AG	67	Band Room 131	Gypsum Board (Grey)	NAD	NAD
	68			NAD	NAD
AH	69		Joint Compound associated with Gypsum Board (Yellow)	Trace (<1%) Chrysotile	N/A
	70			Trace (<1%) Chrysotile	N/A
AI	**71**	**Girls' Toilet Ceiling / Roof Area adjacent to Room 108**	**Cementitious Material (White) at Roof Drain Bowl**	**4.1% Chrysotile**	**N/A**
	72	**Boys' Toilet Ceiling / Roof Area adjacent to Nurse**		**NA/PS**	**N/A**
AJ	73	Art Room 121	Mortar associated with Cinder Block Walls	NAD	NAD
	74			NAD	NAD
AK	75	Exterior – adjacent to MS Cafeteria	Sidewalk Brick Expansion Joint Caulking (Grey)	NAD	NAD
	76			NAD	NAD
AL	77	Stairs by Room 110	Mortar associated with Terrazzo Floor	NAD	NAD
	78	Stairs by Room 115		NAD	NAD
WSP Sampled on 08/26/2021					
AM	79	Fuel Tank / Electrical Enclosure – Outside Wall	White Expansion Joint Caulking	NAD	NAD

Bold = Positive for ACM
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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
AM	80	Fuel Tank / Electrical Enclosure – Outside Wall	White Expansion Joint Caulking	NAD	NAD
AN	81	MS Gym	Mortar (Grey)associated with Block Wall	NAD	N/A
	82	Room 96		NAD	N/A
AO	83	Prep Room adjacent to Room 101	Black Mastic associated with 12” x 12” VFT	NAD	NAD
	84			NAD	NAD
AP	85		12” x 12” Speckled Brown VFT	NAD	NAD
	86			NAD	NAD
AQ	87	Exterior adjacent to Art Room 134	Door Frame/Expansion Joint Caulking (Grey)	NAD	NAD
	88			NAD	NAD
AR	89	Roof G	Felt Paper (White) associated with Foam Insulation	NAD	NAD
	90			NAD	NAD

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APPENDIX B:
ASBESTOS BULK SAMPLE FIELD DATA SHEETS WITH CHAIN OF CUSODY & LABORATORY RESULTS

Atlas Environmental Lab, Corp.
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New York, NY 10018
Phone:(212) 563-0400 Fax:(212) 563-0401
www.atlasenvironmentallab.com

Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.004
Project Address: Briarcliff Manor HSMS
Work Area: Roof

Lab ID: BK0821370
Date Received: 8/23/2021
PLM Date Analyzed: 8/24/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
A01	BK0821370-1	Exterior - North / Brick Mortar (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
A02	BK0821370-2	Exterior - South / Brick Mortar (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
B03	BK0821370-3	Exterior - North / Brick Mortar (Pink)	Red, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
B04	BK0821370-4	Exterior - South / Brick Mortar (Pink)	Red, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
C05	BK0821370-5	Exterior- NE / Stone Mortar (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
C06	BK0821370-6	Exterior- NW / Stone Mortar (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
D07	BK0821370-7	Roof B - Tar (Black) on Foil Paper on Air Handling Units	Black, Homogeneous, Non-Fibrous	92.4	1.9	5.6	0%	100%	**NAD** Inconclusive	**NAD**
D08	BK0821370-8	Roof G - Tar (Black) on Foil Paper on Air Handling Units	Black, Homogeneous, Non-Fibrous	46.2	2.0	51.8	0%	100%	**NAD** Inconclusive	**NAD**
E09	BK0821370-9	Roof G - Caulking (Grey) on Skylight Panel	Grey, Homogeneous, Non-Fibrous	10.7	9.7	79.6	0%	100%	**NAD** Inconclusive	**NAD**
E10	BK0821370-10	Roof G - Caulking (Grey) on Skylight Panel	Grey, Homogeneous, Non-Fibrous	13.0	10.6	76.4	0%	100%	**NAD** Inconclusive	**NAD**

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
F11	BK0821370-11	Roof A - Caulking (Beige) on AHV	Beige, Homogeneous, Non-Fibrous	73.8	3.2	22.9	0%	100%	**NAD** Inconclusive	**NAD**
F12	BK0821370-12	Roof A - Caulking (Beige) on AHV	Beige, Homogeneous, Non-Fibrous	72.8	3.4	23.8	0%	100%	**NAD** Inconclusive	**NAD**
G13	BK0821370-13	Roof H - Pitch Pocket Sealant (Grey)	Grey, Homogeneous, Non-Fibrous	64.9	5.8	29.3	0%	100%	**NAD** Inconclusive	**NAD**
G14	BK0821370-14	Roof G - Pitch Pocket Sealant (Grey)	Grey, Homogeneous, Non-Fibrous	64.1	1.4	34.5	0%	100%	**NAD** Inconclusive	**NAD**
H15	BK0821370-15	Roof E - Pitch Pocket Sealant (White)	White, Homogeneous, Non-Fibrous	65.2	5.6	29.2	0%	100%	**NAD** Inconclusive	**NAD**
H16	BK0821370-16	Roof F - Pitch Pocket Sealant (White)	White, Homogeneous, Non-Fibrous	77.7	5.5	16.9	0%	100%	**NAD** Inconclusive	**NAD**
I17	BK0821370-17	Roof H - Vent Pipe Sealant (Grey)	Grey, Homogeneous, Non-Fibrous	36.3	13.7	50.0	0%	100%	**NAD** Inconclusive	**NAD**
I18	BK0821370-18	Roof J - Vent Pipe Sealant (Grey)	Grey, Homogeneous, Non-Fibrous	56.6	14.9	28.5	0%	100%	**NAD** Inconclusive	**NAD**
J19	BK0821370-19	Roof K - Caulking (Black) at Metal Façade Panels	Black, Homogeneous, Non-Fibrous	72.2	2.4	25.4	0%	100%	**NAD** Inconclusive	**NAD**
J20	BK0821370-20	Roof G - Metal Façade Panels Caulking (White) at Metal cap Flashing	Black, Homogeneous, Non-Fibrous	70.9	2.4	26.7	0%	100%	**NAD** Inconclusive	**NAD**

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Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
K21	BK0821370-21	Roof G - Metal Façade Panels Caulking (White) at Metal cap Flashing	White, Homogeneous, Non-Fibrous	43.0	7.6	49.5	0%	100%	**NAD** Inconclusive	**NAD**
K22	BK0821370-22	Roof G - Metal Façade Panels Caulking (White) at Metal cap Flashing	White, Homogeneous, Non-Fibrous	43.6	10.8	45.6	0%	100%	**NAD** Inconclusive	**NAD**
L23	BK0821370-23	Roof K - Expansion Joint Caulking (Grey) on Wall	Grey, Homogeneous, Non-Fibrous	44.8	26.8	28.4	0%	100%	**NAD** Inconclusive	**NAD**
L24	BK0821370-24	Roof K - Expansion Joint Caulking (Grey) on Wall	Grey, Homogeneous, Non-Fibrous	44.0	13.1	42.9	0%	100%	**NAD** Inconclusive	**NAD**
M25	BK0821370-25	Roof A - Gypsum (White) Roof Deck Material	White, Homogeneous, Friable	Not Applicable			10%FBGL	90%	**NAD**	
M26	BK0821370-26	Roof A - Gypsum (White) Roof Deck Material	White, Homogeneous, Friable	Not Applicable			10%FBGL	90%	**NAD**	
N27	BK0821370-27	Roof A - Fiberboard (Brown) under EPDM Roofing	Brown, Homogeneous, Friable	Not Applicable			95%CELL	5%	**NAD**	
N28	BK0821370-28	Roof B - Fiberboard (Brown) under EPDM Roofing	Brown, Homogeneous, Friable	Not Applicable			95%CELL	5%	**NAD**	
O29	BK0821370-29	Roof J - Perlite (Tan) Insulation under EPDM Roofing	Grey, Homogeneous, Friable	Not Applicable			30%CELL 20%Foam	50%	**NAD**	
O30	BK0821370-30	Roof F - Perlite (Tan) Insulation under EPDM Roofing	Grey, Homogeneous, Friable	Not Applicable			30%CELL 20%Foam	50%	**NAD**	

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
P31	BK0821370-31	Roof K - Fibrous Insulation (Brown) under EPDM Roofing	Brown, Homogeneous, Friable	Not Applicable			95%Wood	5%	**NAD**	
P32	BK0821370-32	Roof H - Perlite (Tan) Insulation under EPDM Roofing	Brown, Homogeneous, Friable	Not Applicable			95%Wood	5%	**NAD**	
Q33	BK0821370-33	Roof G - Felt Paper (Black) under EPDM Roofing	Black, Homogeneous, Non-Fibrous	96.6	1.1	2.4	0%	100%	**NAD** Inconclusive	**NAD**
Q34	BK0821370-34	Roof G - Felt Paper (Black) under EPDM Roofing	Black, Homogeneous, Non-Fibrous	93.8	2.5	3.7	0%	100%	**NAD** Inconclusive	**NAD**
R35	BK0821370-35	Roof C - Sealant (White) on Square Exhaust	White, Homogeneous, Non-Fibrous	33.7	4.5	61.8	0%	100%	**NAD** Inconclusive	**NAD**
R36	BK0821370-36	Roof C - Sealant (White) on Square Exhaust	White, Homogeneous, Non-Fibrous	36.6	2.1	61.4	0%	100%	**NAD** Inconclusive	**NAD**
S37	BK0821370-37	Roof G - Tan (Black) at Base of AHU Herb	Black, Homogeneous, Non-Fibrous	60.3	12.9	26.8	0%	92.6%	**7.4%CHRY**	**Not Analyzed**
S38	BK0821370-38	Roof G - Tan (Black) at Base of AHU Herb	Black, Homogeneous, Non-Fibrous	66.5	9.0	24.5			**NA/PS**	**Not Analyzed**
T39	BK0821370-39	Roof G - Caulking (Black) at Square Skylight Panels	Black, Homogeneous, Non-Fibrous	70.7	14.5	14.8	0%	100%	**NAD** Inconclusive	**NAD**
T40	BK0821370-40	Roof G - Caulking (Black) at Square Skylight Panels	Black, Homogeneous, Non-Fibrous	68.1	16.4	15.6	0%	100%	**NAD** Inconclusive	**NAD**

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Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
U41	BK0821370-41	Roof B (North Side) - Caulking (Black) at Metal Cap / Stone Wall	Black, Homogeneous, Non-Fibrous	41.6	4.3	54.1	0%	100%	**NAD** Inconclusive	**NAD**
U42	BK0821370-42	Roof B (North Side) - Caulking (Black) at Metal Cap / Stone Wall	Black, Homogeneous, Non-Fibrous	41.9	4.0	54.1	0%	100%	**NAD** Inconclusive	**NAD**
V43	BK0821370-43	Roof G - Caulking (White) on Foil Paper AHV Seams	White, Homogeneous, Non-Fibrous	60.3	11.3	28.5	0%	100%	**NAD** Inconclusive	**NAD**
V44	BK0821370-44	Roof G - Caulking (White) on Foil Paper AHV Seams	White, Homogeneous, Non-Fibrous	66.3	8.6	25.0	0%	100%	**NAD** Inconclusive	**NAD**
O45	BK0821370-45	Roof J - Perlite J - Perlite (Tan) Insulation under EPDM Roofing	Grey, Homogeneous, Friable	Not Applicable			30%CELL 20%Foam	50%	**NAD**	
O46	BK0821370-46	Air Handling Room (MS) - Spray-On Fireproofing on Beams	Grey, Homogeneous, Friable	Not Applicable			90%FBGL	10%	**NAD**	
W47	BK0821370-47	Air Handling Room (MS) - Spray-On Fireproofing on Beams	Grey, Homogeneous, Friable	Not Applicable			90%FBGL	10%	**NAD**	
W48	BK0821370-48	Air Handling Room (MS) - Spray-On Fireproofing on Beams	Grey, Homogeneous, Friable	Not Applicable			90%FBGL	10%	**NAD**	
X49	BK0821370-49	Music Room 90 - Yellow Adhesive Associated with Carpet Flooring	Yellow, Homogeneous, Non-Fibrous	78.2	10.1	11.6	0%	100%	**NAD** Inconclusive	**NAD**
X50	BK0821370-50	Music Room 90 - Yellow Adhesive Associated with Carpet Flooring	Yellow, Homogeneous, Non-Fibrous	55.6	18.0	26.4	0%	100%	**NAD** Inconclusive	**NAD**

Atlas Environmental Lab, Corp.
255 West 36th Street, Suite# 1503
New York, NY 10018
Phone:(212) 563-0400 Fax:(212) 563-0401
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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.004
Project Address: Briarcliff Manor HSMS
Work Area: Roof

Lab ID: BK0821370
Date Received: 8/23/2021
PLM Date Analyzed: 8/24/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
Y51	BK0821370-51	Auditorium (HS) - 12"x12" Black VFT	Black, Homogeneous, Non-Fibrous	22.8	9.3	67.9	0%	100%	**NAD** Inconclusive	**Trace CHRY**
Y52	BK0821370-52	Auditorium (HS) - 12"x12" Black VFT	Black, Homogeneous, Non-Fibrous	10.1	2.2	87.7	0%	100%	**NAD** Inconclusive	**Trace CHRY**
Z53	*BK0821370-53	Auditorium (HS) - Yellow Mastic associated with 12"x12" Black VFT	Yellow, Homogeneous, Non-Fibrous	71.2	18.4	10.4	0%	100%	**NAD** Inconclusive	**NAD**
Z54	*BK0821370-54	Auditorium (HS) - Yellow Mastic associated with 12"x12" Black VFT	Yellow, Homogeneous, Non-Fibrous	71.2	18.4	10.4	0%	100%	**NAD** Inconclusive	**NAD**
AA55	BK0821370-55	Auditorium (HS) - Yellow Mastic associated with Carpet Flooring	Yellow, Homogeneous, Non-Fibrous	49.5	9.3	41.2	0%	100%	**NAD** Inconclusive	**NAD**
AA56	BK0821370-56	Auditorium (HS) - Yellow Mastic associated with Carpet Flooring	Yellow, Homogeneous, Non-Fibrous	71.4	6.4	22.2	0%	100%	**NAD** Inconclusive	**NAD**
AB57	BK0821370-57	Library (MS) - Gypsum Board (White)	Beige/ Brown, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AB58	BK0821370-58	Art Room 121 (HS) - Gypsum Board (White)	Beige/ Brown, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AC59	BK0821370-59	Library (MS) - Joint Compound associate with Gypsum (White)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AC60	BK0821370-60	Art Room 121MS) - Joint Compound associate with Gypsum (White)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.004
Project Address: Briarcliff Manor HSMS
Work Area: Roof

Lab ID: BK0821370
Date Received: 8/23/2021
PLM Date Analyzed: 8/24/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AD61	BK0821370-61	Chorus Room 108 - 2'x4" Suspended Ceiling Tiles (White)	Grey, Homogeneous, Non-Fibrous	32.8	41.9	25.3	0%	100%	**NAD** Inconclusive	**NAD**
AD62	BK0821370-62	Maresca Center - 2'x4" Suspended Ceiling Tiles (White)	Grey, Homogeneous, Non-Fibrous	32.0	18.5	49.6	0%	100%	**NAD** Inconclusive	**NAD**
AE63	BK0821370-63	Chorus Room 108 - Gypsum Board (Whit)	Beige/ Brown, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AE64	BK0821370-64	Maresca Center - Gypsum Board (White)	Beige/ Brown, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AF65	BK0821370-65	Chorus Room 108 - Joint Compound (Tan) associated with Gypsum Board	Beige, Homogeneous, Friable	Not Applicable			0%	98.9%	**1.1%CHRY**	
AF66	BK0821370-66	Maresca Center - Joint Compound (Tan) associated with Gypsum Board	Beige, Homogeneous, Friable	Not Applicable					**NA/PS**	
AG67	BK0821370-67	Band Room 131 - Gypsum Board (Grey)	Grey, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AG68	BK0821370-68	Band Room 131 - Gypsum Board (Grey)	Grey, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AH69	BK0821370-69	Band Room 131 - Joint Compound associated with Gypsum board (Yellow)	White/ Beige, Homogeneous, Friable	Not Applicable			0%	~99%	**Trace (<1%)CHRY**	
AH70	BK0821370-70	Band Room 131 - Joint Compound associated with Gypsum board (Yellow)	White/ Beige, Homogeneous, Friable	Not Applicable			0%	~99%	**Trace (<1%)CHRY**	

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.004
Project Address: Briarcliff Manor HSMS
Work Area: Roof

Lab ID: BK0821370
Date Received: 8/23/2021
PLM Date Analyzed: 8/24/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AI71	BK0821370-71	Girls Toilet Ceiling / Roof Area Adj Toom 108 - Cementitious Material (White) at Roof Drain Bowl	Beige, Homogeneous, Friable	Not Applicable			20%FBGL	75.9%	**4.1%CHRY**	
AI72	BK0821370-72	Boys toilet Ceiling / Roof Area Adj Nurse - Cementitious Material (White) at Roof Drain Bowl	Beige, Homogeneous, Friable	Not Applicable					**NA/PS**	
AJ73	BK0821370-73	Art Room 121 - Mortar Associated with Cinderblock Walls	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AJ74	BK0821370-74	Art Room 121 - Mortar Associated with Cinderblock Walls	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AK7	BK0821370-75	Exterior - Adj M.S Cafeteria - Sidewalk / Brick Expansion Joint Caulking (Grey)	Grey, Homogeneous, Non-Fibrous	45.7	1.7	52.6	0%	100%	**NAD** Inconclusive	**NAD**
AK76	BK0821370-76	Exterior - Adj M.S Cafeteria - Sidewalk / Brick Expansion Joint Caulking (Grey)	Grey, Homogeneous, Non-Fibrous	49.8	5.7	44.5	0%	100%	**NAD** Inconclusive	**NAD**
AL77	BK0821370-77	Stair by Room 110 - Mortar associated with Terrazzo Floor	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.004
Project Address: Briarcliff Manor HSMS
Work Area: Roof

Lab ID: BK0821370
Date Received: 8/23/2021
PLM Date Analyzed: 8/24/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AL78	BK0821370-78	Stair by Room 115 - Mortar associated with Terrazzo Floor	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

*Samples #53-54 analyzed as combined TC

Quantitative Analysis (Semi/Full):Bulk Asbestos Analysis-PLM by EPA 600/M4-82-020 per 40 CFR or ELAP198.1 (friable) and 198.6 (NOB) samples for New York.

NAD=no asbestos detected, NA/PS=Not Analyzed/Positive Stop, Trace=<1%,FBGL=Fiberglass, CELL=Cellulose,CHRY=Chrysotile,Amo=Amosite,CRO=Crocidolite,ANTH=Anthophylite, TRE=Tremolite, ACT=Actinolite, NA=not applicable.

PLM is not consistently reliable in detecting Asbestos in floor coverings and similar non friable organically bound materials. NAD or Trace results by PLM are inconclusive.

TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos containing in NY State.

All samples were prepared and analyzed in accordance with the EPA "TEM Method for Identifying and Quantifying Asbestos in Non-Fibrous Organically Bound Bulk Samples" ELAP 198.4".

ORG%=Ashed Organic%, AII= Acid Insoluble Inorganic%, ASI= Acid Soluble Inorganic%

This "Summary of Analytical Results "shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ELAP or any agency of the U.S Government. The results relate only to the items tested. This report may not be reproduced, except in full, without the written approval of AEL .Atlas Environmental lab did not collect the analyzed samples and thus accepts no liability with regard to their collection and/or maintenance . AEL relies on client's data. The liability of Atlas Environmental Lab corp with respect to the services charged, shall in no event exceed the amount of the invoice.

NYS-ELAP#11999, NVLAP Lab Code: 500092-0, NJ ID: NY034, CT Reg. ID: PH-0154

PLM Analyst: AS TEM Analyst: VR Approved by:

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF ~~7~~

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Roof
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/10/2021
Inspector(s): Stephen Gruber, Nicholas Colonni

BK0821370

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.co

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ ~~72~~ HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
A	01	~~Roof SG~~ Exterior - North	Brick Mortar (Grey)		Roof Level
↓	02	- South	↓		↓
B	03	- North	Brick Mortar (~~Red~~ Pink) SG		
↓	04	- South	↓		
C	05	Exterior - NE	Stone Mortar (Grey)		
↓	06	↓ - NW	↓		↓
D	07	Roof B	Tar (Black) on Foil paper		
↓	08	Roof G	on Air Handling Units		
E	09	↓	[Caulking (Grey) on		
↓	10	↓	Skylight Panel]		
F	11	Roof A	Caulking (Beige) on AHU		
↓	12	↓	↓		

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Anita Liow	(Sign)	8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

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ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

LOCATION(S) SURVEYED: Roof
PROPOSED PROJECT: Renovation
DATE(S) OF INSPECTION: 8/10/2021
Inspector(s): Stephen Gruber, Nicholas Colonni

BK0821370

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
G	13	Roof H	[Pitch Pocket Sealant (Grey)]		
↓	14	Roof G			
H	15	Roof ~~#~~ E	[Pitch Pocket Sealant (White)]		
↓	16	Roof ~~#~~ F			
I	17	Roof H	[Vent Pipe ~~Sealant~~ ~~Caulking~~ ~~Caulking~~ Sealant (Grey)]		
↓	18	Roof J			
J	19	Roof K	Caulking (Black) at Metal Facade Panels		
↓	20	Roof G			
K	21	↓	Caulking (White) at metal Cap Flashing		
↓	22	↓			
L	23	Roof K	Expansion Joint Caulking (Grey) on wall		
↓	24	↓			

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Anita Lira	(Sign)	8/23/21	1814 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

wsp

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

BK0821370

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOUIS BERGER
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

LOCATION(S) SURVEYED: Roof
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/10/2021
Inspector(s): STEPHEN GRUBER, NICHOLAS COLONNI

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
M	25	Roof A	Gypsum (White) Roof Deck Material		
↓	26	↓			
N	27	↓	[Fiberboard (Brown) under EPDM Roofing]		
↓	28	Roof B			
O	29	Roof J	[Perlite (Tan) Insulation Under EPDM Roofing]		
↓	30	Roof F			
P	31	Roof K	[Fibrous Insulation (Brown) Under EPDM Roofing]		
↓	32	Roof H			
Q	33	Roof G	Felt Paper (Black) under EPDM Roofing		
↓	34	↓			
R	35	Roof C	Sealant (White) on Square Exhausts		
↓	36	↓			

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/13/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Bullebrau	(Sign)	8/03/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

BK08 21370

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOUIS BERGER
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

LOCATION(S) SURVEYED: Roof
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/10/2021
Inspector(s): STEPHEN GRUBER, NICHOLAS COLONNI

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
S	37	Roof G	Tar (Black) at base of		wooden substrate
↓	38	↓	AHU kerb		
T	39		Caulking (Black) at Square		
↓	40	↓	Skylight panels		
U	41	Roof B (North side)	Caulking (Black) at		
↓	42	↓	Metal cap/Stone wall		
V	43	Roof G	[Caulking (white) on		
↓	44	↓	~~On~~ Foil Paper AHU Seams]		
O	45	Roof J	Perlite (tan) insulation under Epdm roofing		

CHAIN OF CUSTODY

Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)		
STEPHEN GRUBER		8/23/21	615 AM/PM			/ /	AM/PM			/ /	AM/PM
Received by: (print)	(Sign)			Received by: (print)	(Sign)			Received by: (print)	(Sign)		
Natalia		8/23/21	18:40 AM/PM			/ /	AM/PM			/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HS/MS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/13/2021
Inspector(s): STEPHEN GRUBER

BK08121370

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
W	46	Air Handling Room (MS)	Spray-on Fireproofing on Beams		
↓	47	↓	↓		
↓	48	↓	↓		
X	49	Music Room 90	Yellow adhesive assoc w carpet Flooring		
↓	50	↓	↓		
Y	51	Auditorium (HS)	~~Black~~ 12"x12" Black VFT		
↓	52	↓	↓		
Z	53	↓	[Yellow mastic assoc w 12"x12" Black VFT]		
↓	54	↓	↓		
AA	55	↓	Yellow adhesive assoc w carpet flooring		
↓	56	↓	↓		
AB	57	Library (MS)	Gypsum Board (white)		

CHAIN OF CUSTODY

Relinquished by: (print) ~~J. Wang~~ STEPHEN GRUBER	(Sign)	8/23/21	6150 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Aubrey	(Sign)	8/23/21	12:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HS/MS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/13/2021
Inspector(s): STEPHEN GRUBER

BK0821370

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
↓	58	Art Room 121 (HS)	Gypsum Board (white)		
AC	59	Library (MS)	[Joint compound assoc w Gypsum (white)]		
↓	60	Art Room 121 (HS)	↓		
AD	61	Chorus Room 108	[2'x4" Suspended Ceiling Tiles (white)]		
↓	62	Maresca Center	↓		
AE	63	Chorus Room 108	Gypsum Board (white)		
↓	64	Maresca Center	↓		
AF	65	Chorus Room 108	Joint compound (tan)		
↓	66	Maresca Center	assoc. w Gypsum Board		

CHAIN OF CUSTODY

Relinquished by: (print) J. Wang STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print)	(Sign)	8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Briarcliff Manor HS/MS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/18/2021
Inspector(s): Stephen Gruber

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
AG	67	Band Room 131	Gypsum Board (Grey)		
↓	68	↓	↓		
AH	69	↓	Joint compound assoc w Gypsum Board (Yellow)		
↓	70	↓	↓		
AI	71	Girls Toilet Ceiling/Roof Area adj Room 108	Cementitious material (white) at Roof Drain Bowl		
↓	72	Boys Toilet Ceiling/Roof Area adj Nurse	↓		
AJ	73	Art Room 121	Mortar assoc w		
↓	74	↓	Cinder block walls		
AK	75	Exterior - Adj M.S Cafeteria	Sidewalk/Brick Expansion Joint caulking (grey) ~~On grd~~		
↓	76	↓	↓		
AL	77	Stairs by Rm 110	Mortar assoc w		
↓	78	Stairs by Rm 115	Terrazzo Floor		

CHAIN OF CUSTODY

Relinquished by: (print) ~~J. Wang~~ STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print)	(Sign)	8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

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255 West 36th Street, Suite# 1503
New York, NY 10018
Phone:(212) 563-0400 Fax:(212) 563-0401
www.atlasenvironmentallab.com

Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.004
Project Address: 444 Pleasantville Rd., Briarcliff Manor, NY 10510
Work Area:

Lab ID: BK0821466
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 8/31/2021
Report Date: 9/1/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AM07	BK0821466-1	Fuel Tank/Elec. Enclosure - Outside Wall / White Expansion Joint Caulking	Grey, Homogeneous, Non-Fibrous	8.9	12.4	78.7	0%	100%	**NAD** Inconclusive	**NAD**
AM80	BK0821466-2	Fuel Tank/Elec. Enclosure - Outside Wall / White Expansion Joint Caulking	Grey, Homogeneous, Non-Fibrous	12.0	12.0	76.0	0%	100%	**NAD** Inconclusive	**NAD**
AN81	BK0821466-3	M.S Gym - Mortar (Gray) associated with Block Wall	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AN82	BK0821466-4	Room 96 - Mortar (Gray) associated with Block Wall	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AO83	BK0821466-5	Prep Room Adj Room 101- Black Mastic Associated with 12"x12" VFT	Black, Homogeneous, Non-Fibrous	13.0	46.6	40.4	0%	100%	**NAD** Inconclusive	**NAD**
AO84	BK0821466-6	Prep Room Adj Room 101- Black Mastic Associated with 12"x12" VFT	Black, Homogeneous, Non-Fibrous	12.0	15.6	72.4	0%	100%	**NAD** Inconclusive	**NAD**
AP85	BK0821466-7	Prep Room Adj Room 101- 12"x12" Speckled Brown VFT	Tan, Homogeneous, Non-Fibrous	8.3	22.4	69.3	0%	100%	**NAD** Inconclusive	**NAD**
AP86	BK0821466-8	Prep Room Adj Room 101- 12"x12" Speckled Brown VFT	Tan, Homogeneous, Non-Fibrous	3.8	33.4	62.8	0%	100%	**NAD** Inconclusive	**NAD**
AQ87	BK0821466-9	Exterior Adj Room Art Room 134 - Door Frame Caulking (Grey) and Expansion Joint Caulking (Gray)	Brown, Homogeneous, Non-Fibrous	9.1	27.1	63.8	0%	100%	**NAD** Inconclusive	**NAD**
AQ88	BK0821466-10	Exterior Adj Room Art Room 134 - Door Frame Caulking (Grey) and Expansion Joint Caulking (Gray)	Brown, Homogeneous, Non-Fibrous	9.4	26.6	64.0	0%	100%	**NAD** Inconclusive	**NAD**

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Client: WSP
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Project Address: 444 Pleasantville Rd., Briarcliff Manor, NY 10510
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Lab ID: BK0821466
Date Received: 8/30/2021
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TEM Date Analyzed: 8/31/2021
Report Date: 9/1/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AR89	BK0821466-11	Roof G- Felt Paper (White) Associated with Insulation	Grey, Homogeneous, Non-Fibrous	10.1	6.0	83.9	0%	100%	**NAD** Inconclusive	**NAD**
AR90	BK0821466-12	Roof G- Felt Paper (White) Associated with Insulation	Grey, Homogeneous, Non-Fibrous	11.2	6.9	81.9	0%	100%	**NAD** Inconclusive	**NAD**

MG

Quantitative Analysis (Semi/Full):Bulk Asbestos Analysis-PLM by EPA 600/M4-82-020 per 40 CFR or ELAP198.1 (friable) and 198.6 (NOB) samples for New York.

NAD=no asbestos detected, NA/PS=Not Analyzed/Positive Stop, Trace=<1%,FBGL=Fiberglass, CELL=Cellulose,CHRY=Chrysotile,Amo=Amosite,CRO=Crocidolite,ANTH=Anthophylite, TRE=Tremolite, ACT=Actinolite, NA=not applicable.

PLM is not consistently reliable in detecting Asbestos in floor coverings and similar non friable organically bound materials. NAD or Trace results by PLM are inconclusive.

TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos containing in NY State.

All samples were prepared and analyzed in accordance with the EPA "TEM Method for Identifying and Quantifying Asbestos in Non-Fibrous Organically Bound Bulk Samples" ELAP 198.4".

ORG%=Ashed Organic%, AII= Acid Insoluble Inorganic%, ASI= Acid Soluble Inorganic%

This "Summary of Analytical Results "shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ELAP or any agency of the U.S Government. The results relate only to the items tested. This report may not be reproduced, except in full, without the written approval of AEL .Atlas Environmental lab did not collect the analyzed samples and thus accepts no liability with regard to their collection and/or maintenance . AEL relies on client's data. The liability of Atlas Environmental Lab corp with respect to the services charged, shall in no event exceed the amount of the invoice.

NYS-ELAP#11999, NVLAP Lab Code: 500092-0, NJ ID: NY034, CT Reg. ID: PH-0154

PLM Analyst: AS TEM Analyst: VR Approved by:

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PAGE 1 OF 1

PROJECT NO.: 31403475.004
CLIENT: Briarcliff CSD **CAPIS ID#:** #: —
PROJECT SITE: Briarcliff High school / Middle School
PROJECT ADDRESS: 444 Pleasantville Rd. Briarcliff Manor NY 10510

DATE(S) OF INSPECTION: 8.26.2021
Project Manager: A. Smolyar
Inspector(s)/Investigator(s): STEPHEN GRUBER, NICHOLAS CASALE

BK0821466

LOUIS BERGER dba WSP USA Solutions, Inc.
TELEPHONE NO.: (212) 612-7900
ADDRESS: 96 Morton Street 8th Floor, New York, NY 10014

RESULTS TO: Alexander.smolyar@wsp.com; ~~josue.garcia@wsp.com~~; ~~prakash.saha@wsp.com~~ Lbo.labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

	HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL D ESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
1	AM	~~0~~ 79	[Fuel Tank/Elec Enclosure	White Expansion Joint				vertical
2	↓	80	L-Outside Wall]	Caulking				
3	AN	81	[M.S Gym]	[Mortar (gray) assoc				
4	↓	82	[Room 96]	w Block wall]				
5	AO	83	Prep Rm adj Rm 101	[Black mastic assoc				
6	↓	~~84~~	↓	w 12"X12" VFT]				
7	AP	85		[12"x 12" Speckled				
8	↓	86	↓	Brown VFT]				
9	AQ	87	[Exterior Adj Rm A+Rm 134	Door Frame Caulking (Grey)				
10	↓	88	↓ ↓]	B Expansion Join Caulking (Gray)				
11	AR	89	Roof G	[Felt paper (white)				
12	↓	90	↓	assoc w Foam Insulation]				

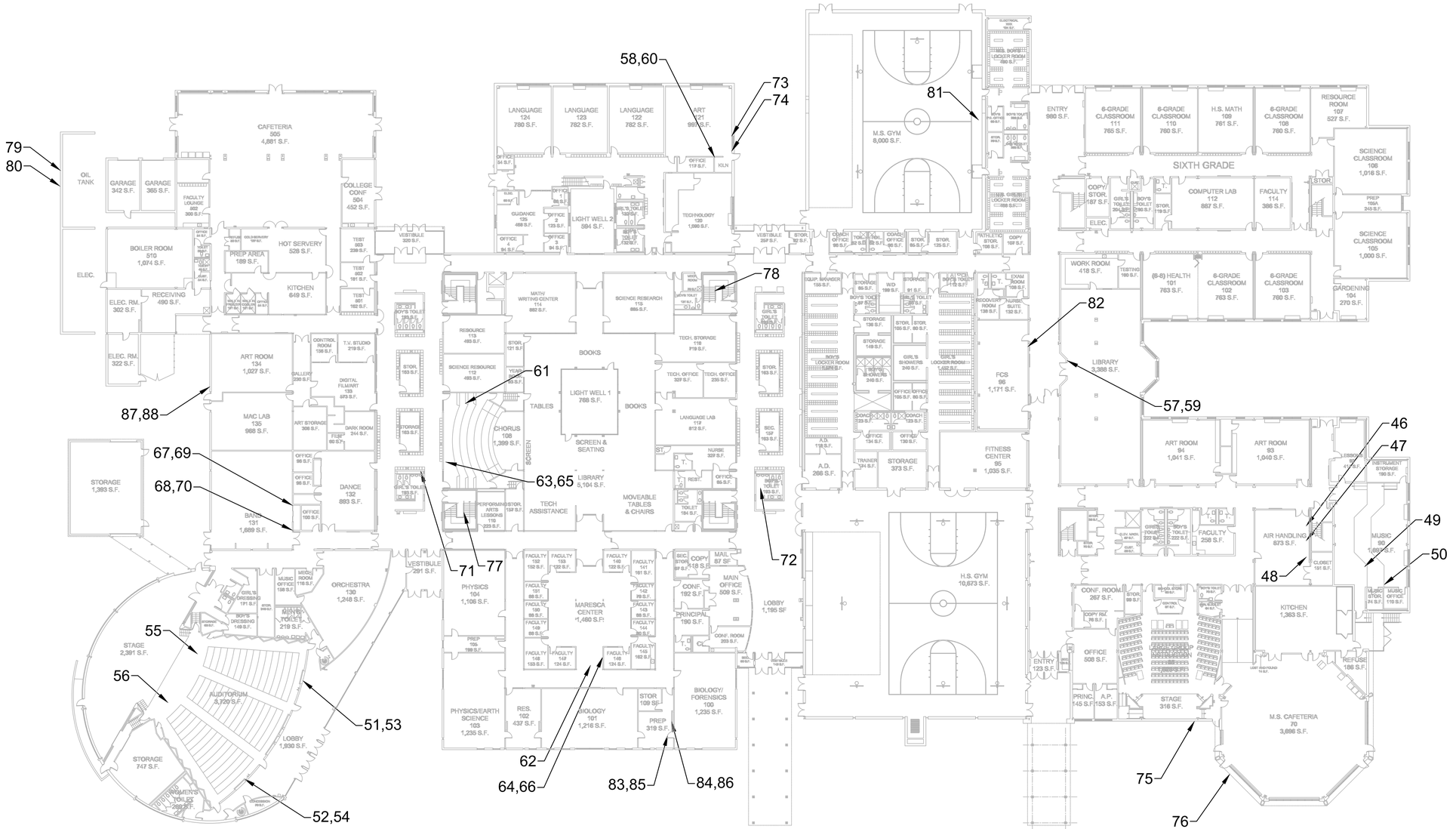
Superseded by BK0821466

CHAIN OF CUSTODY

Relinquished by: (print)	STEPHEN GRUBER	(Sign)		8/30/2021	8:00 AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM	Relinquished by: (print)		(Sign)	08/31/21	AM/PM
Received by: (print)	Metrometry	(Sign)		8/30/21	7:30 AM/PM	Received by: (print)		(Sign)	/ /	AM/PM	Received by: (print)		(Sign)	/ /	AM/PM

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

APPENDIX C:
ASBESTOS BULK SAMPLE LOCATION DRAWINGS



1 BULK SAMPLE LOCATION PLAN - FIRST FLOOR

SCALE: NOT TO SCALE

\\emyccifs01\Jobs2\96 MORTON STREET\PNW Boces 2021-2022\3140375.004 Briarcliff HSMS Survey & Design\CAD Files\BSL.dwg Sep 21, 2021

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL. 914.742.1120

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL
444 PLEASANTVILLE RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

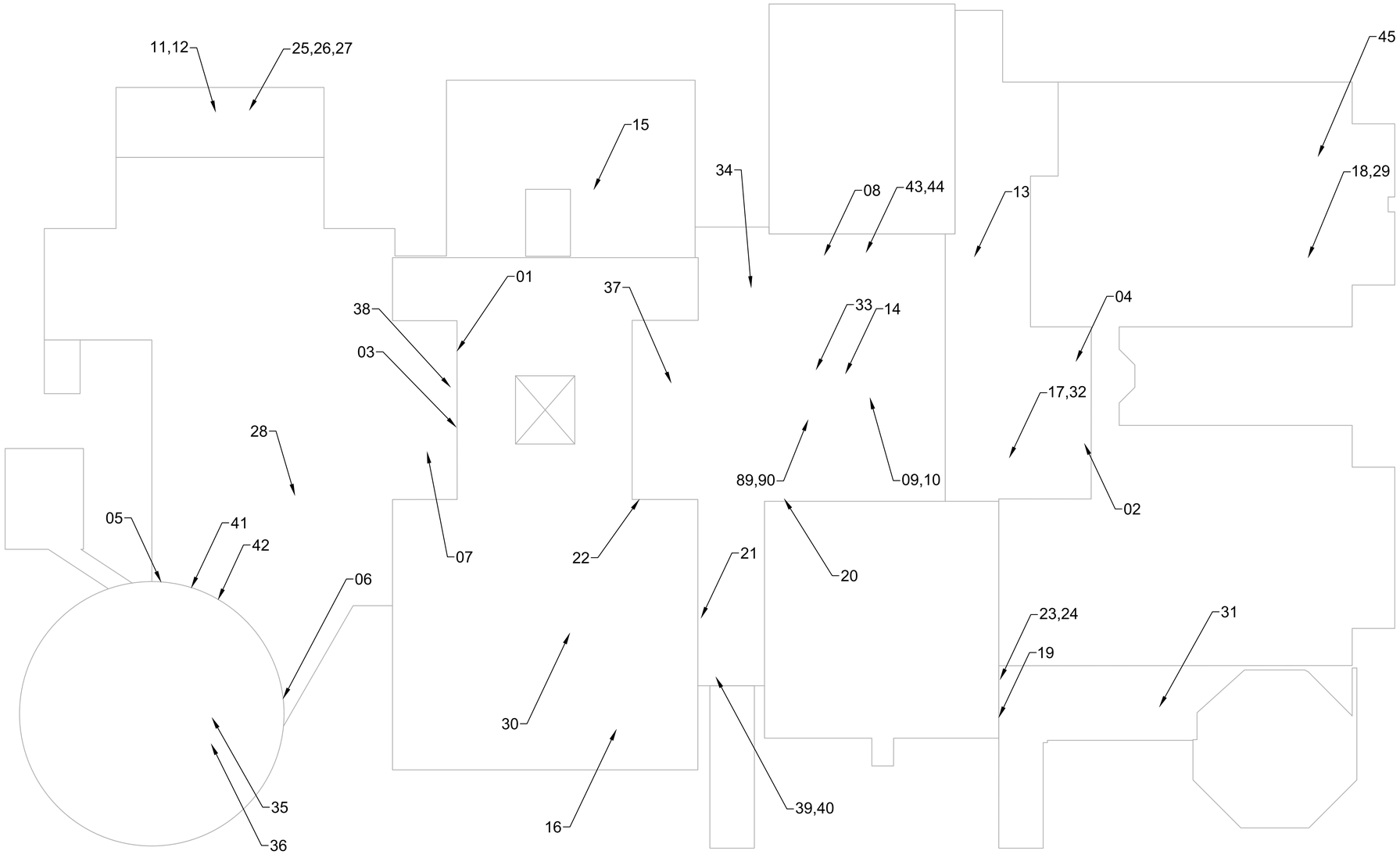
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CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL

DRAWING TITLE:
BULK SAMPLE LOCATION PLAN FIRST FLOOR

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**BSL001**
	DRAWING NUMBER: 1 OF 2



1 BULK SAMPLE LOCATION PLAN - ROOF

SCALE: NOT TO SCALE

\\ennyccifs01\Jobs2\96 MORTON STREET\PNW Boces 2021-2022\3140347S.004 Briarcliff HSMS Survey & Design\CAD Files\BSL.dwg Sep 21, 2021

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

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444 PLEASANTVILLE RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

NUMBER	DESCRIPTION	DATE
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2		
3		
4		

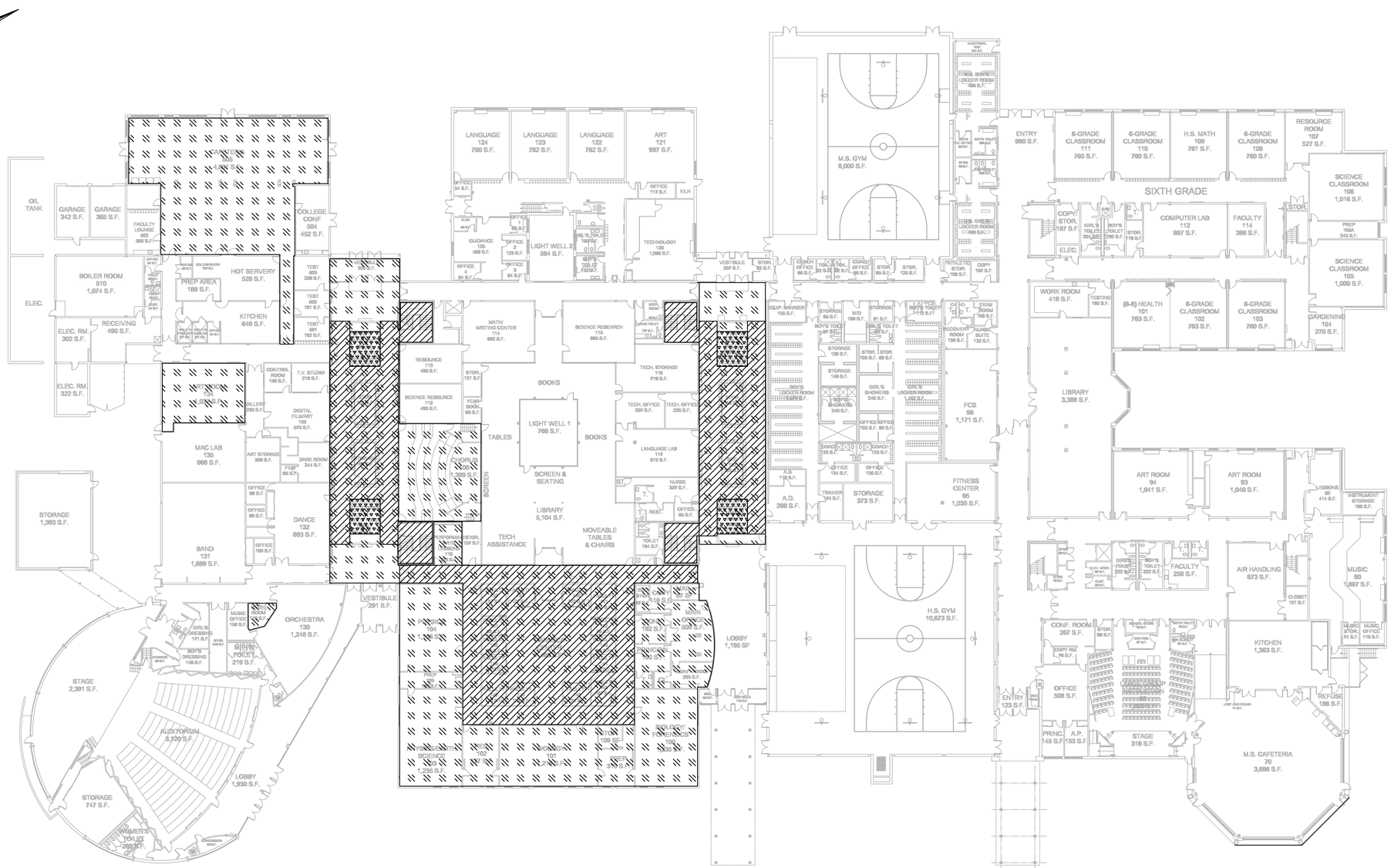
CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL

DRAWING TITLE:
BULK SAMPLE LOCATION PLAN ROOF

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**BSL002**
	DRAWING NUMBER: 2 OF 2

APPENDIX D:
ASBESTOS CONTAINING MATERIALS LOCATION DRAWINGS



1 ACM LOCATION PLAN - FIRST FLOOR

SCALE: NOT TO SCALE

NOTES:
EXACT LOCATIONS OF IMPACTED ACM MATERIALS TO BE DETERMINED BY CONTRACTOR IN THE FIELD (I.E. BELL/STROBE UNITS)

LEGEND:

- APPROXIMATE LOCATION OF ASBESTOS CONTAINING JOINT COMPOUND (TAN) ASSOCIATED WITH GYPSUM BOARD
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING 12"X12" FLOOR TILE & ASSOCIATED MASTIC
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING CEMENTITIOUS MATERIAL (WHITE) AT ROOF DRAIN BOWL AND PIPE ELBOW

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BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL: 914.742.1120

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL
444 PLEASANTVILLE RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

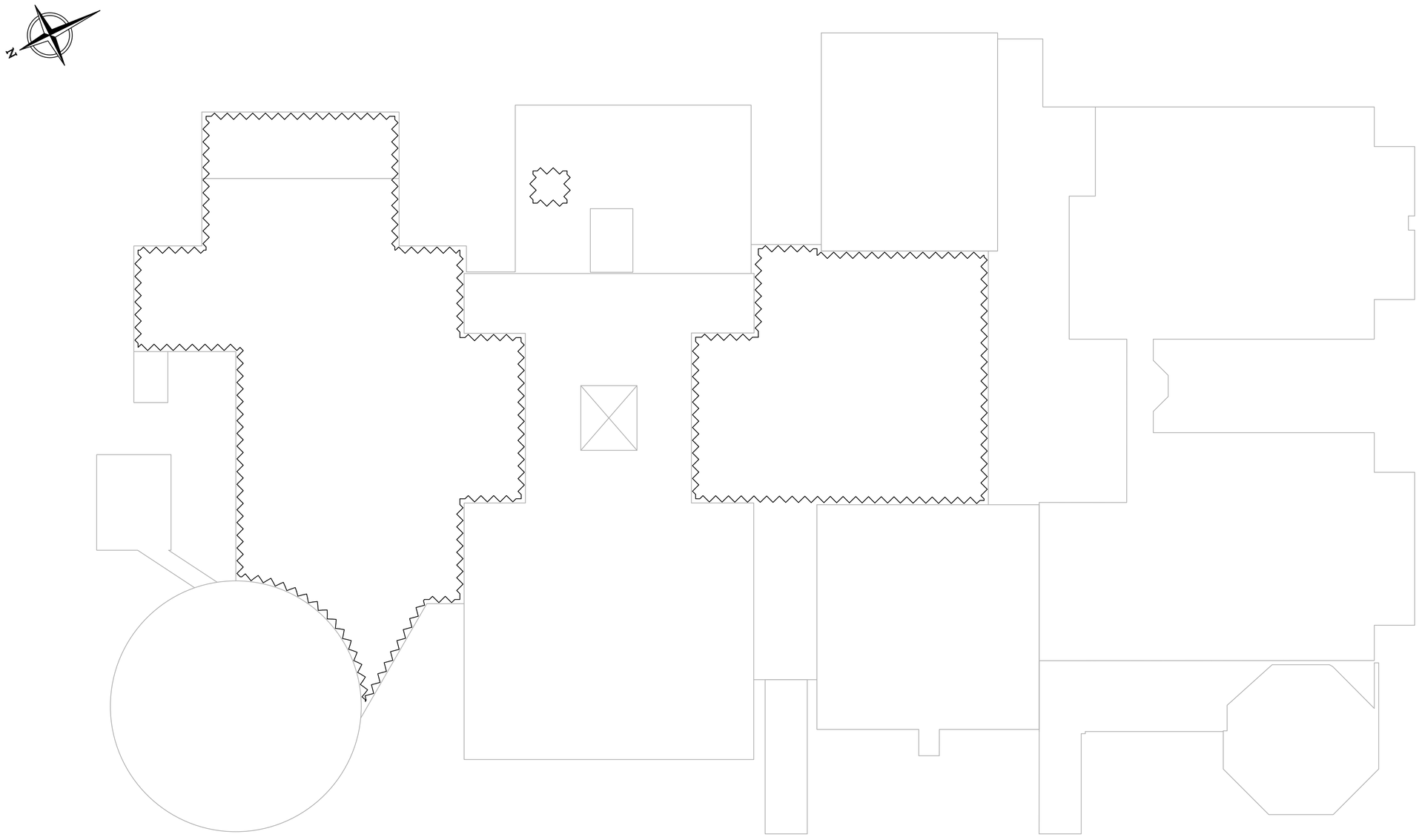
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CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL

DRAWING TITLE:
ACM LOCATION PLAN FIRST FLOOR

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**ACM001**
	DRAWING NUMBER: 1 OF 2



1 ACM LOCATION PLAN - ROOF
SCALE: NOT TO SCALE

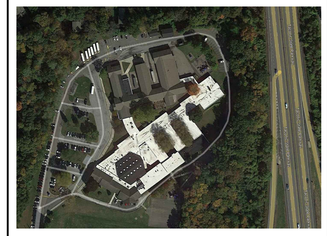
LEGEND:

APPROXIMATE LOCATIONS OF ASBESTOS CONTAINING TAR OF AHU CURB (UNDER EPDM ROOFING)

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL 914.742.1120

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL
444 PLEASANTVILLE RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

BRIARCLIFF HIGH SCHOOL/MIDDLE SCHOOL

DRAWING TITLE:
ACM LOCATION PLAN ROOF

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**ACM002**
	DRAWING NUMBER: 2 OF 2

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APPENDIX E:
LEAD XRF SHOT RESULTS

BRIARCLIFF HS ROOFS PAGE 1 of 1

CONSULTANT: WSP
XRF Inspector Name: N. COLONNI + S. GRUBER
Inspection DATE: 8/10/21

Sample Number	Bldg ID	Space Description	Room #	Wall	Component	Unit No	Substrate	Color	Coordinates	XRF	Damage Quantity	Notes
1					IN OFFICE					1.0		
2					CAL @ 0630					1.0		
3										1.0		
4										0.0		
5										0.1		
6										0.1		
7					IN FIELD CAL					0.9		
8					@ 0830					1.1		
9										1.0		
10										0.0		
11										0.0		
12										0.0		
13					PIPE (Roof G)	1	M	BLACK	MC	0.1		
14					CAL OUT					1.1		
15					@ 1030					1.0		
16										1.0		
17										0.1		
18										0.0		
19										0.0		
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33												
34												
35												

XRF CALIBRATION CHECK FORM

PROJ. NO.:	31403475.004	DATE:	8/26/21
PROJECT NAME:	Reconstruction	INSPECTOR NAME:	N. Casale & S. Gruber
CLIENT:	Briarcliff SD	INSPECTOR SIGNATURE:	
SITE:	Briarcliff MS/HS	PROJ. MANAGER:	A. Smolyar

WSP USA Solutions Inc.
TELEPHONE # : (212) 612-7900
FAX #: (212) 425-1618
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

XRF MAKE/MODEL: RMD LPA-1 (Serial#3675) Heuresis Pb200i (Serial#2150) | LLW#: | JOB#: 08261440

NOTES:

CALIBRATION CHECK – ~~PRIOR TO LEAVING OFFICE~~ Start

1.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 11:19 AM	TEST #	1	2	3	1.1
	XRF READING	1.1	1.1	1.1	

CALIBRATION CHECK – ~~PRIOR TO LEAVING OFFICE~~ Start

0.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 11:22 AM	TEST #	4	5	6	0.0
	XRF READING	0.0	0.0	-0.1	

CALIBRATION CHECK – ~~FIELD START~~

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 4:54pm	TEST #	61	62	63	1.1
	XRF READING	1.1	1.1	1.1	

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 2:56pm	TEST #	64	65	66	0.0
	XRF READING	0.0	0.1	0.0	

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
CLIENT: Briarcliff CSD
INSPECTOR(S): N. Cusate & S. Graber
PROJ. MANAGER: A. Smolyar

PROJECT NAME: Reconstruction
PROJECT LOCATION: Briarcliff HS MS
INSPECTION DATE: 8.26.2021

LPA1 - #3675
PB200I - #2150

SPACE CHARACTERISTICS:
FLOOR #: ____ ROOM #: ____ ROOM NAME: ____

NOTES:
LLW#: JOB#:

SAMPLE #	SUBSTRATE	COLOR	CONDITION [I / F / P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING [mg/cm²]
7	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Door	A B C D RM CTR FL CL				1 Fl		HS Cafeteria	0.0
8	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	↓		Door Frame	A B C D RM CTR FL CL				↓		↓	0.2
9	M PL S C CB PG CR; B W V CT (G) FG; OTHER:	Yellow		Wall	A B C D RM CTR FL CL				↓			0.1
10	M PL S C CB PG CR; (B) W V CT G FG; OTHER:	↓		↓	A B C D RM CTR FL CL				↓			0.2
11	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Window Frame	A B C D RM CTR FL CL				↓		↓	0.2
12	M PL S C (CB) PG CR; B W V CT FG; OTHER:	White		Wall	A B C D RM CTR FL CL				1 Fl		Boiler Rm	0.1
13	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Blue		Cyclonette to Boiler	A B C D RM CTR FL CL				↓		↓	0.1
14	M PL S (C) CB PG CR; B W V CT G FG; OTHER:	Gray		Boiler Footing	A B C D RM CTR FL CL				↓		↓	0.1
15	(M) PL S C CB PG CR; B W V CT (G) FG; OTHER:	~~Yellow~~ Red 86		~~Wall~~ Door Frame 86	A B C D RM CTR FL CL				↓		Rm 134	0.1
16	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Door	A B C D RM CTR FL CL				↓		↓	0.0
17	M PL S C CB PG CR; B W (V) CT G FG; OTHER:	Black		Cove base	A B C D RM CTR FL CL				↓		~~↓~~ Lockers by 133	0.2
18	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Blue		Lockers	A B C D RM CTR FL CL				↓		Lockers by 133	0.1
19	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Blue		Bathroom partition	A B C D RM CTR FL CL				↓		G. To. I by 132	0.0
20	M PL S C CB PG CR; B W V CT (G) FG; OTHER:	White		Ceiling	A B C D RM CTR FL CL				↓		↓	0.1
21	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Light Blue 86		Radiator	A B C D RM CTR FL CL				↓		↓	0.1
22	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Yellow 86		Vertical I beam	A B C D RM CTR FL CL				↓		Rm 131	0.5
23	M PL S C CB PG CR; B W (V) CT G FG; OTHER:	Black		Door Frame	A B C D RM CTR FL CL				↓		↓	0.3
24	M PL S C CB PG CR; B W V CT (G) FG; OTHER:	Yellow		Wall	A B C D RM CTR FL CL				↓		↓	0.2
25	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Black		Seats	A B C D RM CTR FL CL				↓		Auditorium	0.2
26	M PL S C CB PG CR; B W V CT G FG; OTHER:	↓		Bench	A B C D RM CTR FL CL						↓	0.0

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; ~~G: Glass~~; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

G = Gypsum

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: 31403475.004
PROJECT NAME: Reconstruction
LPA1 - #3675
PB200i - #2150
CLIENT: Briarcliff CSD
PROJECT LOCATION: Briarcliff HSMS
INSPECTOR(S): N. Casale & S. Gorka
INSPECTION DATE: 8.26.2021
PROJ. MANAGER: A. SMOLYAN

SPACE CHARACTERISTICS:
FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:
LLW#: JOB#:

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION: COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT/REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING [mg/cm²]
27	M PL S C CB PG CR; B W V CT G FG; OTHER: M	White		Railing	A B C D RM CTR FL CL				1 Floor		Stairs near 110	0.4
28	M PL S C CB PG CR; B W V CT G FG; OTHER: G	↓		Ceiling	A B C D RM CTR FL CL				↓		↓	0.1
29	M PL S C CB PG CR; B W V CT G FG; OTHER: M	Beige Gold		Condt	A B C D RM CTR FL CL				↓		↓	0.7
30	M PL S C CB PG CR; B W V CT G FG; OTHER: M	Red		Sill	A B C D RM CTR FL CL				↓		↓	0.0
31	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Yellow		Wall	A B C D RM CTR FL CL				↓		Hall near 110	0.1
32	M PL S C CB PG CR; B W V CT G FG; OTHER: G	White		Ceiling	A B C D RM CTR FL CL				↓		Chorus Rm	0.2
33	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Red		Wall	A B C D RM CTR FL CL				↓		↓	0.1
34	M PL S C CB PG CR; B W V CT G FG; OTHER: W	Red		Handrail	A B C D RM CTR FL CL				↓		↓	0.0
35	M PL S C CB PG CR; B W V CT G FG; OTHER: M	Red		Beam	A B C D RM CTR FL CL				↓		Maresca Center	0.5
36	M PL S C CB PG CR; B W V CT G FG; OTHER: G	White		Wall	A B C D RM CTR FL CL				↓		↓	0.1
37	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Blue		Wall	A B C D RM CTR FL CL				↓		Rm 110	0.2
38	M PL S C CB PG CR; B W V CT G FG; OTHER: W	Red		Base Molding	A B C D RM CTR FL CL				↓		Corridor by 110	0.2
39	M PL S C CB PG CR; B W V CT G FG; OTHER: M	Purple		DOOR FRAME	A B C D RM CTR FL CL				↓		Rm 100	0.0
40	M PL S C CB PG CR; B W V CT G FG; OTHER: W	Purple		Wall	A B C D RM CTR FL CL	Gym 45 Rm 103/104			↓		↓	1.2
41	M PL S C CB PG CR; B W V CT G FG; OTHER: M	Purple		vertical Beam	A B C D RM CTR FL CL				↓		↓	0.5
42	M PL S C CB PG CR; B W V CT G FG; OTHER: M	White		DOOR Frame	A B C D RM CTR FL CL				↓		Rm 100	0.1
43	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Purple		Wall	A B C D RM CTR FL CL				↓		Rm 102	0.1
44	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Blue		Wall	A B C D RM CTR FL CL				↓		Rm 121	-0.
45	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Teal		Wall	A B C D RM CTR FL CL				↓		Rm 96	0.2
46	M PL S C CB PG CR; B W V CT G FG; OTHER: G	Blue		Wall	A B C D RM CTR FL CL				↓		MS Cafeteria	0.1

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; ~~G: Other~~; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

G= Gypsum

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

LPA1 - #3675
PB200i - #2150

PROJECT NO.: 31403475.004
PROJECT NAME: Reconstruction
CLIENT: Briarcliff CSD
PROJECT LOCATION: Briarcliff HS MS
INSPECTOR(S): STEPHEN GRUBER / N. Lasula
PROJ. MANAGER: A. SMOLYAN
INSPECTION DATE: 8.26.2021

SPACE CHARACTERISTICS:
FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:
LLW#: _____ JOB#: _____

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION: COLOR	CONDITION [I / F / P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING [mg/cm²]
47	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	White		Radiator	A B C D; RM CTR; FL CL				1 Flr		Rm 90	0.2
48	M PL S C CB PG CR; B W V CT (G) FG; OTHER:	Yellow		Wall	A B C D; RM CTR; FL CL				2 Flr		Rm 210	0.1
49	M PL S C CB PG CR; B W V CT (G) FG; OTHER:	Gray		Wall	A B C D; RM CTR; FL CL				↓		Hallway by Elec	0.0
50	M PL S C CB PG CR; B (W) V CT G FG; OTHER:	Black		Wall	A B C D; RM CTR; FL CL				1 Flr		MS Gym	-0.3
51	M PL S C CB PG CR; B W V CT G FG; OTHER:	Yellow		Wall	A B C D; RM CTR; FL CL				↓		Hall by MS Gym	-0.1
52	M PL S C CB PG CR; B (W) V CT G FG; OTHER:	↓		Wall	A B C D; RM CTR; FL CL				↓		Hall by HS Gym	0.1
53	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	White		Ceiling	A B C D; RM CTR; FL CL				↓		Locker by 113	0.1
54	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Ductwork	A B C D; RM CTR; FL CL				↓		↓	0.6
55	M PL S C CB PG CR; B W V CT G (FG); OTHER:	↓		Pipes	A B C D; RM CTR; FL CL			*	↓		↓	1.0
56	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Purple		Beam	A B C D; RM CTR; FL CL				↓		↓	0.4
57	M PL S C CB PG CR; B (W) V CT G FG; OTHER:	Black		Skylight	A B C D; RM CTR; FL CL				↓		↓	0.0
58	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	White		Ceiling	A B C D; RM CTR; FL CL				↓		↓	0.1
59	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Tan		Ductwork	A B C D; RM CTR; FL CL				↓		MS Cafeteria	0.0
60	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	↓		Ceiling	A B C D; RM CTR; FL CL				↓		↓	0.0
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; ~~G: Glass~~; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

G = Gypsum

APPENDIX F:
PCB BULK SAMPLE FIELD DATA SHEETS WITH CHAIN OF CUSTODY & LABORATORY RESULTS

Technical Report

prepared for:

WSP USA Solutions Inc. (New York, NY)
96 Morton Street, 8th Floor
New York NY, 10014
Attention: Alexander Smolyar

Report Date: 09/02/2021
Client Project ID: 31403475.004
York Project (SDG) No.: 21H1490

CT Cert. No. PH-0723 New Jersey Cert. No. CT005 and NY037 New York Cert. Nos. 10854 and 12058 PA Cert. No. 68-04440

120 RESEARCH DRIVE STRATFORD, CT 06615 ■ 132-02 89th AVENUE RICHMOND HILL, NY 11418
www.YORKLAB.com (203) 325-1371 FAX (203) 357-0166 ClientServices@yorklab.com

Report Date: 09/02/2021
Client Project ID: 31403475.004
York Project (SDG) No.: 21H1490

WSP USA Solutions Inc. (New York, NY)
96 Morton Street, 8th Floor
New York NY, 10014
Attention: Alexander Smolyar

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on August 30, 2021 and listed below. The project was identified as your project: **31403475.004**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
21H1490-01	A-01/02/03	Caulk	08/11/2021	08/30/2021
21H1490-02	B-04/05/06	Caulk	08/11/2021	08/30/2021
21H1490-03	C-07/08/09	Caulk	08/11/2021	08/30/2021
21H1490-04	D-10/11/12	Caulk	08/11/2021	08/30/2021
21H1490-05	E-13/14/15	Caulk	08/10/2021	08/30/2021
21H1490-06	F-16/17/18	Caulk	08/10/2021	08/30/2021
21H1490-07	H-22/23/24	Caulk	08/11/2021	08/30/2021
21H1490-08	I-25/26/27	Caulk	08/11/2021	08/30/2021
21H1490-09	J-28/29/30	Caulk	08/11/2021	08/30/2021
21H1490-10	G-19/20/21	Caulk	08/11/2021	08/30/2021
21H1490-11	K-31/32/33	Caulk	08/26/2021	08/30/2021
21H1490-12	L-34/35/36	Caulk	08/26/2021	08/30/2021

General Notes for York Project (SDG) No.: 21H1490

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By:  **Date:** 09/02/2021

Cassie L. Mosher
Laboratory Manager

Sample Information

Client Sample ID: A-01/02/03 **York Sample ID:** 21H1490-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:19	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 17:19	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 17:19	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.289	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 17:19	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*99.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*63.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: B-04/05/06 **York Sample ID:** 21H1490-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ

Sample Information

Client Sample ID: B-04/05/06 **York Sample ID:** 21H1490-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:33	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 17:33	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 17:33	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.311	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 17:33	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*90.0 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*61.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: C-07/08/09 **York Sample ID:** 21H1490-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 17:47	BJ

Sample Information

Client Sample ID: C-07/08/09 **York Sample ID:** 21H1490-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 17:47	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 17:47	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.413	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 17:47	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*94.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*69.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: D-10/11/12 **York Sample ID:** 21H1490-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:00	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.420	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 18:00	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*89.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*68.5 %*	HT-02	*30-140*

Sample Information

Client Sample ID: D-10/11/12 **York Sample ID:** 21H1490-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Sample Information

Client Sample ID: E-13/14/15 **York Sample ID:** 21H1490-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 10, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:14	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 18:14	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*97.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*72.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: F-16/17/18 **York Sample ID:** 21H1490-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 10, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst

Sample Information

Client Sample ID: F-16/17/18 **York Sample ID:** 21H1490-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 10, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:27	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.365	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 18:27	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*101 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*62.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: H-22/23/24 **York Sample ID:** 21H1490-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:41	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:41	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:41	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 18:41	BJ

Sample Information

Client Sample ID: H-22/23/24 **York Sample ID:** 21H1490-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:41	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:41	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:41	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 18:41	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 18:41	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.410	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 18:41	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*84.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*58.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: I-25/26/27 **York Sample ID:** 21H1490-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 18:54	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 18:54	BJ

Sample Information

Client Sample ID: I-25/26/27 **York Sample ID:** 21H1490-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 18:54	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 18:54	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*48.0 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*50.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: J-28/29/30 **York Sample ID:** 21H1490-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 19:08	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.439	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 19:08	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*61.5 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*61.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: G-19/20/21 **York Sample ID:** 21H1490-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 11, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
11104-28-2	Aroclor 1221	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
11141-16-5	Aroclor 1232	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
53469-21-9	Aroclor 1242	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
12672-29-6	Aroclor 1248	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
11097-69-1	Aroclor 1254	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
11096-82-5	Aroclor 1260	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
37324-23-5	Aroclor 1262	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
11100-14-4	Aroclor 1268	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 19:22	BJ
1336-36-3	* Total PCBs	ND	HT-02	mg/kg	0.325	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 19:22	BJ

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*87.0 %*	HT-02	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*62.0 %*	HT-02	*30-140*

Sample Information

Client Sample ID: K-31/32/33 **York Sample ID:** 21H1490-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 26, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.394	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:31	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.394	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:31	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.394	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:31	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.394	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:31	BJ

Sample Information

Client Sample ID: K-31/32/33 **York Sample ID:** 21H1490-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 26, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12672-29-6	Aroclor 1248	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:31	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:31	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:31	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,NJDEP	09/02/2021 03:31	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,NJDEP	09/02/2021 03:31	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.394	1	EPA 8082A Certifications:	08/31/2021 13:07	09/02/2021 03:31	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*69.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*52.5 %*	*30-140*

Sample Information

Client Sample ID: L-34/35/36 **York Sample ID:** 21H1490-12

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 26, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,CTDOH,NJDEP	09/02/2021 03:45	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07 NELAC-NY10854,NJDEP	09/02/2021 03:45	BJ

Sample Information

Client Sample ID: L-34/35/36 **York Sample ID:** 21H1490-12

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1490	31403475.004	Caulk	August 26, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11100-14-4	Aroclor 1268	ND		mg/kg	0.360	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 13:07	09/02/2021 03:45	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.360	1	EPA 8082A Certifications:	08/31/2021 13:07	09/02/2021 03:45	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*77.5 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*56.0 %*	*30-140*

Analytical Batch Summary

Batch ID: BH11755 **Preparation Method:** EPA 3550C **Prepared By:** EMS

YORK Sample ID	Client Sample ID	Preparation Date
21H1490-01	A-01/02/03	08/31/21
21H1490-02	B-04/05/06	08/31/21
21H1490-03	C-07/08/09	08/31/21
21H1490-04	D-10/11/12	08/31/21
21H1490-05	E-13/14/15	08/31/21
21H1490-06	F-16/17/18	08/31/21
21H1490-07	H-22/23/24	08/31/21
21H1490-08	I-25/26/27	08/31/21
21H1490-09	J-28/29/30	08/31/21
21H1490-10	G-19/20/21	08/31/21
BH11755-BLK1	Blank	08/31/21
BH11755-BS1	LCS	08/31/21
BH11755-BSD1	LCS Dup	08/31/21

Batch ID: BH11758 **Preparation Method:** EPA 3550C **Prepared By:** EMS

YORK Sample ID	Client Sample ID	Preparation Date
21H1490-11	K-31/32/33	08/31/21
21H1490-12	L-34/35/36	08/31/21
BH11758-BLK1	Blank	08/31/21
BH11758-BS1	LCS	08/31/21
BH11758-BSD1	LCS Dup	08/31/21

Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BH11755 - EPA 3550C											
Blank (BH11755-BLK1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	ND	0.0166	mg/kg								
Aroclor 1221	ND	0.0166	"								
Aroclor 1232	ND	0.0166	"								
Aroclor 1242	ND	0.0166	"								
Aroclor 1248	ND	0.0166	"								
Aroclor 1254	ND	0.0166	"								
Aroclor 1260	ND	0.0166	"								
Aroclor 1262	ND	0.0166	"								
Aroclor 1268	ND	0.0166	"								
Total PCBs	ND	0.0166	"								
Surrogate: Tetrachloro-m-xylene	*0.0601*		*"*	*0.0664*		*90.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0385*		*"*	*0.0664*		*58.0*	*30-140*				
LCS (BH11755-BS1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	0.359	0.0166	mg/kg	0.332		108	40-130				
Aroclor 1260	0.342	0.0166	"	0.332		103	40-130				
Surrogate: Tetrachloro-m-xylene	*0.0571*		*"*	*0.0664*		*86.0*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0382*		*"*	*0.0664*		*57.5*	*30-140*				
LCS Dup (BH11755-BSD1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	0.360	0.0166	mg/kg	0.332		108	40-130		0.333	25	
Aroclor 1260	0.341	0.0166	"	0.332		103	40-130		0.545	25	
Surrogate: Tetrachloro-m-xylene	*0.0575*		*"*	*0.0664*		*86.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0379*		*"*	*0.0664*		*57.0*	*30-140*				
Batch BH11758 - EPA 3550C											
Blank (BH11758-BLK1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	ND	0.0166	mg/kg								
Aroclor 1221	ND	0.0166	"								
Aroclor 1232	ND	0.0166	"								
Aroclor 1242	ND	0.0166	"								
Aroclor 1248	ND	0.0166	"								
Aroclor 1254	ND	0.0166	"								
Aroclor 1260	ND	0.0166	"								
Aroclor 1262	ND	0.0166	"								
Aroclor 1268	ND	0.0166	"								
Total PCBs	ND	0.0166	"								
Surrogate: Tetrachloro-m-xylene	*0.0508*		*"*	*0.0664*		*76.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0355*		*"*	*0.0664*		*53.5*	*30-140*				

Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BH11758 - EPA 3550C											
LCS (BH11758-BS1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	0.327	0.0166	mg/kg	0.332		98.4	40-130				
Aroclor 1260	0.301	0.0166	"	0.332		90.6	40-130				
Surrogate: Tetrachloro-m-xylene	*0.0542*		*"*	*0.0664*		*81.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0336*		*"*	*0.0664*		*50.5*	*30-140*				
LCS Dup (BH11758-BSD1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	0.317	0.0166	mg/kg	0.332		95.5	40-130		2.99	25	
Aroclor 1260	0.300	0.0166	"	0.332		90.3	40-130		0.354	25	
Surrogate: Tetrachloro-m-xylene	*0.0528*		*"*	*0.0664*		*79.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0349*		*"*	*0.0664*		*52.5*	*30-140*				
Batch Y1I0210 - BH11681											
Aroclor Reference (Y1I0210-ARC1)								Prepared & Analyzed: 09/01/2021			
Surrogate: Tetrachloro-m-xylene	*0.179*		*ug/mL*	*0.200*		*89.5*					
Surrogate: Decachlorobiphenyl	*0.144*		*"*	*0.200*		*72.0*					

Sample and Data Qualifiers Relating to This Work Order

HT-02 NON-COMPLIANT-This sample was received outside the EPA recommended holding time.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H1490

PAGE 1 OF 3

WSP PROJ #: 31403475.004
CLIENT: Briarcliff Manor UFSD
Project Site: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Roof / Exterior
PROPOSED PROJECT: Renovation
DATE(S) OF INSPECTION: 8/11/2021
Inspector(s): STEPHEN GRUBER, NICHOLAS COLONNESI

WSP
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO:

TURNAROUND TIME:
☐48 HR ☐72 H R ☐96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	A	1	Window / Louver Caulking	Exterior - 2nd Flr. (N)		
	↓	2	(Pink)	↓ ↓ (W)		
	↓	3	↓	↓ ↓ (S)		
	B	4	Caulking (Grey) assoc.	Roof G - South		
	↓	5	w/ Skylight	↓ ↓		
	↓	6	↓	↓ ↓		
	C	7	Caulking (Beige) assoc.	Roof A		
	↓	8	w/ AHU	↓		
	↓	9	↓	↓		
	D	10	[Caulking (Black) assoc.	Roof K		
	↓	11	w Metal Facade	↓		
	↓	12	Panels]	Roof G		

1.60c

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/30/21	8:00 AM/PM	Relinquished by: (print) JK / York	(Sign) Rec. Francisco York	8/30/21	18:00 AM/PM	Relinquished by: (print) Francisco York	(Sign)	8/30/21	1928 AM/PM
Received by: (print) JK / York	(Sign)	8/30/21	12:35 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print) K. Blocker	(Sign) K Blocker	8/30/21	1928 AM/PM

~~Received: Francisco York~~

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260). The laboratory shall target a PCB detection limit of 1 ppm

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H4490

WSP PROJ #: 31403475.004
CLIENT: Briarcliff Manor UFSD
Project Site: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED Roof / Exterior
PROPOSED PROJECT : Renovation
DATE(S) OF INSPECTION: 8/10/2021
Inspector(s) STEPHEN GRUBER, NICHOLAS COLONNI

WSP
TELEPHONE N0. : (212) 612-7900 **FAX N0.: (212) 363-4341**
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: Alexander.smolyar@wsp.com
Lb.labresults@wsp.com

TURNAROUND TIME:
☐48 HR ☐72 H R ☐96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	~~A~~	~~1~~	~~Exterior – 2nd Flr. (N)~~	SG 8/11/21		
	↓	2	(W)	SG 8/11/21		
	↓	3	(S)	SG 8/11/21		
	E	13	Caulking (white) on	Roof B		
	↓	14	Metal cap Flushing	Roof G		
	↓	15	↓	↓		
	F	16	Expansion Joint Caulking	Roof K		
	↓	17	(Grey) at Brickwall	↓ [Exterior adjacent Art Rm 134]		Door Frame
	↓	18	↓	↓		Steel Beam
	~~G~~	~~19~~	~~Caulking (Grey) assoc.~~	~~Roof H~~ SG		
	↓	20	w/ Vent Pipes	↓		
	↓	~~21~~	↓	~~Roof J~~		

CHAIN OF CUSTODY

Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)		
STEPHEN GRUBER		8/30/21	8 AM/PM	Rec. Francisco/York	Rec.	8/30/21	18:00 AM/PM	Francisco/York	1.60c	8/30/21	1928 AM/PM
Received by: (print)	(Sign)			Received by: (print)	(Sign)			Received by: (print)	(Sign)		
York		8/30/21	12:35 AM/PM			/ /	AM/PM	K. Blocker	K. Blocker	8/30/21	1928 AM/PM

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H1490

WSP PROJ #: 31403475.004
CLIENT: Briarcliff Manor UFSD
Project Site: Briarcliff Manor HSMS
Project Manager: A. Smolyar

LOCATION(S) SURVEYED Roof / Exterior
PROPOSED PROJECT : Renovation
DATE(S) OF INSPECTION: 8/11/2021
Inspector(s) STEPHEN GRUBER, NICHOLAS COLONNI

WSP
TELEPHONE NO. : (212) 612-7900 **FAX NO.: (212) 363-4341**
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO:

TURNAROUND TIME:
☐48 HR ☐72 H R ☐96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	H	22	Caulking (white) assoc.	Roof G		
	↓	23	w/ Ductwork	↓		
	↓	24	↓ ↓	↓		
	I	25	Caulking (Black) assoc.	↓		
	↓	26	w/ Square Skylight	↓		
	↓	27	Panels	↓		
	J	28	Caulking (Black) assoc.	Roof B - North		
	↓	29	w/ Metal Cap Flashing	↓ ↓		
	↓	30	↓	↓ ↓		
	B	19	Exterior - Adj M.S Cafeteria	Sidewalk Brick Expansion		
	↓	20	↓	Joint Caulking (grey)		
	↓	21	↓	↓		

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/30/21	8:00 AM/PM	Relinquished by: (print) Joe Yorke	(Sign) Rec: Francisco Yorke	8/30/21	18:00 AM/PM	Relinquished by: (print) Francisco Yorke	(Sign)	8/30/21	1928 AM/PM
Received by: (print) Joe Yorke	(Sign)	8/30/21	12:35 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print) K Blocker	(Sign) K Blocker	8/30/21	1928 AM/PM

1, 6 oz

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H14490

WSP PROJ #: 31403475.004
CLIENT: Briarcliff CSD
Project Site: Briarcliff High/Middle School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8.26.21
Inspector(s): STEPHEN GRUBER, NICHOLAS CASALE

WSP
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: Cb.labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☒ 1 WEEK ☐48 HR ☐72 H R ☐96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	K	31	White Expansion Join	[Fuel/oil Enclosure		
	↓	32	Caulking	- Outside wall]		
	↓	33	↓	↓ ↓		
	L	34	Expansion Join Caulking ~~(Gray)~~	Exterior adj Elec Rm		
	↓	35	~~at brick wall~~ (Brown)	A ↓ ↓ Art Rm 134		
	↓	36	↓	↓ ↓ Band Rm 131		

CHAIN OF CUSTODY

1.6 oc

Relinquished by: STEPHEN GRUBER	(Sign)	8/30/21	AM/PM	Relinquished by: (print)	(Sign) Rec. Francisco/Yosi	8/30/21	AM/PM 18:00	Relinquished by: (print) Francisco/Yosi	(Sign)	8/30/21	1928 AM/PM
Received by:	(Sign)	8/30/21	12:37 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print) K. Blocker	(Sign)	8/30/21	1928 AM/PM

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

APPENDIX G:
COMPANY LICENSE, PERSONAL CERTIFICATIONS AND LABORATORY ACCREDITATIONS

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

WSP USA Solutions Inc.
8th Floor
96 Morton Street

New York, NY 10014

FILE NUMBER:
LICENSE NUMBER: 132876
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 03/31/2021
EXPIRATION DATE: 03/31/2022

Duly Authorized Representative – Craig Napolitano:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)



United States Environmental Protection Agency

This is to certify that



Stephen C Gruber

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires December 12, 2023

LBP-I-I219874-1
Certification #

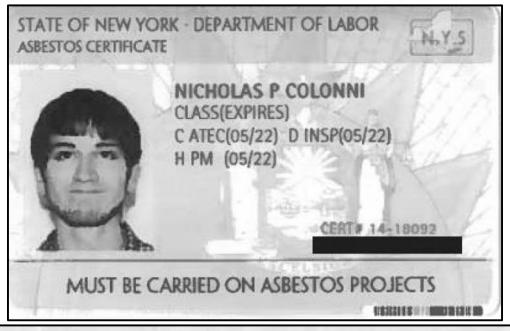
November 28, 2020
Issued On

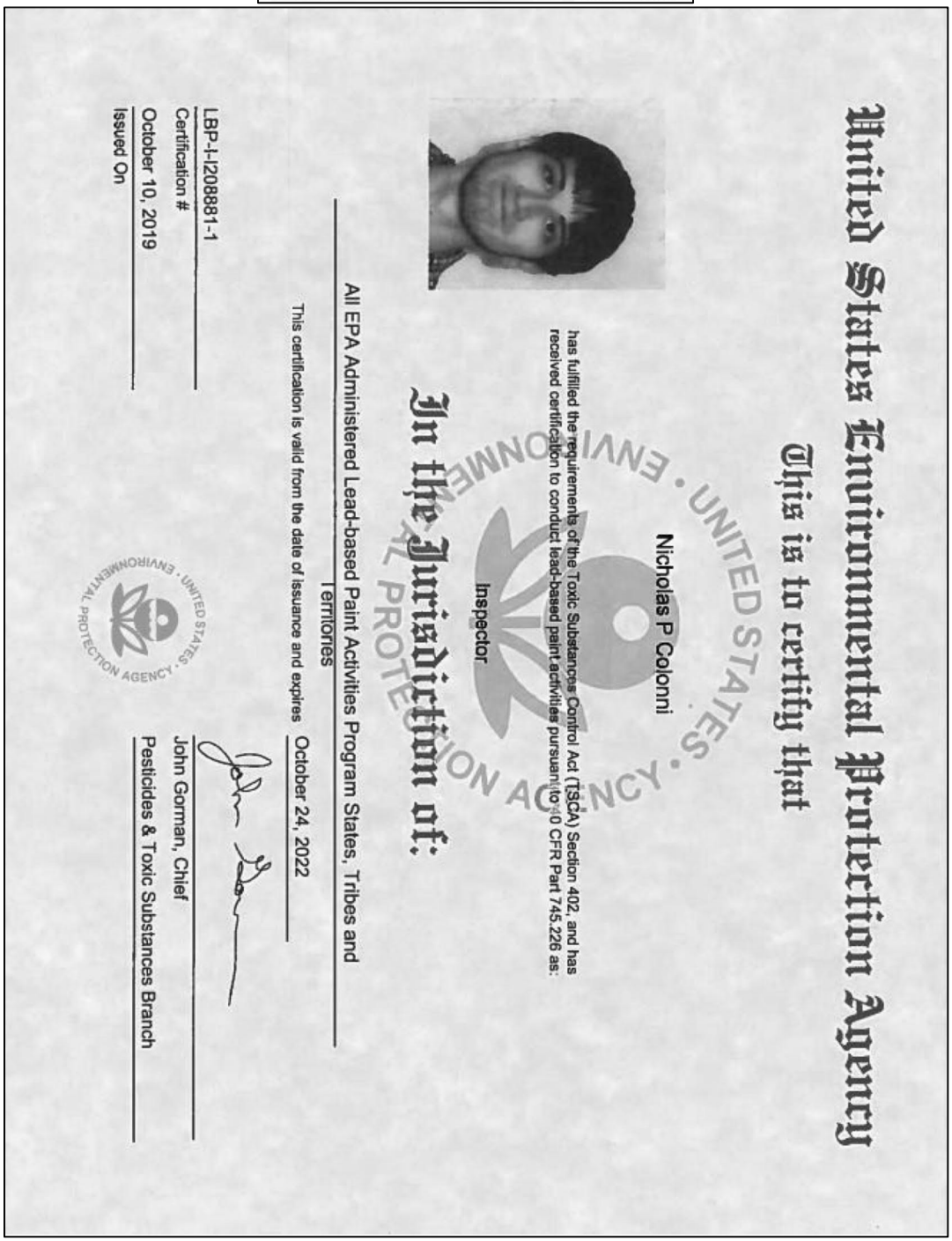
Ben Conetta

Ben Conetta, Chief
Chemicals and Multimedia Programs Branch

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595


STATE OF NEW YORK · DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S.
NICHOLAS P COLONNI
CLASS(EXPIRES)
C ATEC(05/22) D INSP(05/22)
H PM (05/22)
CERT# 14-18092
MUST BE CARRIED ON ASBESTOS PROJECTS


United States Environmental Protection Agency

This is to certify that

Nicholas P Colonni

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires October 24, 2022

LBP-I-I208881-1
Certification #

October 10, 2019
Issued On

John Gorman, Chief
Pesticides & Toxic Substances Branch

United States Environmental Protection Agency

This is to certify that



Nicholas S Casale

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires September 24, 2022

LBP-I-I207478-1
Certification #

September 10, 2019
Issued On

John Gorman, Chief
Pesticides & Toxic Substances Branch



500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

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Suite 450
Valhalla, NY 10595

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. JACKIE DARVISH
ATLAS ENVIRONMENTAL LABS CORP
255 W 36TH STREET SUITE 1503
NEW YORK, NY 10018

NY Lab Id No: 11999

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

	EPA 3050B

Serial No.: 63260

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 500092-0

Atlas Environmental Lab (Asbestos in Bulk)
New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2020-10-01 through 2021-09-30
Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program



AIHA Laboratory Accreditation Programs, LLC

acknowledges that

Atlas Environmental Lab

255 W 36th Street, Suite 1503, New York, NY 10018

Laboratory ID: LAP-208306

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA LAP), LLC accreditation to the ISO/IEC 17025:2017 international standard, General Requirements for the Competence of Testing and Calibration Laboratories in the following:

LABORATORY ACCREDITATION PROGRAMS

☑	**INDUSTRIAL HYGIENE**	Accreditation Expires: August 01, 2023
☑	**ENVIRONMENTAL LEAD**	Accreditation Expires: August 01, 2023
☑	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: August 01, 2023
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached Scope of Accreditation. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2017 and AIHA LAP, LLC requirements. This certificate is not valid without the attached Scope of Accreditation. Please review the AIHA LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Cheryl O. Morton

Cheryl O Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision19.1: 07/28/2021

Date Issued: 07/28/2021

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

APPENDIX H:
SCOPE OF WORK DRAWINGS

Braircliff MANOR HSMS PHASE 1

	Briarcliff Manor HSMS Phase 1 (BBS File No.21-274A)
A4	Firestop/seal penetrations and top of wall in Auditorium Mechanical Rm., Switchgear Rm. and Art Rm. at High School.
A9	Repair missing spray applied fireproofing over structural steel columns/braces in Mechanical Room at Middle School.
A10	Firestop/seal penetrations and top of wall in Electrical Rm. (near Rm. 218) at Middle School.
A16	Remove manual hold open devices at Gymnasium Corridor doors (replace door closer or add magnetic holders).
A17	Remove floor stops (w/ padlocks) in Boys/Girls toilet rooms at High School (near Rm. 120).
A24	Replace EPDM roof areas (2002) and modify masonry/flashing (excludes Gym) at Middle School.
A25	Replace damaged/clogged roof leader and scupper (near loading dock) at Middle School.
A26	Replace EPDM roof areas (1998), skylights and modify masonry/flashing (excludes Gym) at High School.
M1	It was reported that the building exhaust fans were controlled by an old day/night control system, that no longer works. This system should be repaired or replaced, as these fans are required to operate whenever the school is occupied. This is one of a few control system items, which are all priced individually, but should be addressed as a whole.
M2	Replace the non-functional exhaust fan in the main electrical meter room to restore to operation.
M4	Provide an exhaust fan in the copy room adjacent to the nurses office, and vent directly to the exterior. The current fan exhausts into the hallway currently.
M5	Provide a new transfer grille in the art room 121 storage room to restore to original operation. Original grille has been permanently covered over.
M15	Replace 15 original rooftop exhaust fans, which are at or nearing end of life expectancy, to restore to proper operation.
P1	Provide air gaps on all kitchen equipment drains as required by code.
P6	Repair or provide a new domestic hot water recirculation system and pumps for the Middle School to allow for hot water in the building in a timely manner as required by code.
E1	The HS has a combination off bell/strobe units as well as horn/stroke units, which is not allowed by code. Convert all existing bell/strobe units over to the more prevalent horn/strobe unit configuration. Assume 50 units,
E5	Provide exit and emergency lighting in the HS chorus room, as it is classified as an area of assembly, and requires same.
E6	Provide exit lighting, emergency lighting, horn/strobe units and fire alarm pull stations in the library courtyard.
E7	Firestop all penetrations in the MS second floor electrical room as required by code.
E9	Provide magnetic hold open devices on large group spaces including the theatre, libraries, band/chorus rooms, gymnasiums, student cafeterias, etc., to allow for lockdowns as discussed. Assume 20 doors total.
A7	Create alcove and reverse door swing toward corridor in spaces over 1000 sf at Classrooms 101/102 and 209/210 (with folding partitions) at Middle School.
A18	Create alcove and reverse door swing toward corridor in spaces over 1000 sf at Classrooms 100, 101, 103, 104, 134 and 229 at High School.
Total	

Braircliff MANOR HSMS PHASE 2

Item #	Briarcliff Manor HSMS Phase 2 (BBS File No.21-274C)
A6	Provide required rated separation between Maresca Center and Corridor with doors/partition (near Rm. 102) at High School.
A15	Remove corridor lockers where egress width is reduced to less than 8'-0" wide when locker doors are open at High School.
A21	Replace guardrail/ballusters and handrails in interior stairwells (four locations) at High School.
A22	Replace damaged, coated or bulging brick and tuckpoint mortar joints (both sides) at fuel tank/electrical enclosure. Tuckpoint mortar joints and replace damaged brick at High School.
N/A	Infill Light Well
M3	Uncover the combustion air intake louver in the boiler room, and provide a motorized damper to automatically close the damper when the boilers are not firing.
M8	Repair the insulation on the MS cafeteria ductwork to eliminate condensation from dripping down onto the ceiling and then on down to the walls and floor.
M10	Repair the insulation on the duct above the ceiling in HS room 110, which also drips onto the ceiling, and eventually down into the space.
M11	Provide a Variable Frequency Drive (VFD) on the MS Cafeteria chilled water A/C unit supply fan, add a humidity sensor, and add controls to allow for the unit to better dehumidify the cafeteria, which is reported to get cool and humid.
M12	Repair the chilled water pipe insulation in the MS/HS, especially at valves or saddles, where condensation forms and leaks down onto the hung ceiling tiles.
M18	Replace 7 older Carrier rooftop HVAC units, which are nearing the end of their life expectancy. New units will also improve comfort conditions and system energy efficiency. The units on the gyms will be replaced as part of the current gym roof replacement.
P2	Perform maintenance on the acid neutralizing pit in the HS electrical room adjacent to room 110, to reduce odors and restore system to proper operation.
P7	Provide a natural gas leak detection system in the boiler room area.
P14	Replace nine waterless urinals with new low flow urinals.
E22	Provide hardwired carbon monoxide detectors tied into the building's fire alarm system to replace the current battery and line voltage detectors.
A19	Enlarge and renovate student toilet rooms for ADA accessibility at High School (four locations).
N/A	Student Learning Exchange
Total	

Braircliff MANOR HSMS PHASE 3

	Briarcliff Manor HSMS Phase 3 (BBS File No.21-274E)
A3	Replace guardrail at exterior Auditorium ramp with proper height and baluster spacing at High School.
A23	Replace exterior concrete stairs/handrails at parking lot (3) and upper level tennis courts. (excludes MS entry and MS Cafeteria stairs).
A28	Security vestibule upgrades (transaction window and security film over existing glazing at High School and Middle School.
A33	Replace carpet in Music Rm. 90 at Middle School.
A37	Replace Auditorium seating (200 seats) at Middle School.
A38	Provide single key system (replace 200 cores) at High School.
M21	Upgrade the entire Automatic Temperature Control (ATC) system which currently consists of an older JCI Metasys panel as well as original pneumatic controls. Provide a new full DDC System to improve overall comfort levels, as well as eliminating the resultant over and under heating conditions. Provide new temperature sensors with a three degree adjustment band and an override feature.
M22	Provide Rawal Valves and new humidity controls for the HS Cafeteria rooftop unit to reduce the humidity in the space.
P12	Provide trap seals on floor drains that continuously dry out as discussed.
E29	Provide surge suppression at the main switchgear location to eliminate power surges.
Total	

BUILDING GENERAL NOTES:

M21. UPGRADE ENTIRE AUTOMATIC TEMPERATURE CONTROL (ATC). PROVIDE A NEW FULL DDC SYSTEM, AND PROVIDE NEW TEMPERATURE SENSORS. TEST ORIGINAL WALLS.

E1. CONVERT ALL BELL/STROBE UNITS TO A MORE PREVALENT ONE IN THE HIGH SCHOOL. TEST ORIGINAL WALLS.

E22. PROVIDE HARDWIRE CARBON MONOXIDE DETECTORS TID INTO THE ALARM SYSTEM. TEST ALL SUSPECTED MATERIALS.

MIDDLE SCHOOL

LEARNING EXCHANGE. FULL GUTT RENOVATION. TEST ALL MATERIALS.

P2.PERFORM MAINTENANCE ONT HE ACID NEUTRALIZING PIT

M3. UNCOVER COMBUSTION LOUVERS. TEST ALL SUSPECTED MATERIALS.

E9. PROVIDE MAGNETIC HOLD ON ON LARGE GROUP ROOMS. TEST WALL AND DOORS.

E5. PROVIDE EMERGENCY LIGHTING AND EXIST SIGN. TEST CEILING.

A.4. FIRESTOP/ SEAL PENETRATIONS AND TOP OF WALL. TEST ALL SUSPECTED MATERIALS

M.5 NEW TRANSFER GRILLE TO STORAGE ROOM. TEST ALL SUSPECTED MATERIALS

E9. PROVIDE MAGNETIC HOLD ON ON LARGE GROUP ROOMS. TEST WALL AND DOORS.

A-.INFILL LIGHT WELL. TEST ALL SUSPECTED MATERIALS.

M2. REPLACE EXHAUST FAN. TEST ALL SUSTPECTED MATERIALS.

E9. PROVIDE MAGNETIC HOLD ON ON LARGE GROUP ROOMS. TEST WALL AND DOORS.

A7. REVERSE DOOR SWING. A18. REVERSE DOORS IN ROOMS OVER 1000SF. TEST DOORS AND WALLS.

A33. REPLACE CARPET. TEST CARPET.

A.4. FIRESTOP/ SEAL PENETRATIONS AND TOP OF WALL. TEST ALL SUSPECTED MATERIALS

A37. REPLACE SEATING. TEST FLOOR FINISHES.

M10. REPAIR DUCTWORK INSULATION. TEST CEILING AND CURRENT INSULATION. TEST ALL SUSPECTED MATERIALS.

M4. NEW EXHAUST FAN IN COPY ROOM TO VENT OUTSIDE. TEST ALL SUSPECTED MATERIALS

A6. PROVIDE RATED SEPARATION BETWEEN MARESCA CENTER AND CORRIDOR. TEST FLOOR, CEILING AND WALLS FINISHES.

A21.REPLACE GUARDRAIL/BALLUS TERS AND HANDRAIL IN STAIRS. TEST ALL FINISHES MATERIALS.

A15. REMOVE LOCKERS WHERE EGRESS WIDTH IS REDUCE TO LESS THAN 8'. TEST ALL FINISHES MATERIAL.

A16. REMOVE MANUAL HOLD OPEN DEVICES (REPLACE HOLD CLOSER) TEST DOORS AND FLOOR.

A28. TRANSACTION WINDOW AND SECURITY FILM OVER EXISTING GLAZING. TEST GLAZING.

P14.REPLACE URINALS IN BOYS TOILETS. TEST ALL FINISHES MATERIALS INCLUDING GIRLS TOILET.

A28. TRANSACTION WINDOW AND SECURITY FILM OVER EXISTING GLAZING. TEST GLAZING.

A22. TUCKPOINT MORTAR JOINTS AND REPLACE DAMAGED BRICK. TEST ALL SUSPECTED EXTERIOR MATERIALS.

M8. REPAIR DUCTWORK INSULATION. TEST CEILINGS AND CURRENT INSULATION MATERIAL. TEST ALL SUSPECTED MATERIALS

E9. PROVIDE MAGNETIC HOLD ON ON LARGE GROUP ROOMS. TEST WALL AND DOORS.

A3. REPLACE HANDRAIL. TEST ALL SUSPECTED MATERIALS

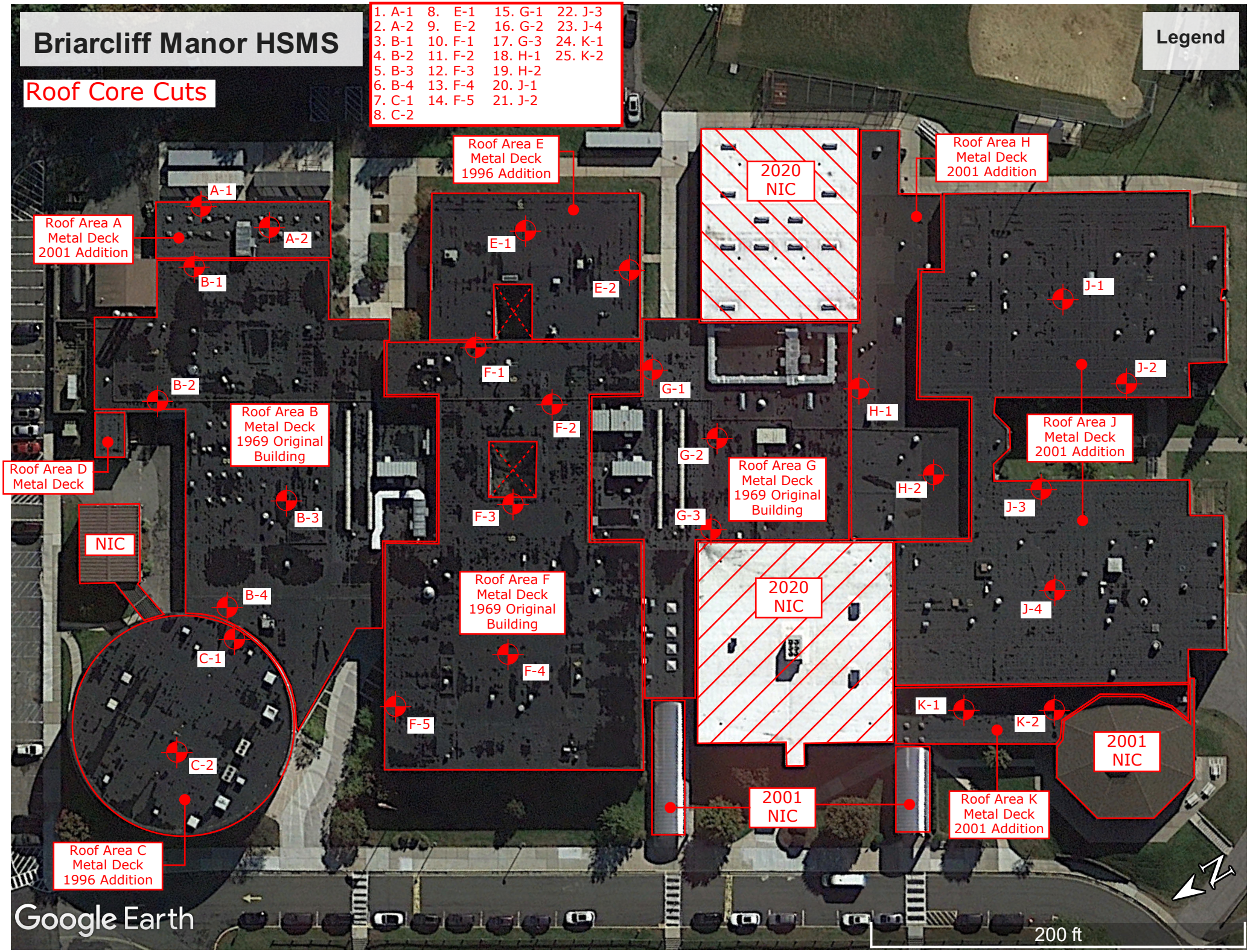
EXISTIING FIRST FLOOR PLAN

BRIARCLIFF H.S.

BRIARCLIFF C.S.D.

06/30/21

BBS ARCHITECTS LANDSCAPE ARCHITECTS ENGINEERS


Briarcliff Manor HSMS
Roof Core Cuts
1. A-1
2. A-2
3. B-1
4. B-2
5. B-3
6. B-4
7. C-1
8. C-2
8. E-1
9. E-2
10. F-1
11. F-2
12. F-3
13. F-4
14. F-5
15. G-1
16. G-2
17. G-3
18. H-1
19. H-2
20. J-1
21. J-2
22. J-3
23. J-4
24. K-1
25. K-2
Legend
Roof Area A Metal Deck 2001 Addition
Roof Area B Metal Deck 1969 Original Building
Roof Area C Metal Deck 1996 Addition
Roof Area D Metal Deck
Roof Area E Metal Deck 1996 Addition
Roof Area F Metal Deck 1969 Original Building
Roof Area G Metal Deck 1969 Original Building
Roof Area H Metal Deck 2001 Addition
Roof Area J Metal Deck 2001 Addition
Roof Area K Metal Deck 2001 Addition
2020 NIC
2020 NIC
2001 NIC
2001 NIC
NIC
Google Earth
200 ft
N

APPENDIX I:
PHOTOGRAPHIC DOCUMENTATION

500 Summit Lake Drive, Suite 450 Valhalla, NY 10595	PHOTOGRAPHIC DOCUMENTATION	
Client: Briarcliff Manor Union Free School District	Project Name: Final Report of Environmental Services for Phase 1, 2 & 3 Project at Briarcliff Middle/High School	WSP Project No.: 31403475.004

PHOTO No.: 1	
DESCRIPTION: Roof Area G Tar (black) at base of AHU (Air Handling Unit) kerbs (typical) confirmed to be ACM	

PHOTO No.: 2	
DESCRIPTION: Interior, 1st Floor, Maresca Center Joint Compound (tan) (typical) confirmed to be ACM	

500 Summit Lake Drive, Suite 450 Valhalla, NY 10595	PHOTOGRAPHIC DOCUMENTATION	
Client: Briarcliff Manor Union Free School District	Project Name: Final Report of Environmental Services for Phase 1, 2 & 3 Project at Briarcliff Middle/High School	WSP Project No.: 31403475.004

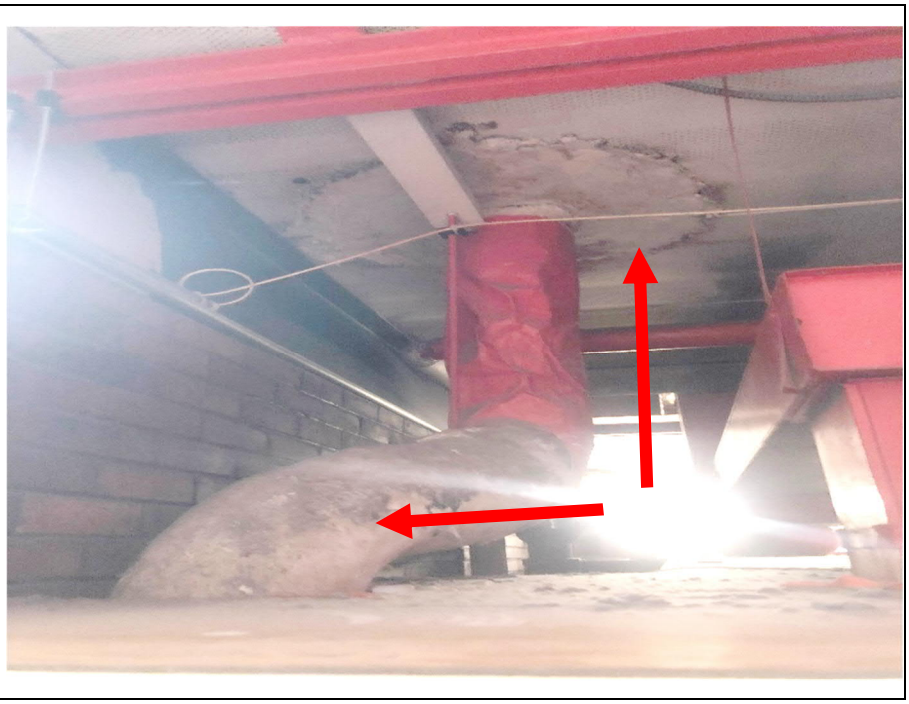
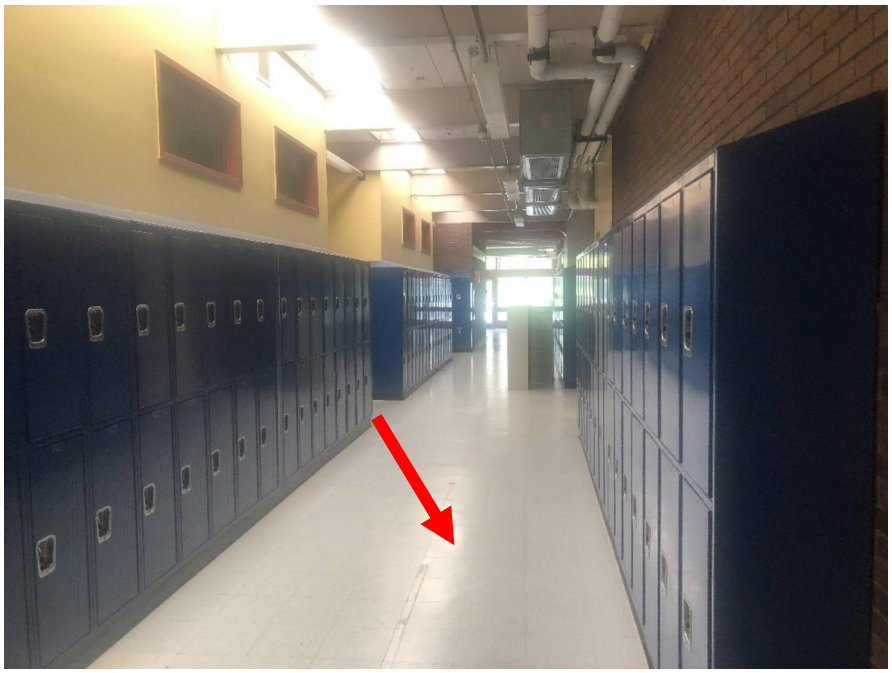
PHOTO No.: 3	
DESCRIPTION: Interior, 1st Floor, Ceiling Area (typical) above A & C Wing Boys and Girls Toilets Cementitious material (white) under roof drains confirmed to be ACM and Pipe Elbows confirmed to be ACM (As per 2019 AHERA)	

PHOTO No.: 4	
DESCRIPTION: Interior, 1st Floor, Ceiling Area (typical) above A & C Wing Boys and Girls Toilets Pipe Elbows confirmed to be ACM (As per 2019 AHERA)	

WSP 500 Summit Lake Drive, Suite 450 Valhalla, NY 10595	PHOTOGRAPHIC DOCUMENTATION	
Client: Briarcliff Manor Union Free School District	Project Name: Final Report of Environmental Services for Phase 1, 2 & 3 Project at Briarcliff Middle/High School	WSP Project No.: 31403475.004

PHOTO No.: 5	
DESCRIPTION: Interior, HS Stairs (typical) 12”x12” Floor Tile and associated mastic confirmed to be ACM (As per 2019 AHERA)	

PHOTO No.: 6	
DESCRIPTION: Interior, 1st Floor, A/C Wing Hallway Locker Area (typical) 12”x12” Floor Tile and associated mastic confirmed to be ACM (As per 2019 AHERA)	

500 Summit Lake Drive, Suite 450 Valhalla, NY 10595	PHOTOGRAPHIC DOCUMENTATION	
Client: Briarcliff Manor Union Free School District	Project Name: Final Report of Environmental Services for Phase 1, 2 & 3 Project at Briarcliff Middle/High School	WSP Project No.: 31403475.004

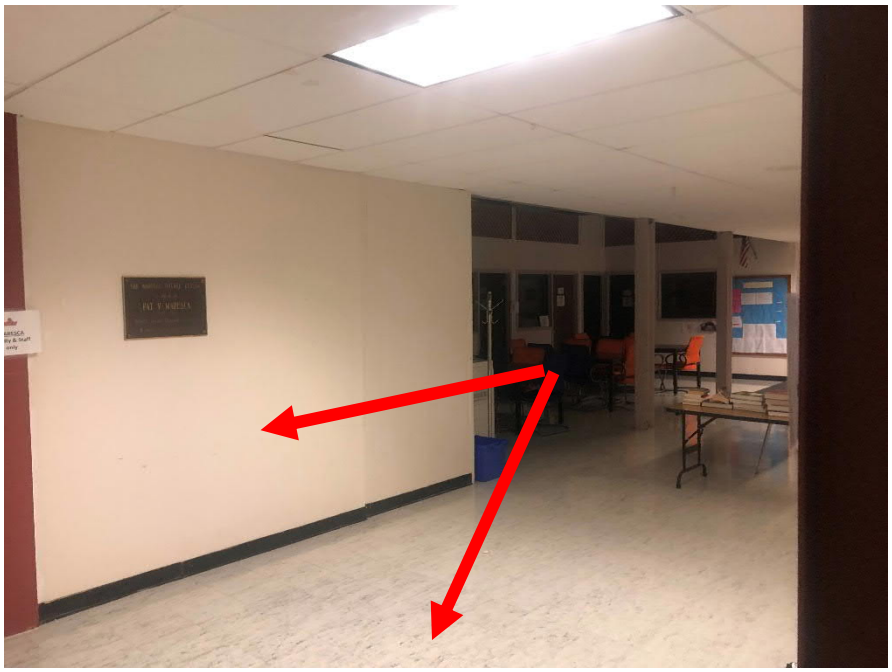
PHOTO No.: 7	
DESCRIPTION: Interior, 1st Floor, Maresca Center 12"x12" Floor Tile and associated mastic confirmed to be ACM (As per 2019 AHERA) and Joint Compound (tan) confirmed to be ACM	

PHOTO No.: 8	
DESCRIPTION: Interior, 1st Floor, Room 103 Purple paint to wood wall confirmed to be lead-based paint LBP.	

APPENDIX J:
FILE SEARCH

565 Taxter Road, Suite 510
Elmsford, New York 10523

HOMOGENEOUS AREA SHEET

Client: Briarcliff Manor UFSD **Project Site:** Todd Elementary School

Inspector(s): Drew Cheskin **Management Planner(s):** Drew Cheskin **Project #:** 2042839.044

HA #	Homogenous Area Description	Material Type	ACM	Friable
01	**12”x12” White VAT w/ Gray Marble and Mastic**	**M**	**YES**	**NO**
02	**12”x12” White VAT w/ Gray Specks and Mastic**	**M**	**YES**	**NO**
03	**Mastic to 12”x12” Light Blue w/ Dark Blue VAT**	**M**	**YES**	**NO**
04	**Mastic to 12”x12” Light Salmon w/ Dark Salmon VAT**	**M**	**YES**	**NO**
05	**Sheetrock (Joint Compound Only)**	**M**	**YES**	**YES**
06	**Mudded Joint Packing**	**M**	**YES**	**YES**
07	**Transite Table Top Beneath Hood**	**M**	**YES**	**YES**
08	**Pipe Elbows**	**M**	**YES**	**YES**
09	Ceiling Plaster, Brown Coat (Girls Locker Room Shower)	S	NO	YES
10	**Ceiling Plaster, White Coat (Girls Locker Room Shower)**	**S**	**YES**	**YES**
11	Mastic to 12”x12” Floor Tile, Black (Hall outside Loading Dock)	M	NO	NO
12	12”x12” Floor Tiles, White (Hall outside Loading Dock)	M	NO	NO
13	Mastic to 4” Cove Base, Yellow (Hall outside Loading Dock)	M	NO	NO
14	Drywall, White (Hall outside Loading Dock)	M	NO	YES
15	Drywall, Gray (Custodians Office & Restroom)	M	NO	YES
16	Mastic assoc. with Cork Board, Brown (Custodians Office)	M	NO	NO
17	Cork Board, Brown (Custodians Office)	M	NO	YES

TSI = Thermal System Insulation S = Surfacing M = Miscellaneous

SUMMARY OF SPACE

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
BRIARCLIFF MANOR HIGH SCHOOL
444 PLEASANTVILE ROAD, BRIARCLIFF MANOR, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
1004	High School Custodians Office	2	12"x12" Floor Tile and Associated Mastic	64 SF	X	-	-	64 SF	White w/ Gray Marble
1006	Hallway at Kitchen	2	12"x12" Floor Tile and Associated Mastic	1200 SF	X	-	-	1200 SF	White w/ Gray Marble
1011	High School Kitchen Storage	2	12"x12" Floor Tile and Associated Mastic	250 SF	X	-	-	250 SF	White w/ Gray Marble
1014	Kitchen Office	2	12"x12" Floor Tile and Associated Mastic	56 SF	X	-	-	56 SF	White w/ Gray Marble
1021	C-Wing Halls	2	12"x12" Floor Tile and Associated Mastic	5,950 SF	X	-	-	5950 SF	White w/ Gray Specks
1022	Counselor	2	12"x12" Floor Tile and Associated Mastic	300 SF	X	-	-	300 SF	White w/ Gray Specks
1023	Music Storage	2	12"x12" Floor Tile and Associated Mastic	300 SF	X	-	-	300 SF	White w/ Gray Specks (Under Carpet)
1040	Corridor Rear @ HS Library	2	12"x12" Floor Tile and Associated Mastic	10,982 SF	X	-	-	10,982 SF	White w/ Gray Marble
1049	Room 113	2	12"x12" Floor Tile and Associated Mastic	540 SF	X	-	-	540 SF	White w/ Gray Marble
1050	Room 112	2	12"x12" Floor Tile and Associated Mastic	600 SF	X	-	-	600 SF	White w/ Gray Marble
1051	Stairs	2	12"x12" Floor Tile and Associated Mastic	120 SF	X	-	-	120 SF	White w/ Gray Marble
1066	Custodial Closet	1	Pipe Elbow	10 LF	7	-	-	10 LF	
1067	Stairs	2	12"x12" Floor Tile and Associated Mastic	120 SF	X	-	-	120 SF	White w/ Gray Marble
1072	Nurse's Office	2	12"x12" Floor Tile and Associated Mastic	380 SF	X	-	-	380 SF	White w/ Gray Marble
1073	Nurse's Closet	2	12"x12" Floor Tile and Associated Mastic	80 SF	X	-	-	80 SF	White w/ Gray Marble

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
BRIARCLIFF MANOR HIGH SCHOOL
444 PLEASANTVILE ROAD, BRIARCLIFF MANOR, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
1074	Closet	2	12"x12" Floor Tile and Associated Mastic	96 SF	X	-	-	96 SF	White w/ Gray Marble
1077	Stairs	2	12"x12" Floor Tile and Associated Mastic	120 SF	X	-	-	120 SF	White w/ Gray Marble
1080	Hallway	2	12"x12" Floor Tile and Associated Mastic	2,832 SF	X	-	-	2,832 SF	White w/ Gray Marble
1081	Room 145	2	12"x12" Floor Tile and Associated Mastic	650 SF	X	-	-	650 SF	White w/ Gray Marble (Under Carpet)
1082	Room 144	1	Pipe Elbow	9 LF	7	-	-	9 LF	
1082	Room 144	2	12"x12" Floor Tile and Associated Mastic	100 SF	X	-	-	100 SF	White w/ Gray Marble
1083	Room 143	2	12"x12" Floor Tile and Associated Mastic	100 SF	X	-	-	100 SF	White w/ Gray Marble
1084	Room 142	1	Pipe Elbow	10 LF	7	-	-	10 LF	
1084	Room 142	2	12"x12" Floor Tile and Associated Mastic	100 SF	X	-	-	100 SF	White w/ Gray Marble
1085	Room 141	2	12"x12" Floor Tile and Associated Mastic	150 SF	X	-	-	150 SF	White w/ Gray Marble
1086	Room 140	2	12"x12" Floor Tile and Associated Mastic	130 SF	X	-	-	130 SF	White w/ Gray Marble
1087	Room 153	2	12"x12" Floor Tile and Associated Mastic	150 SF	X	-	-	150 SF	White w/ Gray Marble (Under Carpet)
1088	Room 152	2	12"x12" Floor Tile and Associated Mastic	192 SF	X	-	-	192 SF	White w/ Gray Marble
1089	Room 151	2	12"x12" Floor Tile and Associated Mastic	96 SF	X	-	-	96 SF	White w/ Gray Marble (Under Carpet)
1090	Room 150	1	Pipe Elbow	12 LF	7	-	-	12 LF	
1090	Room 150	2	12"x12" Floor Tile and Associated Mastic	96 SF	X	-	-	96 SF	White w/ Gray Marble

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
BRIARCLIFF MANOR HIGH SCHOOL
444 PLEASANTVILE ROAD, BRIARCLIFF MANOR, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
1091	Room 149	2	12"x12" Floor Tile and Associated Mastic	84 SF	X	-	-	84 SF	White w/ Gray Marble
1092	Room 148	2	12"x12" Floor Tile and Associated Mastic	192 SF	X	-	-	192 SF	White w/ Gray Marble
1093	Room 147	2	12"x12" Floor Tile and Associated Mastic	140 SF	X	-	-	140 SF	White w/ Gray Marble
1094	Room 146	2	12"x12" Floor Tile and Associated Mastic	140 SF	X	-	-	140 SF	White w/ Gray Marble (Under Carpet)
1095	Maresca Center	2	12"x12" Floor Tile and Associated Mastic	1,800 SF	X	-	-	1,800 SF	White w/ Gray Marble
1104	A-Wing Hallway	2	12"x12" Floor Tile and Associated Mastic	6,200 SF	X	-	-	6,200 SF	White w/ Gray Specks
1106	Security Office	2	12"x12" Floor Tile and Associated Mastic	600 SF	X	-	-	600 SF	White w/ Gray Marble (Under Carpet)
1107	Copy Room	2	12"x12" Floor Tile and Associated Mastic	200 SF	X	-	-	200 SF	White w/ Gray Specks
1109	Equipment Managers Office	1	Pipe Elbow	12 LF	7	-	-	12 LF	
1109		2	12"x12" Floor Tile and Associated Mastic	110SF	X	-	-	110SF	White w/ Gray Marble
1110	Boy's Locker Vestible	2	12"x12" Floor Tile and Associated Mastic	30 SF	X	-	-	30 SF	White w/ Gray Marble
1113	Trainer's Room (In Gym)	2	12"x12" Floor Tile and Associated Mastic	150 SF	X	-	-	150 SF	White w/ Gray Marble
1114	Athletic Director's Office	1	Pipe Elbow	4 LF	7	-	-	4 LF	Above Ceiling
1116	Storage (In Gym)	1	Pipe Elbow	20 LF	7	-	-	20 LF	
1118	Girl's Locker Vestible	2	12"x12" Floor Tile and Associated Mastic	30 SF	X	-	-	30 SF	White w/ Gray Marble
1126	Storage	1	Pipe Elbow	50 LF	7	-	-	50 LF	

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
BRIARCLIFF MANOR HIGH SCHOOL
444 PLEASANTVILE ROAD, BRIARCLIFF MANOR, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
1128	Storage	2	12"x12" Floor Tile and Associated Mastic	100 SF	X	-	-	100 SF	White w/ Gray Marble
2011	Stairs	2	12"x12" Floor Tile and Associated Mastic	110 SF	X	-	-	110 SF	White w/ Gray Marble
2022	Stairs	2	12"x12" Floor Tile and Associated Mastic	110SF	X	-	-	110SF	White w/ Gray Marble
2023	Room 218	2	12"x12" Floor Tile and Associated Mastic	420 SF	X	-	-	420 SF	White w/ Gray Marble
2025	Room 217	2	12"x12" Floor Tile and Associated Mastic	840 SF	X	-	-	840 SF	White w/ Gray Specks
2027	Room 216	2	12"x12" Floor Tile and Associated Mastic	420 SF	X	-	-	420 SF	White w/ Gray Specks
2028	Room 215	2	12"x12" Floor Tile and Associated Mastic	840 SF	X	-	-	840 SF	White w/ Gray Specks
2029	Room 214	2	12"x12" Floor Tile and Associated Mastic	1,216 SF	X	-	-	1,216 SF	White w/ Gray Specks
2030	Room 212	2	12"x12" Floor Tile and Associated Mastic	110 SF	X	-	-	110 SF	White w/ Gray Specks
2031	Book Storage	2	12"x12" Floor Tile and Associated Mastic	176 SF	X	-	-	176 SF	White w/ Gray Specks
2032	Hallway	2	12"x12" Floor Tile and Associated Mastic	512 SF	X	-	-	512 SF	White w/ Gray Specks
2033	Room 210	2	12"x12" Floor Tile and Associated Mastic	784 SF	X	-	-	784 SF	White w/ Gray Specks
2034	Room 208	2	12"x12" Floor Tile and Associated Mastic	784 SF	X	-	-	784 SF	White w/ Gray Specks
2035	Room 207	2	12"x12" Floor Tile and Associated Mastic	176 SF	X	-	-	176 SF	White w/ Gray Specks
2036	Room 206	2	12"x12" Floor Tile and Associated Mastic	784 SF	X	-	-	784 SF	White w/ Gray Specks

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

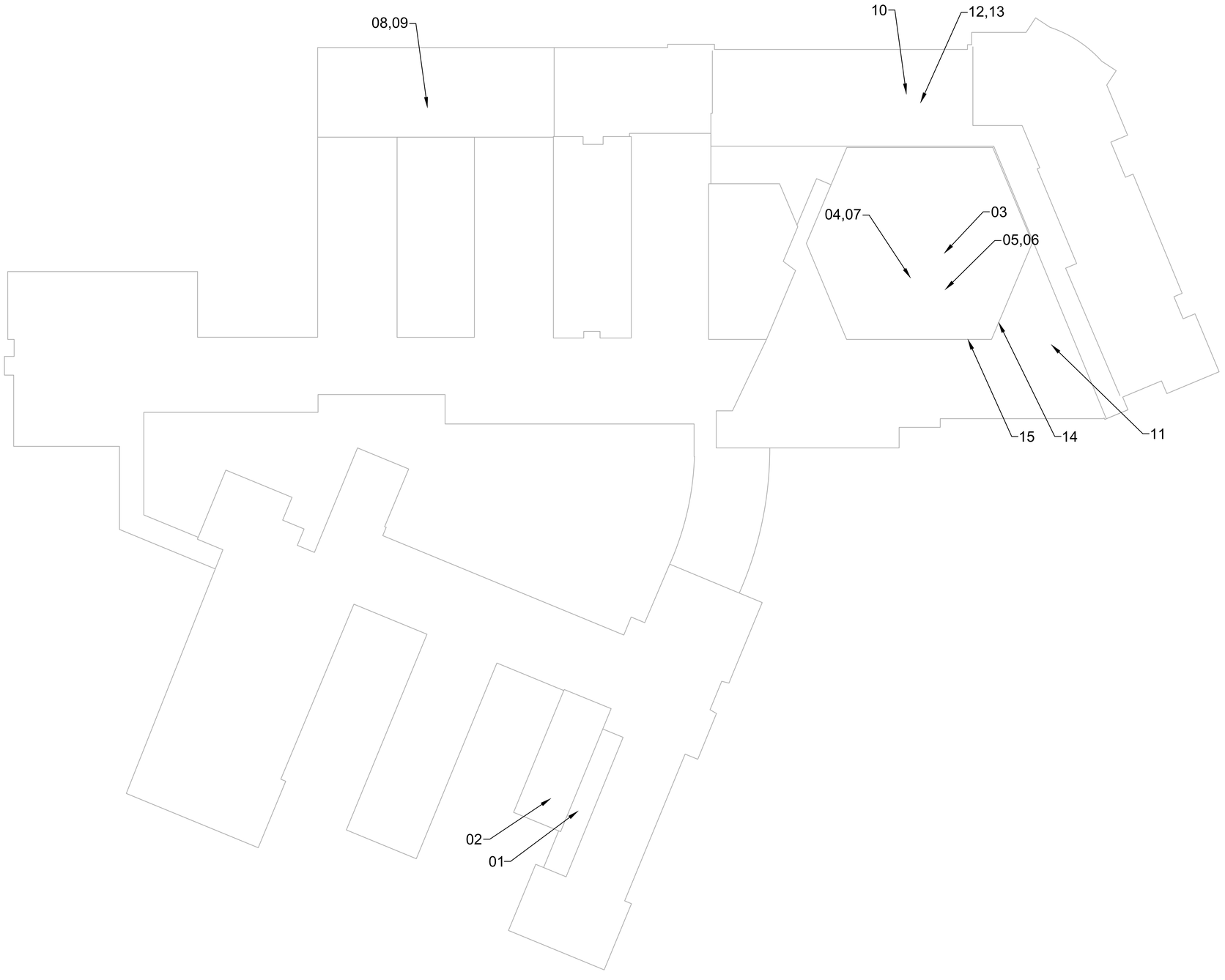
BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
BRIARCLIFF MANOR HIGH SCHOOL
444 PLEASANTVILE ROAD, BRIARCLIFF MANOR, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
2037	Room 204	2	12"x12" Floor Tile and Associated Mastic	896 SF	X	-	-	896 SF	White w/ Gray Specks
2038	Room 200	3	Sheetrock and Associated Joint Compound	628 SF	7	-	-	628 SF	
2038	Room 200	2	12"x12" Floor Tile and Associated Mastic	448 SF	X	-	-	448 SF	White w/ Gray Specks
2040	Room 203	2	12"x12" Floor Tile and Associated Mastic	784 SF	X	-	-	784 SF	White w/ Gray Specks
2041	Room 201	2	12"x12" Floor Tile and Associated Mastic	784 SF	X	-	-	784 SF	White w/ Gray Specks
2042	Hallway	2	12"x12" Floor Tile and Associated Mastic	416 SF	X	-	-	416 SF	White w/ Gray Specks
2043	Room 242	2	12"x12" Floor Tile and Associated Mastic	104 SF	X	-	-	104 SF	White w/ Gray Specks
2047	Hallway	2	12"x12" Floor Tile and Associated Mastic	712 SF	X	-	-	712 SF	White w/ Gray Specks
2054	Stairs	2	12"x12" Floor Tile and Associated Mastic	110 SF	X	-	-	110 SF	White w/ Gray Specks
2059	Stairs	2	12"x12" Floor Tile and Associated Mastic	110 SF	X	-	-	110 SF	White w/ Gray Specks

ASSESSMENT CATEGORIES

1. = Damaged or Significantly Damaged TSI ACBM
2. = Damaged Friable Surfacing ACBM
3. = Significantly Damaged Friable Surfacing ACBM
4. = Damaged or Significantly Damaged Friable Miscellaneous ACBM
5. = ACBM with Potential for Damage
6. = ACBM with Potential for Significant Damage
7. = Any Remaining Friable ACBM or Friable Suspect ACBM

X. = Not Applicable (Material is Nonfriable Surfacing or Miscellaneous Material)



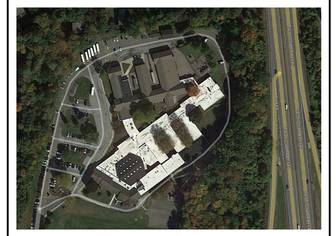
1 BULK SAMPLE LOCATION PLAN - ROOF

SCALE: NOT TO SCALE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL. 914.742.1120

TODD ELEMENTARY SCHOOL
45 INGHAM RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

TODD ELEMENTARY SCHOOL

DRAWING TITLE:

BULK SAMPLE LOCATION PLAN ROOF

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER: **BSL002**
CHECKED BY: A. SMOLYAR	DRAWING NUMBER: 2 OF 2

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FINAL REPORT OF ENVIRONMENTAL SERVICES

Performed at:

TODD ELEMENTARY SCHOOL
45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

Prepared for:

Briarcliff Manor Union Free School District
45 Ingham Road
Briarcliff Manor, NY 10510

Prepared by:

WSP USA Solutions, Inc.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
Tel. (914) 747-1120

Project No. 31403475.005
Final Submission Date: September 21, 2021

September 21, 2021

Mr. Anthony Bauso
Assistant Director of Facilities Operations & Maintenance
Briarcliff Manor Union Free School District
45 Ingham Road
Briarcliff Manor, NY 10510

Subject: **Final Report of Environmental Services**
Todd Elementary School
45 Ingham Road
Briarcliff Manor, NY 10510

Dear Mr. Bauso:

WSP USA Solutions, Inc. has completed a material inspection at the Todd Elementary School located at 45 Ingham Road, Briarcliff Manor, NY 10510. The inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) as part of the BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

WSP USA SOLUTIONS, INC.



Craig Napolitano, CHMM
Vice President, Emergency Management & IH Services

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1.0 EXECUTIVE SUMMARY

WSP USA Solutions, Inc. has performed a material inspection for the presence or absence of Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) at the Todd Elementary School located at 45 Ingham Road, Briarcliff Manor, NY 10510. The intent of this inspection was to screen for ACM, LBP and PCBs that may be impacted during the BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School.

Stephen Gruber and Nicholas Casale of WSP performed this inspection on August 17, 19 and 27, 2021. Mr. Gruber is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-42557) and is licensed New York State EPA as a Lead Inspector (Cert# LBP-I-I219874-1). Mr. Casale is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-25789) and is licensed New York State EPA as a Lead Inspector (LBP-I-I207478-1)

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM, LBP and PCB materials may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School:

A. ASBESTOS-CONTAINING MATERIAL

Analytical results of the bulk samples collected on 08/17/21, 08/19/2021 and 08/27/2021 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Tar at Foundation Wall**
- **Beige Door Frame Caulking**
- **Expansion Join Caulking (Gray) at wall**
- **Gray Door Frame Caulking**
- **Cementitious Windowsill (White)**
- **Sealant (beige) at brick expansion join**

The following materials **contain asbestos as per 2019 AHERA Report**

- **9”x9” White VAT w/Black Specks and Mastic (Not Affected by SOW)**
- **9”x9” Blue VAT w/White Specks and Mastic (Not Affected by SOW)**
- **9”x9” Tan VAT w/Black Marbled and Mastic (Not Affected by SOW)**
- **9”x9” Orange-Born VAT and Mastic (Not Affected by SOW)**
- **9”x9” Gray VAT w/Beige Specks and Mastic (Not Affected by SOW)**
- **9”x9” White VAT w/Brown Specks and Mastic (Not Affected by SOW)**
- **9”x9” Black VAT w/White Spots and Mastic (Not Affected by SOW)**
- **9”x9” Black VAT w/White Marbled and Mastic (Not Affected by SOW)**
- **Pipe Elbows (Not Affected by SOW)**
- **Pipe Insulation (Not Affected by SOW)**

Analytical results of the bulk samples collected on 08/17/21, 08/19/2021 and 08/27/2021 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum (White) under EPDM Roofing
- Perlite Insulation (tan)
- Fiberboard (brown) under EPDM
- Vent Sealant (Gray)
- Pitch Pocket Sealant (Gray)
- Pitch Pocket Sealant (Black)
- Gray Caulking at Metal Cap Flashing
- Sink Undercoating (Gray)
- Brown Mastic associated w. cove base (2nd Layer)
- Crème adhesive associated w. cove base (1st Layer)
- Blue Cove Base
- 12”x12” White VFT w. Blue Spots
- White Floor Levelling Compound w. Yellow Adhesive
- Acoustical Ceiling Plaster (Gray)
- Ceiling Plaster Patches (White)
- Black Glue dots on wall
- Sealant (White) at pipe edges
- Cementitious Ceiling (Gray)
- Yellow mastic assoc. w. Carpet Flooring
- Mortar assoc. w. ceramic floor tiles
- Backing associated w. ceramic wall tiles
- White textured paint
- Mortar at Cinder Block
- Window Caulking (White)
- Expansion Joint Caulking Brown (At Wall)
- Window Frame Caulking (Gray)
- Stone Sill Caulking (Crème)
- Fiberboard at Floor (Black)
- 2’x4’ Suspended Ceiling Tiles
- Cementitious Windowsill (Black)
- Black mastic assoc. w. 12”x12” White VFT w. Brown Spots
- 12”x12” White VFT w. Brown Spots
- Joint compound (white) assoc. w. Gypsum Board
- Gypsum Board (White)
- Backing (grayish/white) assoc. w. ceramic wall tiles
- Grout (white) assoc. w. ceramic wall tiles
- 12”x12” Gray w. Spots Vinyl Floor Tiles
- Black Mastic assoc. w. 12”x12” Gray w. Spots Vinyl Floor Tiles
- Black Cove Base (6”)
- Gray mastic associated w. black cove base (6”)
- Wall Plaster (Brown Coat)

- Wall Plaster (White Coat)
- Ceiling Plaster (Brown Coat)
- Ceiling Plaster (White Coat)
- Mortar (gray) at ceramic floor tiles
- Backing (gray) assoc. w. ceramic wall tiles
- Grout (white) assoc. w. ceramic wall tiles
- Gypsum Board (Brown)
- Joint Compound assoc. w. Gypsum Board (white)
- Brick Mortar (gray)
- Louver Caulking (Gray)

Analytical results of bulk samples **previously collected** by Berger indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Glue Dots, Brown
- Gypsum Board, Gray
- Wall Plaster, Brown Coat
- Wall Plaster, White Coat
- Ceiling Insulation, White
- Ceiling Insulation, Brown
- Ceiling Plaster, Brown Coat
- Ceiling Plaster, White Coat
- Glue dots assoc. w. peg board brown
- Pegboard

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **White Paint on Metal I-Beam**
- **White Paint on Metal Ceiling**
- **Tan Paint on Metal Ceiling**
- **Tan Paint on Metal I-Beam**
- **White Paint on Wood Door Frame**
- **White Paint on Wood Awning**

Lead was **not detected** in the following tested combinations via XRF readings:

- Red Paint on Metal Exterior Door Frame
- Varnish Paint on Wood Door
- Gray Paint on Metal Door Frame
- White Paint on Concrete Wall
- White Paint on Cinderblock Wall

- Red Paint on Metal Radiator Cover
- White Paint on Vinyl Electric Conduit
- White Paint on Metal Electric Conduit
- White Paint on Metal Radiator Cover
- White Paint on Wood Shelves
- Tan Paint on Gypsum Wall
- White Paint on Metal Window Frame
- White Paint on Metal Radiator Cover
- Tan Paint on Metal Column
- Yellow Paint on Gypsum Wall
- Red Paint on Metal Handrail
- Red Paint on Metal Door
- Yellow Paint on Cinder Block Wall
- White Paint on Plaster Wall
- Red Paint on Wood Wall Trim
- Red Paint on Wood Door Frame
- Red Paint on Wood Door
- Yellow Paint on Plaster Wall
- Red Paint on Wood Window Frame
- Beige Paint on Metal Door Frame
- Blue Paint on Metal Door
- Varnish Paint on Wood Window Frame
- Blue Paint on Vinyl Baseboard
- Yellow Paint on Metal Radiator Cover
- Black Paint on Vinyl Baseboard
- Yellow Paint on Corkboard
- Yellow Paint on Glass Window
- Yellow Paint on Wood Window Frame
- Yellow Paint on Concrete Wall
- Red Paint on Metal Column
- White Paint on Wood Door Frame
- Tan Paint on Cinder Block Wall
- White Paint on Cinderblock Wall
- Yellow Paint on Brick Wall
- Blue Paint on Metal Door Frame
- Blue Paint on Cinder Block Wall
- Blue Paint on Metal Radiator Cover
- Red Paint on Metal Door
- Red Paint on Metal Door Frame
- Blue Paint on Metal Door Frame
- Black Paint on Metal Stairs
- Red Paint on Concrete Floor

C. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Gray Caulking at Metal Cap Flashing
- Brown Expansion Join Caulking
- Gray Expansion Join Caulking
- Beige Door Frame Caulking
- White Window Caulking
- Gray Window Frame Caulking
- Crème Stone Joint Caulking
- Gray Door Frame Caulking
- Gray Louver Frame Caulking

2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS

A. ASBESTOS-CONTAINING MATERIAL

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater then 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25th, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25th 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method "Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples" must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each "negative" (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a "non-friable" material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is Atlas Environmental Lab Corp located at 255 West 36th Street | New York, NY 10018. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 500092-0)
- New York State Environmental Laboratory Approval Program (Lab No. 11999)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 208306)

B. LEAD-BASED PAINT

Painted surfaces within the space equivalents in the scope of work were identified and grouped together by component type, substrate and visible color. In similar fashion, the inspection continued in each space equivalent with the identification of unique combinations of component, substrate and visible color. A random representative area of each unique combination was sampled and tested. For each of these designated components, an area on the component was chosen which represents the paint on that building component. During the inspection, components that are accessible surfaces, friction surfaces, impact surfaces, or have deteriorated paint was identified.

The readings of paint surfaces were taken using Heuresis Pb200i XRF Lead Paint Spectrum Analyzer. The Heuresis method of measurement is based on the spectrometric analysis of lead K-shell X-ray fluorescence within a controlled depth of interrogation. The Heuresis Analyzer uses a Co-57 radioactive source and an advanced, solid-state, room temperature, radiation detector to generate and detect the x-ray fluorescence spectrum of a painted surface. The spectrum is then analyzed by a microprocessor to eliminate the effects of substrate and other factors such as scattering to allow an accurate determination of the amount of lead on a surface. The Heuresis automatically analyzes spectrometric data in real time and differentiates the lead signal from the spectrum. The x-ray fluorescence properties are determined through calibration process and are used for automatic substrate correction and calculation of the lead content of a painted surface.

For quality control, the XRF instrument was calibrated using a U.S. Department of Commerce National Institute of Standards and Technology (NIST) Level III 1.0 mg/cm2 lead based paint film. For each calibration, three (3) XRF readings were taken on the paint film. The average of these three (3) readings was then subtracted from the known lead content in the paint film. The difference was compared with an Environmental Protection Agency (EPA)-approved tolerance range. Such calibration procedures were conducted at the start and at the end of the workday.

C. POLYCHLORINATED BIPHENYLS (PCBs)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.

The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is aroclor.

Polychlorinated biphenyls (PCBs) are regulated pursuant to the United States Environmental Protection Agency Code of Federal Regulations (40 CFR Part 761) and the Toxic Substances Control Act (TSCA – 15 U.S.C. 2605). These regulations require certain testing and reporting requirements to determine management, recycling and disposal options for PCBs.

3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT

The areas inspected for ACM materials that may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School. Locations surveyed include:

- Roofs (Limited Survey of designated roof areas as per BBS personnel)
- Exterior – Façade
- Interior – Various Locations

A. ASBESTOS-CONTAINING MATERIAL

Materials examined during the WSP this inspection included:

- Gypsum (White) under EPDM Roofing
- Perlite Insulation (tan)
- Fiberboard (brown) under EPDM
- Vent Sealant (Gray)
- Pitch Pocket Sealant (Gray)
- Pitch Pocket Sealant (Black)
- Gray Caulking at Metal Cap Flashing
- Sink Undercoating (Gray)
- Brown Mastic associated w. cove base (2nd Layer)
- Crème adhesive associated w. cove base (1st Layer)
- Blue Cove Base
- 12”x12” White VFT w. Blue Spots
- White Floor Levelling Compound w. Yellow Adhesive
- Acoustical Ceiling Plaster (Gray)
- Ceiling Plaster Patches (White)
- Black Glue dots on wall
- Sealant (White) at pipe edges
- Cementitious Ceiling (Gray)
- Yellow mastic assoc. w. Carpet Flooring
- Mortar assoc. w. ceramic floor tiles
- Backing associated w. ceramic wall tiles
- White textured paint
- Mortar at Cinder Block
- Window Caulking (White)
- Expansion Joint Caulking Brown (At Wall)
- Tar at Foundation Wall
- Beige Door Frame Caulking
- Expansion Join Caulking (Gray) at wall
- Window Frame Caulking (Gray)
- Stone Sill Caulking (Crème)

- Gray Door Frame Caulking
- Fiberboard at Floor (Black)
- 2'x4' Suspended Ceiling Tiles
- Cementitious Windowsill (Black)
- Cementitious Windowsill (White)
- Black mastic assoc. w. 12"x12" White VFT w. Brown Spots
- 12"x12" White VFT w. Brown Spots
- Sealant (beige) at brick expansion join
- Joint compound (white) assoc. w. Gypsum Board
- Gypsum Board (White)
- Backing (grayish/white) assoc. w. ceramic wall tiles
- Grout (white) assoc. w. ceramic wall tiles
- 12"x12" Gray w. Spots Vinyl Floor Tiles
- Black Mastic assoc. w. 12"x12" Gray w. Spots Vinyl Floor Tiles
- Black Cove Base (6")
- Gray mastic associated w. black cove base (6")
- Wall Plaster (Brown Coat)
- Wall Plaster (White Coat)
- Ceiling Plaster (Brown Coat)
- Ceiling Plaster (White Coat)
- Mortar (gray) at ceramic floor tiles
- Backing (gray) assoc. w. ceramic wall tiles
- Grout (white) assoc. w. ceramic wall tiles
- Gypsum Board (Brown)
- Joint Compound assoc. w. Gypsum Board (white)
- Brick Mortar (gray)
- Louver Caulking (Gray)

Analytical results of the bulk samples collected on 08/17/21, 08/19/2021 and 08/27/2021 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Tar at Foundation Wall**
- **Beige Door Frame Caulking**
- **Expansion Join Caulking (Gray) at wall**
- **Gray Door Frame Caulking**
- **Cementitious Windowsill (White)**
- **Sealant (beige) at brick expansion join**

The following materials **contain asbestos as per 2019 AHERA Report**

- **9"x9" White VAT w/Black Specks and Mastic (Not Affected by SOW)**
- **9"x9" Blue VAT w/White Specks and Mastic (Not Affected by SOW)**
- **9"x9" Tan VAT w/Black Marbled and Mastic (Not Affected by SOW)**
- **9"x9" Orange-Born VAT and Mastic (Not Affected by SOW)**
- **9"x9" Gray VAT w/Beige Specks and Mastic (Not Affected by SOW)**

- **9”x9” White VAT w/Brown Specks and Mastic (Not Affected by SOW)**
- **9”x9” Black VAT w/White Spots and Mastic (Not Affected by SOW)**
- **9”x9” Black VAT w/White Marbled and Mastic (Not Affected by SOW)**
- **Pipe Elbows (Not Affected by SOW)**
- **Pipe Insulation (Not Affected by SOW)**

Analytical results of the bulk samples collected on 08/17/21, 08/19/2021 and 08/27/2021 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum (White) under EPDM Roofing
- Perlite Insulation (tan)
- Fiberboard (brown) under EPDM
- Vent Sealant (Gray)
- Pitch Pocket Sealant (Gray)
- Pitch Pocket Sealant (Black)
- Gray Caulking at Metal Cap Flashing
- Sink Undercoating (Gray)
- Brown Mastic associated w. cove base (2nd Layer)
- Crème adhesive associated w. cove base (1st Layer)
- Blue Cove Base
- 12”x12” White VFT w. Blue Spots
- White Floor Levelling Compound w. Yellow Adhesive
- Acoustical Ceiling Plaster (Gray)
- Ceiling Plaster Patches (White)
- Black Glue dots on wall
- Sealant (White) at pipe edges
- Cementitious Ceiling (Gray)
- Yellow mastic assoc. w. Carpet Flooring
- Mortar assoc. w. ceramic floor tiles
- Backing associated w. ceramic wall tiles
- White textured paint
- Mortar at Cinder Block
- Window Caulking (White)
- Expansion Joint Caulking Brown (At Wall)
- Window Frame Caulking (Gray)
- Stone Sill Caulking (Crème)
- Fiberboard at Floor (Black)
- 2’x4’ Suspended Ceiling Tiles
- Cementitious Windowsill (Black)
- Black mastic assoc. w. 12”x12” White VFT w. Brown Spots
- 12”x12” White VFT w. Brown Spots
- Joint compound (white) assoc. w. Gypsum Board
- Gypsum Board (White)
- Backing (grayish/white) assoc. w. ceramic wall tiles

- Grout (white) assoc. w. ceramic wall tiles
- 12”x12” Gray w. Spots Vinyl Floor Tiles
- Black Mastic assoc. w. 12”x12” Gray w. Spots Vinyl Floor Tiles
- Black Cove Base (6”)
- Gray mastic associated w. black cove base (6”)
- Wall Plaster (Brown Coat)
- Wall Plaster (White Coat)
- Ceiling Plaster (Brown Coat)
- Ceiling Plaster (White Coat)
- Mortar (gray) at ceramic floor tiles
- Backing (gray) assoc. w. ceramic wall tiles
- Grout (white) assoc. w. ceramic wall tiles
- Gypsum Board (Brown)
- Joint Compound assoc. w. Gypsum Board (white)
- Brick Mortar (gray)
- Louver Caulking (Gray)

Analytical results of bulk samples **previously collected** by Berger indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Glue Dots, Brown
- Gypsum Board, Gray
- Wall Plaster, Brown Coat
- Wall Plaster, White Coat
- Ceiling Insulation, White
- Ceiling Insulation, Brown
- Ceiling Plaster, Brown Coat
- Ceiling Plaster, White Coat
- Glue dots assoc. w. peg board brown
- Pegboard

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **White Paint on Metal I-Beam**
- **White Paint on Metal Ceiling**
- **Tan Paint on Metal Ceiling**
- **Tan Paint on Metal I-Beam**
- **White Paint on Wood Door Frame**
- **White Paint on Wood Awning**

Lead was **not detected** in the following tested combinations via XRF readings:

- Red Paint on Metal Exterior Door Frame
- Varnish Paint on Wood Door
- Gray Paint on Metal Door Frame
- White Paint on Concrete Wall
- White Paint on Cinderblock Wall
- Red Paint on Metal Radiator Cover
- White Paint on Vinyl Electric Conduit
- White Paint on Metal Electric Conduit
- White Paint on Metal Radiator Cover
- White Paint on Wood Shelves
- Tan Paint on Gypsum Wall
- White Paint on Metal Window Frame
- White Paint on Metal Radiator Cover
- Tan Paint on Metal Column
- Yellow Paint on Gypsum Wall
- Red Paint on Metal Handrail
- Red Paint on Metal Door
- Yellow Paint on Cinder Block Wall
- White Paint on Plaster Wall
- Red Paint on Wood Wall Trim
- Red Paint on Wood Door Frame
- Red Paint on Wood Door
- Yellow Paint on Plaster Wall
- Red Paint on Wood Window Frame
- Beige Paint on Metal Door Frame
- Blue Paint on Metal Door
- Varnish Paint on Wood Window Frame
- Blue Paint on Vinyl Baseboard
- Yellow Paint on Metal Radiator Cover
- Black Paint on Vinyl Baseboard
- Yellow Paint on Corkboard
- Yellow Paint on Glass Window
- Yellow Paint on Wood Window Frame
- Yellow Paint on Concrete Wall
- Red Paint on Metal Column
- White Paint on Wood Door Frame
- Tan Paint on Cinder Block Wall
- White Paint on Cinderblock Wall
- Yellow Paint on Brick Wall
- Blue Paint on Metal Door Frame
- Blue Paint on Cinder Block Wall
- Blue Paint on Metal Radiator Cover
- Red Paint on Metal Door

- Red Paint on Metal Door Frame
- Blue Paint on Metal Door Frame
- Black Paint on Metal Stairs
- Red Paint on Concrete Floor

C. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Gray Caulking at Metal Cap Flashing
- Brown Expansion Join Caulking
- Gray Expansion Join Caulking
- Beige Door Frame Caulking
- White Window Caulking
- Gray Window Frame Caulking
- Crème Stone Joint Caulking
- Gray Door Frame Caulking
- Gray Louver Frame Caulking

4.0 INSPECTION RESULTS

A. ASBESTOS-CONTAINING MATERIAL

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School. The following suspect materials were sampled and analyzed for asbestos content by WSP:

4.1 Table 4.1 – Suspect Materials Inspected

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
WSP Sampled on 08/17/21, 08/19/2021 & 08/27/2021			
-	Roof M, N & O	Metal Roof Deck	Non-Suspect
-		Foam Insulation	Non-Suspect
A		Gypsum (White) under EPDM Roofing	NAD
-	Roof K	Metal Roof Deck	Non-Suspect
B		Perlite Insulation (Tan) under fiberboard	NAD
C	Roof K	Fiberboard (brown) under EPDM Roofing	NAD
-	Roof E	Metal Roof Deck	Non-Suspect
-		Foam Insulation	Non-Suspect
D		Vent Sealant (Gray)	NAD
E	Roof G & L	Pitch Pocket Sealant (Gray)	NAD
F	Roof G	Pitch Pocket Sealant (Black)	NAD
G	Roof L	Gray Caulking at metal cap Flashing	NAD
H	Room 217	Sink Undercoating (Gray)	NAD
I		Brown mastic associated with cove base (2nd layer)	NAD
J		Crème mastic associated with cove base (2nd layer)	NAD
K		Blue Cove Base	NAD
L	Interior – Various Locations	12”x12” White Vinyl Floor Tiles with blue spots	NAD
M		White Floor Levelling Compound With Yellow Adhesive	NAD
N	Mechanical Room 247	Acoustical Ceiling Plaster (Gray)	NAD
O		Ceiling Plaster Patches (White)	NAD
P		Black Glue Dots on wall	NAD
Q		Sealant (White) at Pipe Edges	NAD

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
R	Exterior – Overhang by Room 121 Exit	Cementitious Ceiling (Gray)	NAD
S	Library 201	Yellow Mastic associated with carpet flooring	NAD
T	Boys and Girls Toilets	Mortar associated with ceramic floor tiles	NAD
U		Backing associated with ceramic wall tiles	NAD
AP		Grout (white) associated with ceramic wall tiles	NAD
V	Exterior – Various Locations	White Textured Paint	NAD
W	Throughout	Mortar at Cinderblock Walls	NAD
X		Window Caulking (White)	NAD
Y	Exterior (2001 Bldg.)	Expansion Joint Caulking (Brown)	NAD
Z	**Exterior – Stair 6 Courtyard**	**Tar at Foundation Wall**	**2.5% Chrysotile**
AA	**Exterior (1955 & 1963 Bldg.)**	**Beige Door Frame Caulking**	**1.7% Chrysotile**
AB	**Exterior (1955 & 1963 Bldg.)**	**Expansion Joint Caulking (Gray) at Wall**	**3.1% Anthophyllite**
AC	Exterior (1995 Bldg.)	Window Frame Caulking (Gray)	NAD
AD	Exterior (Throughout)	Stone Sill Caulking (Crème)	NAD
AE	**Exterior (1952 & 1963 Bldg.)**	**Gray Door Frame Caulking (Wooden Trim Doors)**	**4.2% Chrysotile**
AF	Exterior Stair 6 Courtyard	Fiberboard at Floor (Black)	NAD
AG	Classroom 110	2’x4’ Suspended Ceiling Tiles	NAD
AH	Interior – Corridors	Cementitious Windowsill (Black)	NAD
AI	**Interior – Corridor 260**	**Cementitious Windowsill (White)**	**33% Chrysotile**
AJ	Interior – Various Locations	Black mastic associated w. 12”x12” white vinyl floor tiles w. brown spots	NAD
AK		12”x12” white vinyl floor tiles w. brown spots	NAD
AL	**Interior – Library 201**	**Sealant (beige) at brick expansion joint**	**2.6% Chrysotile**
-		Metal radiator w. metal pipes and vinyl wires	Non-Suspect
AM	Interior – Various Locations	Joint Compound (White) associated with gypsum board	NAD
AN		Gypsum Board (White)	NAD

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
AO	Interior – Various Locations	Backing (grayish/white) associated with ceramic wall tiles	NAD
AP		Grout (white) associated with ceramic wall tiles	NAD
AQ		12”x12” Gray with spots Vinyl Floor Tiles	NAD
AR		Black Mastic associated with 12”x12” Gray with spots VFT	NAD
AS		Black 6” Cove Base	NAD
AT		Gray mastic associated w. black cove base (6”)	NAD
AU	Interior – Lobby/Nurse/Toilets (1952 Bldg.)	Wall Plaster (Brown Coat)	NAD
AV		Wall Plaster (White Coat)	NAD
AW		Ceiling Plaster (Brown Coat)	NAD
AX		Ceiling Plaster (White Coat)	NAD
-		Ceiling Insulation, White	HA previous survey 12.05.19 (NAD)
-		Ceiling Insulation, Brown	
AY		Mortar (Gray) at ceramic floor tiles	NAD
AZ		Backing (gray) assoc. w. ceramic wall tiles	NAD
BA		Grout (white) assoc. w. ceramic wall tiles	NAD
BB	Exterior – Awning by Lobby 160	Gypsum Board (Brown)	NAD
BC		Joint Compound assoc. w. gypsum board (white)	NAD
BD	Exterior – Throughout	Brick Mortar (gray)	NAD
BE	Exterior – Throughout	Louver caulking (Gray)	NAD
As Per 2019 AHERA Report			
01	**Interior – Various Locations[1]**	**9”x9” White VAT w/Black Specks and Mastic[1]**	**ACM[1]**
02		**9”x9” Blue VAT w/White Specks and Mastic[1]**	**ACM[1]**
03		**9”x9” Tan VAT w/Black Marbled and Mastic[1]**	**ACM[1]**
04		**9”x9” Orange-Born VAT and Mastic[1]**	**ACM[1]**
05		**9”x9” Gray VAT w/Beige Specks and Mastic[1]**	**ACM[1]**
06		**9”x9” White VAT w/Brown Specks and Mastic[1]**	**ACM[1]**
07		**9”x9” Black VAT w/White Spots and Mastic[1]**	**ACM[1]**

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
08	**Interior – Various Locations[1]**	**9"x9" Black VAT w/White Marbled and Mastic[1]**	**ACM[1]**
09		**Pipe Elbows[1]**	**ACM[1]**
10		**Pipe Insulation[1]**	**ACM[1]**
Previous Sampled by Berger			
01	Room 110	Glue Dots, Brown	NAD
02	Room 110	Gypsum Board, Gray	NAD
03	Room 110	Wall Plaster, Brown Coat	NAD
04	Room 110	Wall Plaster, White Coat	NAD
05	Elec. Room	Ceiling Insulation, White	NAD
06	Elec. Room	Ceiling Insulation, Brown	NAD
07	Elec. Room	Ceiling Plaster, Brown Coat	NAD
08	Elec. Room	Ceiling Plaster, White Coat	NAD
01	Room 110	Glue dots assoc. w pegboard brown	NAD
02	Room 110	Pegboard	NAD

Bold = Positive for ACM NAD = No Asbestos Detected NA/PS = Not analyzed/ positive sample
Note: [1] Not affected by current scope of work.

4.2 CONDITION AND FRIABLITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

Table 4.2 – Condition and Friability Assessment

Location	Material	Quantity	Friability	Condition
Exterior – Stair 6 Courtyard	**Tar at Foundation Wall**	**8 SF**	**Non-Friable**	**Good**
Exterior (1955 & 1963 Bldg.) (Stair 6 Courtyard)	**Beige Door Frame Caulking**	**50 LF**	**Non-Friable**	**Good**
	Expansion Joint Caulking (Gray) at Wall	**8 LF**	**Non-Friable**	**Good**
Exterior (1952 & 1963 Bldg.)	**Gray Door Frame Caulking (Wooden Trim Doors)**	**370 LF**	**Non-Friable**	**Good**
Interior – Corridor 260	**Cementitious Windowsills (White)**	**44 SF**	**Non-Friable**	**Good**
Interior – Library 201	**Sealant (beige) at brick expansion joint**	**15 LF**	**Non-Friable**	**Good**

Condition Definitions:
Good: None/Minimal apparent damage to ACM
Fair: Up to 10% localized damage or up to 25% of the entire ACM is damaged
Poor: Over 10% localized damage or over 25% of the entire ACM is damaged

4.3 SAMPLE ANALYSIS TABLE

Laboratory analysis results, in tabular form, are included in Appendix A.

B. LEAD-BASED PAINT

The lead Inspection involved a thorough visual examination of all accessible areas impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School. The following suspect surfaces were tested for lead content:

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
1	Calibration Check @ 1.0	---	---	---	---	**1.0**
2	Calibration Check @ 1.0	---	---	---	---	**1.0**
3	Calibration Check @ 1.0	---	---	---	---	**1.1**
4	Calibration Check @ 0.0	---	---	---	---	0.1
5	Calibration Check @ 0.0	---	---	---	---	0.2
6	Calibration Check @ 0.0	---	---	---	---	-0.1
7	Men's Bathroom by 156	Exterior Door Frame	Red	Metal	Good	0.2
8	Men's Bathroom by 156	Door	Varnish	Wood	Good	-0.1
9	Men's Bathroom by 156	Door Frame	Gray	Metal	Fair	0.6
10	Men's Bathroom by 156	Wall	White	Concrete	Fair	-0.1
11	Men's Bathroom by 156	Upper Wall	White	Cinderblock	Good	-0.2
12	Men's Bathroom by 156	Radiator Cover	Red	Metal	Good	0.2
13	**Men's Bathroom by 156**	**I-Beam**	White	**Metal**	**Good**	**3.2**
14	**Men's Bathroom by 156**	**Ceiling**	White	**Metal**	**Good**	**1.8**
15	Men's Bathroom by 156	Conduit	White	Vinyl	Good	0.5
16	Men's Bathroom by 156	Conduit	White	Metal	Good	0.4

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
17	Women's Bathroom by 156	Radiator Cover	White	Metal	Fair	0.2
18	Closet across from 155	Shelves	White	Wood	Fair	0.3
19	**Closet across from 155**	**I-Beam**	Tan	**Metal**	**Good**	**2.9**
20	**Closet across from 155**	**Ceiling**	Tan	**Metal**	**Good**	**3.2**
21	**Storage Room in 209**	**Ceiling**	White	**Metal**	**Good**	**1.6**
22	Library 201	Wall	Tan	Gypsum	Good	0.2
23	Library 201	Window Frame	White	Metal	Fair	0.2
24	Library 201	Radiator Cover	White	Metal	Good	0.1
25	Library 201	Column	Tan	Metal	Good	0.2
26	Hall Outside of Special Services	Wall	Yellow	Gypsum	Good	0.2
27	Hall Outside of Special Services	Handrail	Red	Metal	Good	0.0
28	Hall Outside of Special Services	Door	Red	Metal	Fair	0.1
29	Hall Outside of Special Services	Wall	Yellow	Cinderblock	Good	-0.1
30	General Office	Wall	White	Plaster	Good	-0.4
31	Nurses Office	Wall Trim	Red	Wood	Good	0.1
32	Nurses' Bathroom	Door Frame	Red	Wood	Good	0.3
33	Nurses' Bathroom	Door	Red	Wood	Good	0.1
34	Nurses' Bathroom	Wall	Yellow	Plaster	Good	0.0
35	Hall outside General Office	Window Frame	Red	Wood	Good	-0.1
36	General Office Mailroom	Door Frame	Beige	Metal	Fair	0.4
37	General Office Mailroom	Door	Blue	Metal	Good	0.1
38	General Office	Window Frame	Varnish	Wood	Good	0.1
39	**Large Courtyard**	**Door Frame**	White	**Wood**	**Good**	**1.3**
40	Corridor 133	Baseboard	Blue	Vinyl	Good	0.1
41	Corridor 133	Radiator Cover	Yellow	Metal	Good	0.2
42	Corridor 133	Baseboard	Black	Vinyl	Fair	0
43	Hall by 232	Corkboard	Yellow	Corkboard	Good	0.1
44	Hall by 225	Window	Yellow	Glass	Good	0.2
45	Hall by 225	Window Frame	Yellow	Wood	Good	0.0
46	Hall by 225	Lower Wall	Yellow	Concrete	Good	0.2
47	Hall by 225	Column	Red	Metal	Good	0.5
48	Small Courtyard	Door Frame	White	Wood	Fair	0.2
49	Small Courtyard	Wall	Tan	Cinderblock	Good	0.0
50	Small Courtyard	Wall	White	Cinderblock	Good	0.1
51	Hall Outside Small Courtyard	Wall	Yellow	Brick	Good	0.0

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
52	Book Room 217	Door Frame	Blue	Metal	Good	0.6
53	Book Room 217	Wall	Blue	Cinderblock	Good	0.0
54	Book Room 217	Radiator Cover	Blue	Metal	Good	0.2
55	Gym Courtyard	Door	**Red**	Metal	Good	0.1
56	Gym Courtyard	Door Frame	Red	Metal	Good	0.5
57	**Gym Courtyard**	**Awning**	White	**Wood**	**Good**	**1.5**
58	Gym Courtyard	Door Frame	Blue	Metal	Good	0.4
59	Gym Courtyard	Stairs	Black	Metal	Good	0.1
60	Mechanical Room	Floor	Red	Concrete	Fair	0.3
61	Calibration Check @ 1.0	---	---	---	---	**1.1**
62	Calibration Check @ 1.0	---	---	---	---	**1.1**
63	Calibration Check @ 1.0	---	---	---	---	**1.1**
64	Calibration Check @ 0.0	---	---	---	---	0.2
65	Calibration Check @ 0.0	---	---	---	---	0.1
66	Calibration Check @ 0.0	---	---	---	---	0.1

C. PCB-CONTAINING MATERIAL

The PCB Inspection involved a thorough visual examination of all areas that may be impacted by the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School. The following suspect materials were tested for PCB content:

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	PCB CONTENT (PPM)
A	Roof L	Gray Caulking at Metal Cap Flashing	ND
B	Stair 6 Courtyard	Brown Expansion Join Caulking	ND
C		Gray Expansion Join Caulking	ND
D		Beige Door Frame Caulking	ND
E	Throughout	White Window Caulking	ND
F		Gray Window Frame Caulking	ND
G		Crème Stone Joint Caulking	ND
H		Gray Door Frame Caulking	ND
I		Gray Louver Frame Caulking	ND

Bold = Positive for PCB ND = No PCB Detected

5.0 AREAS NOT ACCESSIBLE

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Building Envelope: No destructive sampling was performed on the building envelope. It should be assumed that asbestos, lead and PCB containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

6.0 CONCLUSIONS AND RECOMMENDATIONS

ACM and LBP have been identified in this inspection that may be impacted as part of the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School, reported in Section 3.0 of this report, may require complete removal prior to the start of the upgrade project.

No PCB was identified in this inspection that may be impacted as part of the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School.

The ACM, LBP & PCB inspection was conducted at the request of Briarcliff Manor Union Free School District for the proposed BBS Architects, Landscape Architects, & Engineers, P.C. Phase 1, 2 & 3 project at the Todd Elementary School. Any change in the scope of work will require further investigation to accurately classify any additional ACM, LBP or PCBs resulting from the modified or updated scope of work.

7.0 REPORT CERTIFICATIONS

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of WSP's efforts for the environmental inspection work for the Todd Elementary School.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of WSP's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which WSP is unaware and has not had the opportunity to evaluate.

The conclusions presented in this report are professional opinions solely upon WSP's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:



Stephen Gruber
NYS DOL Inspector

Reviewed by:



Craig Napolitano, CHMM
Vice President, Emergency Management & IH Services

APPENDIX A:
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM

APPENDIX A
SAMPLE ANALYSIS RESULTS IN TABULAR FORM
TODD ELEMENTARY SCHOOL
45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
WSP Sampled on 08/17/2021 & 08/19/2021					
A	01	Roof O	Gypsum (White) under EPDM Roofing	NAD	N/A
	02	Roof M		NAD	N/A
B	03	Roof K	Perlite Insulation (tan)	NAD	N/A
	04			NAD	N/A
	05			NAD	N/A
C	06		Fiberboard (brown) under EPDM	NAD	N/A
	07			NAD	N/A
D	08	Roof E	Vent Sealant (Gray)	NAD	NAD
	09			NAD	NAD
E	10	Roof G	Pitch Pocket Sealant (Gray)	NAD	NAD
	11	Roof L		NAD	NAD
F	12	Roof G	Pitch Pocket Sealant (Black)	NAD	NAD
	13			NAD	NAD
G	14	Roof L	Gray Caulking at Metal Cap Flashing	NAD	NAD
	15			NAD	NAD
H	16	Room 217	Sink Undercoating (Gray)	NAD	NAD

Bold = Positive for ACM
NAD = No Asbestos Detected
N/A = Not Applicable
NA/PS = Not analyzed/ positive sample

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
H	17	Room 217	Sink Undercoating (Gray)	NAD	NAD
I	18		Brown Mastic associated w. cove base (2nd Layer)	NAD	NAD
	19			NAD	NAD
J	20		Crème adhesive associated w. cove base (1st Layer)	NAD	NAD
	21			NAD	NAD
K	22		Blue Cove Base	NAD	NAD
	23			NAD	NAD
L	24		12”x12” White VFT w. Blue Spots	NAD	NAD
	25			NAD	NAD
M	26A		White Floor Levelling Compound w. Yellow Adhesive	NAD	N/A
	26B			NAD	NAD
	27A			NAD	N/A
	27B			NAD	NAD
N	28	Mechanical Room 247	Acoustical Ceiling Plaster (Gray)	NAD	N/A
	29			NAD	N/A
	30			NAD	N/A
O	31		Ceiling Plaster Patches (White)	NAD	N/A
	32			NAD	N/A
	33			NAD	N/A
P	34		Black Glue dots on wall	NAD	NAD
	35			NAD	NAD
Q	36		Sealant (White) at pipe edges	NAD	NAD

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NA/PS = Not analyzed/ positive sample

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
Q	37	Mechanical Room 247	Sealant (white) at pipe edges	NAD	NAD
	38			NAD	NAD
R	39	Exterior – Overhang by Room 121 Exit	Cementitious Ceiling (Gray)	NAD	N/A
	40			NAD	N/A
S	41	Library 201	Yellow mastic assoc. w. Carpet Flooring	NAD	NAD
	42			NAD	NAD
T	43	Boys Toilet by Mail	Mortar assoc. w. ceramic floor tiles	NAD	N/A
	44	Girls Toilet by Mail		NAD	N/A
U	45	Boys Toilet by Mail	Backing associated w. ceramic wall tiles	NAD	N/A
	46	Girls Toilet by Mail		NAD	N/A
V	47	Courtyard by Classroom 242	White textured paint	NAD	NAD
	48	Courtyard by Classroom 175		NAD	NAD
W	49	Courtyard by Classroom 242	Mortar at Cinder Block	NAD	N/A
	50	Courtyard by Classroom 175		NAD	N/A
X	51	Courtyard by Classroom 242	Window Caulking (White)	NAD	NAD
	52	Courtyard by Classroom 175		NAD	NAD
Y	53	**Stair 6 Courtyard**	Expansion Joint Caulking Brown (At Wall)	NAD	NAD
	54			NAD	NAD
Z	**55**		**Tar at Foundation Wall**	**Trace (<1%) Chrysotile**	**2.5% Chrysotile**
	56			**Trace (<1%) Chrysotile**	**NA/PS**
AA	**57**		**Beige Door Frame Caulking**	**Trace (<1%) Chrysotile**	**1.7% Chrysotile**

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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
AA	**58**	**Stair 6 Courtyard**	**Beige Door Frame Caulking**	**Trace (<1%) Chrysotile**	**NA/PS**
AB	**59**		**Expansion Join Caulking (Gray) at wall**	**NAD**	**0.8% Chrysotile 3.1% Anthophyllite**
	60			**NAD**	**NA/PS**
AC	61	Courtyard by Classroom 245	Window Frame Caulking (Gray)	NAD	NAD
	62			NAD	NAD
AD	63	Courtyard by Classroom 245	Stone Sill Caulking (Crème)	NAD	NAD
	64			NAD	NAD
AE	**65**	**Exterior – Kindergarten Courtyard**	**Gray Door Frame Caulking**	**Trace (<1%) Chrysotile**	**4.2% Chrysotile 1.7% Anthophyllite**
	66			**Trace (<1%) Chrysotile**	**NA/PS**
AF	67	Stair 6 Courtyard	Fiberboard at Floor (Black)	NAD	NAD
	68			NAD	NAD
AG	69	Classroom 110	2'x4' Suspended Ceiling Tiles	NAD	NAD
	70			NAD	NAD
WSP Sampled on 08/27/2021					
AH	71	Corridor 258 adjacent Rm 232	Cementitious Windowsill (Black)	NAD	NAD
	72	Corridor 254 adjacent Rm 241		NAD	NAD
AI	**73**	**Corridor 260**	**Cementitious Windowsill (White)**	**33% Chrysotile**	**NA/PS**
	74			**NA/PS**	**NA/PS**
AJ	75	Corridor adj Rm 227	Black mastic assoc. w. 12"x12" White VFT w. Brown Spots	NAD	NAD
	76	Corridor 260		NAD	NAD

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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
AK	77	Corridor adj Rm 227	12”x12” White VFT w. Brown Spots	NAD	NAD
	78	Corridor 260	12”x12” White VFT w. Brown Spots	NAD	NAD
AL	**79**	**Library 201**	**Sealant (beige) at brick expansion join**	**2.6 % Chrysotile**	**NA/PS**
	80			**NA/PS**	**NA/PS**
AM	81		Joint compound (white) assoc. w. Gypsum Board	NAD	N/A
	82	Library 201		NAD	N/A
AN	83		Gypsum Board (White)	NAD	N/A
	84	Closet near Mail Room		NAD	N/A
AO	85	Boys adj Rm 201	Backing (grayish/white) assoc. w. ceramic wall tiles	NAD	N/A
	86			NAD	N/A
AP	87		Grout (white) assoc. w. ceramic wall tiles	NAD	N/A
	88			NAD	N/A
AQ	89	Corridor 130	12”x12” Gray w. Spots Vinyl Floor Tiles	NAD	NAD
	90			NAD	NAD
AR	91		Black Mastic assoc. w. 12”x12” Gray w. Spots Vinyl Floor Tiles	NAD	NAD
	92			NAD	NAD
AS	93	Corridor adj Rm 220	Black Cove Base (6”)	NAD	NAD
	94	Corridor adj Rm 227		NAD	NAD
AT	95	Corridor adj Rm 220	Gray mastic associated w. black cove base (6”)	NAD	NAD
	96	Corridor adj Rm 227		NAD	NAD

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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
AU	97	Lobby 100	Wall Plaster (Brown Coat)	NAD	N/A
	98	Nurse 103		NAD	N/A
	99			NAD	N/A
AV	100	Lobby 100	Wall Plaster (White Coat)	NAD	N/A
	101	Nurse 103		NAD	N/A
	102	Nurse 103 – Toilet		NAD	N/A
AW	103	Nurse 103 – Toilet	Ceiling Plaster (Brown Coat)	NAD	N/A
	104	Girls Toilet by Lobby 100		NAD	N/A
	105			NAD	N/A
AX	106	Nurse 103 – Toilet	Ceiling Plaster (White Coat)	NAD	N/A
	107	Girls Toilet by Lobby 100		NAD	N/A
	108			NAD	N/A
AY	109	Nurse Toilet	Mortar (gray) at ceramic floor tiles	NAD	N/A
	110			NAD	N/A
AZ	111	Girls Toilet by Lobby 100	Backing (gray) assoc. w. ceramic wall tiles	NAD	N/A
	112			NAD	N/A
BA	113	Nurse Toilet	Grout (white) assoc. w. ceramic wall tiles	NAD	N/A
	114			NAD	N/A
BB	115	Exterior – Awning by Lobby 160	Gypsum Board (Brown)	NAD	N/A
	116			NAD	N/A

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Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
BC	117	Exterior – Awning by Lobby 160	Joint Compound assoc. w. Gypsum Board (white)	NAD	N/A
	118			NAD	N/A
BD	119	Exterior – Stair 6 Courtyard	Brick Mortar (gray)	NAD	N/A
	120	Exterior – North		NAD	N/A
BE	121	Exterior – By Classroom 123	Louver Caulking (Gray)	NAD	NAD
	122	Exterior – By Classroom 234		NAD	NAD

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APPENDIX B:
ASBESTOS BULK SAMPLE FIELD DATA SHEETS WITH CHAIN OF CUSODY & LABORATORY RESULTS

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Client: WSP
Collected by: Client
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Project Address: Todd Elementary School
Work Area: Various Locations

Lab ID: BK0821371
Date Received: 8/23/2021
PLM Date Analyzed: 8/25/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
A01	BK0821371-1	Roof O - Gypsum (White) under EPDM Roofing	Beige, Homogeneous, Friable	Not Applicable			30%FBGL	70%	**NAD**	
A02	BK0821371-2	Roof M - Gypsum (White) under EPDM Roofing	Beige, Homogeneous, Friable	Not Applicable			30%FBGL	70%	**NAD**	
B03	BK0821371-3	Roof K - Perlite Insulation (Tan)	Grey, Homogeneous, Friable	Not Applicable			30%CELL 10%FOAM	60%	**NAD**	
B04	BK0821371-4	Roof K - Perlite Insulation (Tan)	Grey, Homogeneous, Friable	Not Applicable			30%CELL 10%FOAM	60%	**NAD**	
B05	BK0821371-5	Roof K - Perlite Insulation (Tan)	Grey, Homogeneous, Friable	Not Applicable			30%CELL 10%FOAM	60%	**NAD**	
C06	BK0821371-6	Roof K - Fiberboard (Brown) under EPDM	Brown, Homogeneous, Friable	Not Applicable			95%WOOD	5%	**NAD**	
C07	BK0821371-7	Roof K - Fiberboard (Brown) under EPDM	Brown, Homogeneous, Friable	Not Applicable			95%WOOD	5%	**NAD**	
D08	BK0821371-8	Roof E - Vent Sealant (Gray)	Grey, Homogeneous, Non-Fibrous	34.4	19.7	45.9	0%	100%	**NAD** Inconclusive	**NAD**
D09	BK0821371-9	Roof E - Vent Sealant (Gray)	Grey, Homogeneous, Non-Fibrous	35.8	21.6	42.5	0%	100%	**NAD** Inconclusive	**NAD**
E10	BK0821371-10	Roof G - Pitch Pocket Sealant (gray)	Grey, Homogeneous, Non-Fibrous	65.1	4.2	30.7	0%	100%	**NAD** Inconclusive	**NAD**

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
E10	BK0821371-11	Roof L - Pitch Pocket Sealant (gray)	Black, Homogeneous, Non-Fibrous	65.4	8.6	26.0	0%	100%	**NAD** Inconclusive	**NAD**
F12	BK0821371-12	Roof G - Pitch Pocket Sealant (Black)	Black, Homogeneous, Non-Fibrous	56.2	5.6	38.2	0%	100%	**NAD** Inconclusive	**NAD**
F13	BK0821371-13	Roof G - Pitch Pocket Sealant (Black)	Black, Homogeneous, Non-Fibrous	65.2	6.6	28.2	0%	100%	**NAD** Inconclusive	**NAD**
G14	BK0821371-14	Roof L - Gray Caulking at Metal Cap Flashing	Grey, Homogeneous, Non-Fibrous	61.6	8.8	29.6	0%	100%	**NAD** Inconclusive	**NAD**
G15	BK0821371-15	Roof L - Gray Caulking at Metal Cap Flashing	Grey, Homogeneous, Non-Fibrous	59.8	8.0	32.3	0%	100%	**NAD** Inconclusive	**NAD**
H16	BK0821371-16	Room 217 - Sink Undercoating (Grey)	Grey, Homogeneous, Non-Fibrous	30.3	20.5	49.2	0%	100%	**NAD** Inconclusive	**NAD**
H17	BK0821371-17	Room 217 - Sink Undercoating (Grey)	Grey, Homogeneous, Non-Fibrous	31.6	27.1	41.3	0%	100%	**NAD** Inconclusive	**NAD**
I18	BK0821371-18	Room 217 - Brown Mastic associated with Cove Base (2nd Layer)	Brown, Homogeneous, Non-Fibrous	48.5	16.7	34.8	0%	100%	**NAD** Inconclusive	**NAD**
I19	BK0821371-19	Room 217 - Brown Mastic associated with Cove Base (2nd Layer)	Brown, Homogeneous, Non-Fibrous	51.7	17.1	31.1	0%	100%	**NAD** Inconclusive	**NAD**
J20	BK0821371-20	Room 217 - Creme Adhesive Associated with Cove Base (1st Layer)	Beige, Homogeneous, Non-Fibrous	29.0	3.0	68.0	0%	100%	**NAD** Inconclusive	**NAD**

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
J21	BK0821371-21	Room 217 - Creme Adhesive Associated with Cove Base (1st Layer)	Beige, Homogeneous, Non-Fibrous	23.3	1.8	74.9	0%	100%	**NAD** Inconclusive	**NAD**
K22	BK0821371-22	Room 217 - Blue Cove Base	Blue, Homogeneous, Non-Fibrous	55.2	1.5	43.3	0%	100%	**NAD** Inconclusive	**NAD**
K23	BK0821371-23	Room 217 - Blue Cove Base	Blue, Homogeneous, Non-Fibrous	54.5	2.2	43.2	0%	100%	**NAD** Inconclusive	**NAD**
L24	BK0821371-24	Room 217 - 12"x12" White VFT with Blue Spots	White, Homogeneous, Non-Fibrous	17.4	2.2	80.4	0%	100%	**NAD** Inconclusive	**NAD**
L25	BK0821371-25	Room 217 - 12"x12" White VFT with Blue Spots	White, Homogeneous, Non-Fibrous	25.0	11.9	63.1	0%	100%	**NAD** Inconclusive	**NAD**
M26	BK0821371-26A	Room 217 - White Floor Leveling Compound with Yellow Adhesive	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
M26	BK0821371-26B	Room 217 - White Floor Leveling Compound with Yellow Adhesive	Beige, Homogeneous, Non-Fibrous	36.5	25.8	37.7	0%	100%	**NAD** Inconclusive	**NAD**
M27	BK0821371-27A	Room 217 - White Floor Leveling Compound with Yellow Adhesive	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
M27	BK0821371-27B	Room 217 - White Floor Leveling Compound with Yellow Adhesive	Beige, Homogeneous, Non-Fibrous	41.9	15.7	42.5	0%	100%	**NAD** Inconclusive	**NAD**
N28	BK0821371-28	Mechanical Room 247 - Acoustical Ceiling Plaster (Grey)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
N29	BK0821371-29	Mechanical Room 247 - Acoustical Ceiling Plaster (Grey)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
N30	BK0821371-30	Mechanical Room 247 - Acoustical Ceiling Plaster (Grey)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
O31	BK0821371-31	Mechanical Room 247 - Ceiling Plaster Patches (White)	White, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
O32	BK0821371-32	Mechanical Room 247 - Ceiling Plaster Patches (White)	White, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
O33	BK0821371-33	Mechanical Room 247 - Ceiling Plaster Patches (White)	White, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
P34	BK0821371-34	Mechanical Room 247 - Black Glue Dots on Wall	Black, Homogeneous, Non-Fibrous	18.8	8.6	72.6	0%	100%	**NAD** Inconclusive	**NAD**
P35	BK0821371-35	Mechanical Room 247 - Black Glue Dots on Wall	Black, Homogeneous, Non-Fibrous	24.7	10.1	65.2	0%	100%	**NAD** Inconclusive	**NAD**
Q36	BK0821371-36	Mechanical Room 247 - Sealant (White) at Pipe Edges	White, Homogeneous, Non-Fibrous	42.6	30.3	27.0	0%	100%	**NAD** Inconclusive	**NAD**
Q37	BK0821371-37	Mechanical Room 247 - Sealant (White) at Pipe Edges	White, Homogeneous, Non-Fibrous	42.7	15.8	41.5	0%	100%	**NAD** Inconclusive	**NAD**
Q38	BK0821371-38	Mechanical Room 247 - Sealant (White) at Pipe Edges	White, Homogeneous, Non-Fibrous	43.1	27.1	29.8	0%	100%	**NAD** Inconclusive	**NAD**

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							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
R39	BK0821371-39	Exterior - Overhang by Room 127 Exit - Cementitious Ceiling (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
R40	BK0821371-40	Exterior - Overhang by Room 127 Exit - Cementitious Ceiling (Grey)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
S41	BK0821371-41	Library 201 - Yellow Mastic Associated with Carpet Flooring	Brown, Homogeneous, Non-Fibrous	48.1	15.3	36.6	0%	100%	**NAD** Inconclusive	**NAD**
S42	BK0821371-42	Library 201 - Yellow Mastic Associated with Carpet Flooring	Brown, Homogeneous, Non-Fibrous	47.9	24.3	27.9	0%	100%	**NAD** Inconclusive	**NAD**
T43	BK0821371-43	Boys Toilet by mail - Mortar Associated with Ceramic Floor Tiles	Grey, Homogeneous, Friable	Not Applicable			5%CELL	95%	**NAD**	
T44	BK0821371-44	Girls Toilet by mail - Mortar Associated with Ceramic Floor Tiles	Grey, Homogeneous, Friable	Not Applicable			5%CELL	95%	**NAD**	
U45	BK0821371-45	Boys Toilet by mail - Backing associated with Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
U46	BK0821371-46	Girls Toilet by mail - Backing associated with Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
V47	BK0821371-47	Courtyard by Classroom 242 - White Textured Paint	White, Homogeneous, Non-Fibrous	39.3	30.0	30.7	0%	100%	**NAD** Inconclusive	**NAD**
V48	BK0821371-48	Courtyard by Classroom 175 - White Textured Paint	White, Homogeneous, Non-Fibrous	33.0	34.0	33.0	0%	100%	**NAD** Inconclusive	**NAD**

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Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
W49	BK0821371-49	Courtyard by Classroom 242 - Mortar at Cinderblock	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
W50	BK0821371-50	Courtyard by Classroom 175 - Mortar at Cinderblock	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
X51	BK0821371-51	Courtyard by Classroom 242 - Widow Caulking (White)	White, Homogeneous, Non-Fibrous	35.1	3.8	61.1	0%	100%	**NAD** Inconclusive	**NAD**
X52	BK0821371-52	Courtyard by Classroom 175 - Widow Caulking (White)	White, Homogeneous, Non-Fibrous	41.6	12.2	46.2	0%	100%	**NAD** Inconclusive	**NAD**
Y53	BK0821371-53	Stair 6 Courtyard - Expansion Joint Caulking Brown (At Wall)	Red, Homogeneous, Non-Fibrous	51.0	22.8	26.2	0%	100%	**NAD** Inconclusive	**NAD**
Y54	BK0821371-54	Stair 6 Courtyard - Expansion Joint Caulking Brown (At Wall)	Red, Homogeneous, Non-Fibrous	48.7	26.8	24.5	0%	100%	**NAD** Inconclusive	**NAD**
Z55	BK0821371-55	Stair 6 Courtyard - Tar Foundation Wall	Black, Homogeneous, Non-Fibrous	44.3	24.5	31.2	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**2.5%CHRY**
Z56	BK0821371-56	Stair 6 Courtyard - Tar Foundation Wall	Black, Homogeneous, Non-Fibrous	40.2	25.7	34.1	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**Not Analyzed**
AA57	BK0821371-57	Stair 6 Courtyard - Beige Door Frame Caulking	Beige, Homogeneous, Non-Fibrous	45.6	11.0	43.4	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**1.7%CHRY**
AA58	BK0821371-58	Stair 6 Courtyard - Beige Door Frame Caulking	Beige, Homogeneous, Non-Fibrous	41.2	11.5	47.3	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**Not Analyzed**

Atlas Environmental Lab, Corp.
255 West 36th Street, Suite# 1503
New York, NY 10018
Phone:(212) 563-0400 Fax:(212) 563-0401
www.atlasenvironmentallab.com

Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.005
Project Address: Todd Elementary School
Work Area: Various Locations

Lab ID: BK0821371
Date Received: 8/23/2021
PLM Date Analyzed: 8/25/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AB59	BK0821371-59	Stair 6 Courtyard - Expansion Joint Caulking Grey (At Wall)	Grey, Homogeneous, Non-Fibrous	25.7	15.5	58.8	0%	100%	**NAD** Inconclusive	**0.8%CRY 3.1%ANTH**
AB60	BK0821371-60	Stair 6 Courtyard - Expansion Joint Caulking Grey (At Wall)	Grey, Homogeneous, Non-Fibrous	30.8	16.2	53.0	0%	100%	**NAD** Inconclusive	**Not Analyzed**
AC61	BK0821371-61	Courtyard by Classroom 245 - Window Frame Caulking (Grey)	Grey, Homogeneous, Non-Fibrous	68.6	8.9	22.5	0%	100%	**NAD** Inconclusive	**NAD**
AC62	BK0821371-62	Courtyard by Classroom 245 - Window Frame Caulking (Grey)	Grey, Homogeneous, Non-Fibrous	65.8	7.4	26.8	0%	100%	**NAD** Inconclusive	**NAD**
AD63	BK0821371-63	Courtyard by Classroom 175 - Stone Sill Caulking (Crème)	Beige, Homogeneous, Non-Fibrous	42.2	43.3	14.6	0%	100%	**NAD** Inconclusive	**NAD**
AD64	BK0821371-64	Courtyard by Classroom 175 - Stone Sill Caulking (Crème)	Beige, Homogeneous, Non-Fibrous	48.1	24.4	27.5	0%	100%	**NAD** Inconclusive	**NAD**
AE65	BK0821371-65	Exterior - Kindergarten Courtyard - Gray Door Frame Caulking	Grey, Homogeneous, Non-Fibrous	18.9	16.8	64.3	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**4.2%CHRY 1.7%ANTH**
AE66	BK0821371-66	Exterior - Kindergarten Courtyard - Gray Door Frame Caulking	Grey, Homogeneous, Non-Fibrous	22.9	14.7	62.4	0%	~99%	**Trace (<1%)CHRY** Inconclusive	**Not Analyzed**
AF67	BK0821371-67	Stair 6 Courtyard - Fiberboard at Floor (Black)	Black, Homogeneous, Non-Fibrous	91.8	6.5	1.8	0%	100%	**NAD** Inconclusive	**NAD**
AF68	BK0821371-68	Stair 6 Courtyard - Fiberboard at Floor (Black)	Black, Homogeneous, Non-Fibrous	79.7	4.0	16.4	0%	100%	**NAD** Inconclusive	**NAD**

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff Manor UFSD / 31403475.005
Project Address: Todd Elementary School
Work Area: Various Locations

Lab ID: BK0821371
Date Received: 8/23/2021
PLM Date Analyzed: 8/25/2021
TEM Date Analyzed: 8/26/2021
Report Date: 8/26/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AG69	BK0821371-69	Classroom 110 - 2'x4' Suspended Ceiling Tiles	Grey, Homogeneous, Non-Fibrous	21.5	69.9	8.6	0%	100%	**NAD** Inconclusive	**NAD**
AG70	BK0821371-70	Classroom 110 - 2'x4' Suspended Ceiling Tiles	Grey, Homogeneous, Non-Fibrous	18.1	47.7	34.2	0%	100%	**NAD** Inconclusive	**NAD**

Quantitative Analysis (Semi/Full):Bulk Asbestos Analysis-PLM by EPA 600/M4-82-020 per 40 CFR or ELAP198.1 (friable) and 198.6 (NOB) samples for New York. MG

NAD=no asbestos detected, NA/PS=Not Analyzed/Positive Stop, Trace=<1%,FBGL=Fiberglass, CELL=Cellulose,CHRY=Chrysotile,Amo=Amosite,CRO=Crocidolite,ANTH=Anthophylite, TRE=Tremolite, ACT=Actinolite, NA=not applicable.

PLM is not consistently reliable in detecting Asbestos in floor coverings and similar non friable organically bound materials. NAD or Trace results by PLM are inconclusive.

TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos containing in NY State.

All samples were prepared and analyzed in accordance with the EPA "TEM Method for Identifying and Quantifying Asbestos in Non-Fibrous Organically Bound Bulk Samples" ELAP 198.4".

ORG%=Ashed Organic%, AII= Acid Insoluble Inorganic%, ASI= Acid Soluble Inorganic%

This "Summary of Analytical Results "shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ELAP or any agency of the U.S Government. The results relate only to the items tested. This report may not be reproduced, except in full, without the written approval of AEL .Atlas Environmental lab did not collect the analyzed samples and thus accepts no liability with regard to their collection and/or maintenance . AEL relies on client's data. The liability of Atlas Environmental Lab corp with respect to the services charged, shall in no event exceed the amount of the invoice.

NYS-ELAP#11999, NVLAP Lab Code: 500092-0, NJ ID: NY034, CT Reg. ID: PH-0154

PLM Analyst: AS TEM Analyst: VR Approved by:

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 6

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: ~~Briarcliff HS AA~~ Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/17/2021
Inspector(s): Stephen Gruber

BK08213711

LOUIS BERGER
TELEPHONE NO. : (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
A	01	Roof O	[Gypsum (White) under EPDM Roofing]		
↓	02	↓ M			
B	03	Roof K	Perlite Insulation (tan)		Under Fiberboard / Steel/ plywood deck 3rd Layer
↓	04	↓	↓		
↓	05	↓	↓		
C	06	↓	[Fiberboard (brown) under EPDM]		2nd Layer (1st Layer EPDM)
↓	07	↓	↓		
D	08 09	Roof E	Vent Sealant (Gray)		
E	10	Roof G	Pitch Pocket Sealant (~~Black~~) (Gray)		
↓	11	↓ L	↓		
F	12	Roof G	Pitch pocket Sealant (~~Gray~~) (Black)		
↓	13	↓ ↓	↓		

CHAIN OF CUSTODY

Relinquished by: (print) ~~J. Wang~~ STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Natalia	(Sign)	8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Bronxlift Manor UFSD
PROJECT SITE: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s): Stephen Gruber

BK08821371

LOUIS BERGER
TELEPHONE NO. : (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
G	14	Roof L	Gray Caulking at Metal Cap Flashing		
↓	15	↓			
H	16	Room 217	Sink Undercoating (gray)		
↓	17	↓	↓		
I	18	↓	Brown Mastic assoc w Cove base (2nd Layer)		
↓	19	↓			
J	20	↓	Creme adhesive assoc w Cove base (1st Layer)		
↓	21	↓			
K	22	↓	Blue Cove base		
↓	23	↓	↓ ↓ ↓		
L	24	↓	12"X12" White VFT w Blue Spots		
↓	25	↓			

CHAIN OF CUSTODY

Relinquished by: (print) J. Wang STEPHEN GRUBER	(Sign)		8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Autolaw	(Sign)		8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Bruarcliff Manor UFSD
PROJECT SITE: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s): Stephen Gruber

BK0821371

LOUIS BERGER
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
M	26	Room 217	[White Floor levelling compound A w yellow adhesive B]		
↓	27	↓			
N	28	Mechanical Room 247	Acoustical ceiling Pluster (gray)		
↓	29	↓	↓		
↓	30	↓	↓		
O	31	↓	Ceiling Plaster Patches (white)		
↓	32	↓	↓		
↓	33	↓	↓		
P	34	↓	[Black Glue dots on Wall]		
↓	35	↓	↓		
Q	36	↓	Sealant (white) at Pipe edges		
↓	37	↓	↓		

CHAIN OF CUSTODY

Relinquished by: (print) ~~J. Wang~~ STEPHEN GRUBER	(Sign)	8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print)	(Sign)	8/23/21	18:45 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s): Stephen Gruber

BK0821371

LOUIS BERGER
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RESULTS TO: Lb.Labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
Q	38	Mechanical Room 247	Sealant (white) at Pipe Edges		Fiberglass pipes
R	39	Exterior - Overhang by Room 121 Exit	[Cementitious Ceiling (gray)		
↓	40	↓ ↓			
S	41	Library 201	[Yellow mastic assoc w carpet Flooring]		
↓	42	↓ ↓			
T	43	Boys Toilet by Mail	[Mortar assoc w ceramic		
↓	44	Girls Toilet by Mail	Floor Tiles]		
U	45	Boys Toilet by Mail	[Backing assoc w ceramic		
↓	46	Girls Toilet by Mail	wall tiles]		
V	47	Courtyard by Classroom 242	[White textured		
↓	48	↓ by Classroom 175	Paint]		
W	49	Courtyard by Classroom 242	Mortar at Cinderblock		

CHAIN OF CUSTODY

Relinquished by: (print) J. Wang STEPHEN GRUBER	(Sign)		8/23/21	615 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print)	(Sign)		8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Todd Elementary School
Project Manager: A. Smolyar

LOUIS BERGER
TELEPHONE NO. : (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Deconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s): Stephen Gruber

BK0821371

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
W	50	Courtyard by classroom 175	Mortar at Cinderblock		
X	51	Courtyard by classroom 242	Window Caulking (White)		
↓	52	↓ ↓ 175	↓ ↓		
Y	53	Stair 6 Courtyard	[Expansion Joint Caulking		
↓	54	↓	Brown (at wall)]		
Z	55		[Tar at Foundation Wall		
↓	56		↓		
AA	57		Beige door Frame Caulking		
↓	58		↓ ↓		
			~~Gray Expansion Joint Sealant on Brick~~		
			~~at Wall Joint~~		
AB	59	↓	Expansion Joint Caulking (gray) at wall		

CHAIN OF CUSTODY

Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)			Relinquished by: (print)	(Sign)		
J. Wang STEPHEN GRUBER		8/23/21	615 AM/PM			/ /	AM/PM			/ /	AM/PM
Received by: (print)	**(Sign)**			**Received by: (print)**	**(Sign)**			**Received by: (print)**	**(Sign)**		
[illegible]		8/23/21	18:40 AM/PM			/ /	AM/PM			/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD
PROJECT SITE: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s): Stephen Gruber

BK0821371

LOUIS BERGER
TELEPHONE NO. : (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
~~AB~~	~~60~~	~~Expansion Joint Caulking~~			
AB	60	Stair 6 Courtyard	Expansion Joint Caulking (gray) at wall		
AC	61	Courtyard by Classroom 245	Window Frame Caulking		
↓	62	↓	(Gray)		
AD	63	Courtyard by Classroom	Stone Sill caulking		
↓	64	175	(Creme)		
AE	65	Exterior - Kindergarten Courtyard	[Gray door frame caulking]		Wooden Trim
↓	66	↓			
AF	67	Stair 6 Courtyard	[Fiberboard at Floor (Black)]		Concrete Floor Joint
↓	68	↓			
AG	69	Classroom 110	[2x4' suspended Ceiling Tiles]		
↓	70	↓			

CHAIN OF CUSTODY

Relinquished by: (print) ~~J. Wang~~ STEPHEN GRUBER	(Sign)	8/23/21	6:50 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Anthelias	(Sign)	8/23/21	18:40 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AH71	BK0821467-1	Corridor 258 Adjacent Room 232 - Cementitious Window Sill (Black)	Black, Homogeneous, Non-Fibrous	18.6	3.5	77.8	0%	100%	**NAD** Inconclusive	**NAD**
AH72	BK0821467-2	Corridor 254 Adjacent Room 241 - Cementitious Window Sill (Black)	Black, Homogeneous, Non-Fibrous	94.2	3.1	2.6	0%	100%	**NAD** Inconclusive	**NAD**
AI73	BK0821467-3	Corridor 260 - Cementitious Window Sill (White)	White, Homogeneous, Friable	Not Applicable			0%	97%	**33%CHRY**	
AI74	BK0821467-4	Corridor 260 - Cementitious Window Sill (White)	White, Homogeneous, Friable	Not Applicable					**NA/PS**	
AJ75	BK0821467-5	Corridor Adj Room 227 - Black Mastic Associated with 12"12" White VFT with Brown Spots	Black, Homogeneous, Non-Fibrous	61.6	14.2	24.2	0%	100%	**NAD** Inconclusive	**NAD**
AJ76	BK0821467-6	Corridor 260 - Black Mastic Associated with 12"12" White VFT with Brown Spots	Black, Homogeneous, Non-Fibrous	80.3	5.8	13.9	0%	100%	**NAD** Inconclusive	**NAD**
AK77	BK0821467-7	Corridor Adj Room 227 - 12"x12" White VFT with Brown Spots	Grey, Homogeneous, Non-Fibrous	18.0	3.7	78.3	0%	100%	**NAD** Inconclusive	**NAD**
AK78	BK0821467-8	Corridor 260 - 12"x12" White VFT with Brown Spots	Grey, Homogeneous, Non-Fibrous	19.3	7.0	73.6	0%	100%	**NAD** Inconclusive	**NAD**
AL79	BK0821467-9	Library 201 - Sealant (Beige) at Brick Expansion Joint	Beige, Homogeneous, Non-Fibrous	36.4	13.1	50.5	0%	97.4%	**2.6%CHRY**	**Not Analyzed**
AL80	BK0821467-10	Library 201 - Sealant (Beige) at Brick Expansion Joint	Beige, Homogeneous, Non-Fibrous	35.7	13.2	51.1			**NA/PS**	**Not Analyzed**

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AM81	BK0821467-11	Library 201 - Joint Compound (White) associated with Gypsum Board	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AM82	BK0821467-12	Library 201 - Joint Compound (White) associated with Gypsum Board	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AN83	BK0821467-13	Library 201 - Gypsum Board (White)	Grey/Brown, Homogeneous, Friable	Not Applicable			5%CELL 5%FBGL	90%	**NAD**	
AN83	BK0821467-14	Closet Near Mail Room - Gypsum Board (White)	Grey/Brown, Homogeneous, Friable	Not Applicable			5%CELL	95%	**NAD**	
AO85	BK0821467-15	Boys Adj Room 201 - Backing (Greyish/White) Associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AO86	BK0821467-16	Boys Adj Room 201 - Backing (Greyish/White) Associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AP87	BK0821467-17	Boys Adj Room 201 - Grout (White) Associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AO88	BK0821467-18	Boys Adj Room 201 - Grout (White) Associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AQ89	BK0821467-19	Corridor 130 - 12"x12" Grey with Spots Vinyl Floor Tiles	Grey, Homogeneous, Non-Fibrous	22.2	14.6	63.3	0%	100%	**NAD** Inconclusive	**NAD**
AQ90	BK0821467-20	Corridor 130 - 12"x12" Grey with Spots Vinyl Floor Tiles	Grey, Homogeneous, Non-Fibrous	22.7	13.8	63.6	0%	100%	**NAD** Inconclusive	**NAD**

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AR91	BK0821467-21	Corridor 130 - Black Mastic Associated with 12"x12" Grey with Spots VFT	Black, Homogeneous, Non-Fibrous	27.0	23.0	50.0	0%	100%	**NAD** Inconclusive	**NAD**
AR92	BK0821467-22	Corridor 130 - Black Mastic Associated with 12"x12" Grey with Spots VFT	Black, Homogeneous, Non-Fibrous	29.5	19.8	50.7	0%	100%	**NAD** Inconclusive	**NAD**
AS93	BK0821467-23	Corridor Adj Room 220 - Black Cove Base (6")	Black, Homogeneous, Non-Fibrous	45.7	2.4	51.9	0%	100%	**NAD** Inconclusive	**NAD**
AS94	BK0821467-24	Corridor Adj Room 227 - Black Cove Base (6")	Black, Homogeneous, Non-Fibrous	46.9	3.3	49.8	0%	100%	**NAD** Inconclusive	**NAD**
AT95	BK0821467-25	Corridor Adj Room 220 -Grey Mastic Associated with Black Cove Base (6")	Yellow, Homogeneous, Non-Fibrous	36.0	31.4	32.6	0%	100%	**NAD** Inconclusive	**NAD**
AT96	BK0821467-26	Corridor Adj Room 227 -Grey Mastic Associated with Black Cove Base (6")	Yellow, Homogeneous, Non-Fibrous	28.2	10.2	61.7	0%	100%	**NAD** Inconclusive	**NAD**
AU97	BK0821467-27	Lobby 100 - Wall Plaster (Brown Coat)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AU98	BK0821467-28	Nurse 103 - Wall Plaster (Brown Coat)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AU99	BK0821467-29	Nurse 103 - Wall Plaster (Brown Coat)	Beige, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AV100	BK0821467-30	Lobby 100 - Wall Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

Atlas Environmental Lab, Corp.
255 West 36th Street, Suite# 1503
New York, NY 10018
Phone:(212) 563-0400 Fax:(212) 563-0401
www.atlasenvironmentallab.com

Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AV101	BK0821467-31	Nurse 103- Wall Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AV102	BK0821467-32	Nurse 103 - Toilet - Wall Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AW103	BK0821467-33	Nurse 103- Toilet - Ceiling Plaster (Brown Coat)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
AW104	BK0821467-34	Girls Toilet by Lobby 100 - Ceiling Plaster (Brown Coat)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
AW105	BK0821467-35	Girls Toilet by Lobby 100 - Ceiling Plaster (Brown Coat)	Grey, Homogeneous, Friable	Not Applicable			5%FOAM	95%	**NAD**	
AX106	BK0821467-36	Nurse 103 - Toilet - Ceiling Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AX107	BK0821467-37	Girls Toilet by Lobby 100 - Ceiling Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AX108	BK0821467-38	Girls Toilet by Lobby 100 - Ceiling Plaster (White Coat)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AY109	BK0821467-39	Nurse Toilet - Mortar (Gray) at Ceramic Floor Tiles	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AY110	BK0821467-40	Nurse Toilet - Mortar (Gray) at Ceramic Floor Tiles	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
AZ111	BK0821467-41	Girls Toilet by Lobby 100 - Backing (Gray) associated with Ceramic Wall Tiles	Beige, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
AZ112	BK0821467-42	Girls Toilet by Lobby 100 - Backing (Gray) associated with Ceramic Wall Tiles	Beige, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BA113	BK0821467-43	Nurse Toilet - Grout (White) associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BA114	BK0821467-44	Nurse Toilet - Grout (White) associated with Ceramic Wall Tiles	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BB115	BK0821467-45	Exterior - A Wing by Lobby 160 - Gypsum Board (Brown)	Tan, Homogeneous, Friable	Not Applicable			5%FBGL	95%	**NAD**	
BB116	BK0821467-46	Exterior - A Wing by Lobby 160 - Gypsum Board (Brown)	Tan, Homogeneous, Friable	Not Applicable			5%FBGL	95%	**NAD**	
BC117	BK0821467-47	Exterior - A Wing by Lobby 160 - Joint Compound Associated with Gypsum Board (White)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BC118	BK0821467-48	Exterior - A Wing by Lobby 160 - Joint Compound Associated with Gypsum Board (White)	White, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BD119	BK0821467-49	Exterior - Stair 6 Courtyard - Brick Mortar (Gray)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	
BD120	BK0821467-50	Exterior - North - Brick Mortar (Gray)	Grey, Homogeneous, Friable	Not Applicable			0%	100%	**NAD**	

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Bulk Asbestos Report by PLM-TEM

Client: WSP
Collected by: Client
Project Name/No.: Briarcliff CSD / 31403475.005
Project Address: Todd Elementary School; 45 Inghum Rd, Briarcliff Manor NY 10510
Work Area:

Lab ID: BK0821467
Date Received: 8/30/2021
PLM Date Analyzed: 8/31/2021
TEM Date Analyzed: 9/1/2021
Report Date: 9/2/2021

Client ID#	Lab ID#	Description/ Location	Analyst Description	ORG%	AII%	ASI%	PLM			TEM
							Fibrous%	Non Fibrous%	Asbestos% &Type	Asbestos% &Type
BE121	BK0821467-51	Exterior - By Classroom 123 - Louver Caulking	Grey, Homogeneous, Non-Fibrous	56.2	23.6	20.2	0%	100%	**NAD** Inconclusive	**NAD**
BE122	BK0821467-52	Exterior - By Classroom 234 - (Gray)	Grey, Homogeneous, Non-Fibrous	50.3	29.7	20.1	0%	100%	**NAD** Inconclusive	**NAD**

MG

Quantitative Analysis (Semi/Full):Bulk Asbestos Analysis-PLM by EPA 600/M4-82-020 per 40 CFR or ELAP198.1 (friable) and 198.6 (NOB) samples for New York.

NAD=no asbestos detected, NA/PS=Not Analyzed/Positive Stop, Trace=<1%,FBGL=Fiberglass, CELL=Cellulose,CHRY=Chrysotile,Amo=Amosite,CRO=Crocidolite,ANTH=Anthophylite, TRE=Tremolite, ACT=Actinolite, NA=not applicable.

PLM is not consistently reliable in detecting Asbestos in floor coverings and similar non friable organically bound materials. NAD or Trace results by PLM are inconclusive.

TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos containing in NY State.

All samples were prepared and analyzed in accordance with the EPA "TEM Method for Identifying and Quantifying Asbestos in Non-Fibrous Organically Bound Bulk Samples" ELAP 198.4".

ORG%=Ashed Organic%, AII= Acid Insoluble Inorganic%, ASI= Acid Soluble Inorganic%

This "Summary of Analytical Results "shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ELAP or any agency of the U.S Government. The results relate only to the items tested. This report may not be reproduced, except in full, without the written approval of AEL .Atlas Environmental lab did not collect the analyzed samples and thus accepts no liability with regard to their collection and/or maintenance . AEL relies on client's data. The liability of Atlas Environmental Lab corp with respect to the services charged, shall in no event exceed the amount of the invoice.

NYS-ELAP#11999, NVLAP Lab Code: 500092-0, NJ ID: NY034, CT Reg. ID: PH-0154

PLM Analyst: AS TEM Analyst: VR Approved by:

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD CAPIS ID#: #: —
PROJECT SITE: Todd Elementary School
PROJECT ADDRESS: 45 Ingham Rd, Briarcliff Manor NY 10510

DATE(S) OF INSPECTION: 8-27-2021
Project Manager: A. Smolyar
Inspector(s)/Investigator(s): STEPHEN GRUBER, NICHOLAS CASALE

BK0891467

LOUIS BERGER dba WSP USA Solutions, Inc.
TELEPHONE NO.: (212) 612-7900
ADDRESS: 96 Morton Street 8th Floor, New York, NY 10014

Alexander.Smolyar@wsp.com
RESULTS TO: ~~josue.garcia@wsp.com~~; ~~prakash.saha@wsp.com~~ Lbolabresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

	HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
1	AH	71	Corridor 258 adjacent Rm 232	Cementitious Window				
2	↓	72	~~Corridor 254~~ ~~Corridor 260~~ adjacent Rm 241	Sill (Black)				
3	AI	73	corridor 260	Cementitious Window				
4	↓	74	↓	Sill (White)				
5	AJ	75	Corridor adj Rm 227	Black mastic assoc w 12"x12" White VFT w Brown spots				
6	↓	76	Corridor 260	↓				
7	AK	77	Corridor adj Rm 227	12"x12" White VFT w Brown spots				
8	↓	78	Corridor 260	↓				
9	AL	79	Library 201	Sealant (beige) at Brick expansion Join				
10	↓	80	↓	↓				
11	AM	81	↓	Joint compound (white)				
12	↓	82	↓	assoc w Gypsum Board				

CHAIN OF CUSTODY

Relinquished by: (print)	STEPHEN GRUBER	(Sign)		8/30/2021	7:30 AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM	Relinquished by: (print)	Relinquished by Mel	(Sign)	/ /	AM/PM
Received by: (print)	Telamon	(Sign)		8/30/21	7:30 AM/PM	Received by: (print)		(Sign)	/ /	AM/PM	Received by: (print)		(Sign)	/ /	AM/PM

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Bronxdale Manor UFSD CAPIS ID#: #: —
PROJECT SITE: Todd Elementary School
PROJECT ADDRESS: 45 Ingham Rd, Bronxdale Manor NY 10510

DATE(S) OF INSPECTION: 8-27-2021
Project Manager: A. Smolyar
Inspector(s)/Investigator(s): STEPHEN GRUBER, NICHOLAS CASALE

BK0821467

LOUIS BERGER dba WSP USA Solutions, Inc.
TELEPHONE NO.: (212) 612-7900
ADDRESS: 96 Morton Street 8th Floor, New York, NY 10014

RESULTS TO: Alexander.Smolyar@wsp.com; josue.garcia@wsp.com; prakash.saha@wsp.com Ubc.labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☑ 72 HR.

	HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL D ESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
13	AN	83	Library 201	Gypsum Board (white)				
14	↓	84	closet near Mail Room	↓				
15	AO	85	Boys adj Rm 201	Backing (Greyish/white) assoc.				
16	↓	86	↓	w ceramic wall tiles				
17	AP	87		Grout (white) assoc				
18	↓	88	↓	w ceramic wall tiles				
19	AQ	89	Corridor 130	[12"X12" Grey w ~~Brown~~ spots Vinyl Floor Tiles]				
20	↓	90	↓	↓				
21	AR	91	↓	[Black mastic assoc w 12"X12" Grey w spots VFT]				
22	↓	92	↓	↓				
23	AS	93	Corridor adj Rm 220	[Black Cove base (6")]				
24	↓	94	Corridor adj Rm 227	↓				

CHAIN OF CUSTODY

Relinquished by: (print)	STEPHEN GRUBER	(Sign)		08/30/2021	7:30 AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM
Received by: (print)	Melanie Torres	(Sign)		8/30/21	7:30 AM/PM	Received by: (print)		(Sign)	/ /	AM/PM	Received by: (print)		(Sign)	09/09/21	AM/PM

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Bruarcliff Manor UFSD CAPIS ID#: #: —
PROJECT SITE: Todd Elementary School
PROJECT ADDRESS: 45 Ingham Rd, Bruarcliff Manor NY 10510

DATE(S) OF INSPECTION: 8-27-2021 BK0821467
Project Manager: A. Smolyar
Inspector(s)/Investigator(s): STEPHEN GRUBER, NICHOLAS CASALE

LOUIS BERGER dba WSP USA Solutions, Inc.
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RESULTS TO: Alexander.smolyar@wsp.com; ~~josue.garcia@wsp.com; prakash.saha@wsp.com~~ Lbolubasz1s@gmail.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

	HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL D ESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
25	AT	95	Corridor adj Rm 220	[Grey mastic associated				
26	↓	96	Corridor adj Rm 227	w black cove base (6")]				
27	AV	97	Lobby 100	Wall plaster (Brown coat)				
28	↓	98	Nurse 103	↓				
29	↓	99	↓ ↓	↓				
30	AV	100	Lobby 100	Wall Plaster (white coat)				
31	↓	101	Nurse 103	↓				
32	↓	102	↓ ↓ - Toilet	↓				
33	AW	103	~~Lo~~ Nurse 103 - Toilet	Ceiling Plaster (Brown coat)				
34	↓	104	Girls Toilet by Lobby 100	↓				
35	↓	105	↓ ↓	↓				
36	AX	106	Nurse 103 - Toilet	Ceiling Plaster (white coat)				

Analyzed by Meeltex 09/01/21

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/30/2021	7:00 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) Melaniefox	(Sign)	8/30/21	7:30 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD **CAPIS ID#:** #: —
PROJECT SITE: Todd Elementary School
PROJECT ADDRESS: 45 Ingham Rd, Briarcliff Manor NY 10510

DATE(S) OF INSPECTION: 8-27-2021
Project Manager: A. Smolyar
BV0821467
Inspector(s)/Investigator(s): STEPHEN GAUBER, NICHOLAS CASALE

LOUIS BERGER dba WSP USA Solutions, Inc.
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RESULTS TO: Alexander.osmolyar@wsp.com; ~~josue.garcia@wsp.com~~; ~~prakash.saha@wsp.com~~ nyc1labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

	HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL D ESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
37	AX	107	Girls Toilet by Lobby 100	Ceiling Plaster (white coat)				
38	↓	108	↓	↓				
39	AY	109	Nurse Toilet	[Mortar (gray) at Ceramic Floor tiles]				
40	↓	110	↓					
41	AZ	111	Girls Toilet by Lobby 100	Backing (gray) assoc w				
42	↓	112	↓	Ceramic wall tiles				
43	BA	113	Nurse Toilet	Grout (white) assoc				
44	↓	114	↓	w ceramic wall t/es				
45	BB	115	Exterior - Awning by Lobby 160	Gypsum Board (Brown)				
46	↓	116	↓	↓				
47	BC	117	↓	Joint Compound assoc				
48	↓	118	↓	w Gypsum Board (White)				

Relinquished by Melanie Fong 9/2/2021

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GAUBER	(Sign)	8/30/2021	7:00 AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	0012 AM/PM
Received by: (print) Melanie Fong	(Sign)	8/30/21	7:00 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PROJECT NO.: 31403475.005
CLIENT: Briarcliff Manor UFSD **CAPIS ID#:** #: —
PROJECT SITE: Todd Elementary School
PROJECT ADDRESS: 45 Ingham Rd, Briarcliff Manor NY 10510

DATE(S) OF INSPECTION: 8-27-2021
Project Manager: A. Smolyar
BF0821467
Inspector(s)/Investigator(s): STEPHEN GRUBER, NICHOLAS CASALE

LOUIS BERGER dba WSP USA Solutions, Inc.
TELEPHONE NO.: (212) 612-7900
ADDRESS: 96 Morton Street 8th Floor, New York, NY 10014

Alexander.smolyar@wsp.com
RESULTS TO: ~~josue.garcia@wsp.com;~~ ~~prakash.saha@wsp.com~~ Lbo.labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR. ☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL D ESCRIPTION	APPROX. QUANTITY (LF/SF)	Conditions Good/Fair/Poor	Friable Yes/No	FIELD NOTES
~~AB~~	~~71~~	~~Roof E Bulkhead~~	~~Caulk at Window (Gray)~~	~~SF~~			
↓	~~72~~	↓					
79 BD	119	Exterior - Stair 6 Courtyar	Brick Mortar (gray)				
80 ↓	120	Exterior - North	↓				
81 BE	121	[Exterior - By Classroom 123]	Louver Caulking				
82 ↓	122	[Exterior - By Classroom 234]	(Gray)				

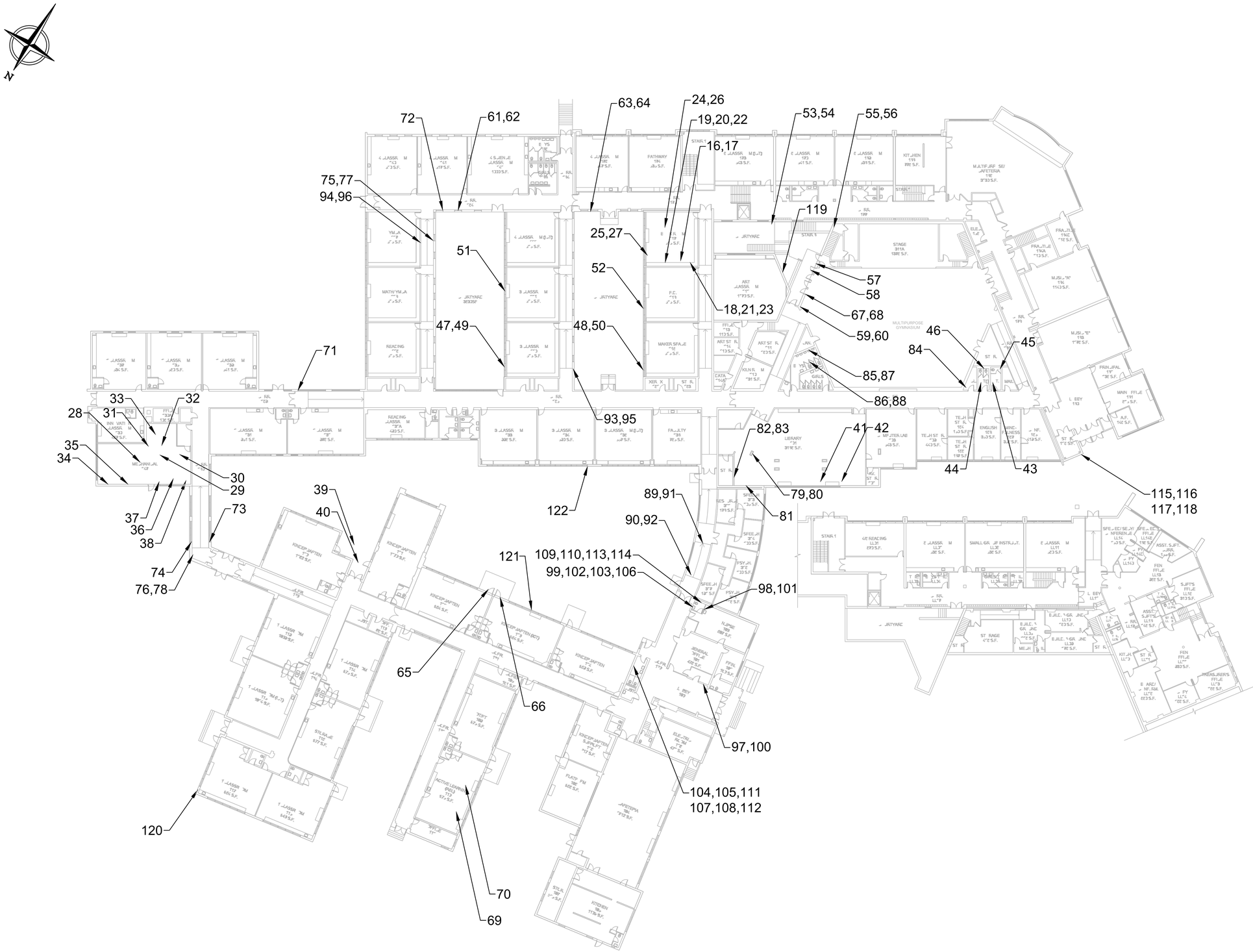
CHAIN OF CUSTODY

Relinquished by: (print)	STEPHEN GRUBER	(Sign)		8/30/2021	7:00 AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM	Relinquished by: (print)		(Sign)	/ /	AM/PM
Received by: (print)	Melanie Fan	(Sign)		8/30/21	7:30 AM/PM	Received by: (print)		(Sign)	/ /	AM/PM	Received by: (print)		(Sign)	8/31/21	7 AM/PM

Received by Mel

General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

APPENDIX C:
ASBESTOS BULK SAMPLE LOCATION DRAWINGS



1 BULK SAMPLE LOCATION PLAN - FIRST FLOOR

SCALE: NOT TO SCALE

\\ennyccifs01\Jobs2\96 MORTON STREET\PNW Boces 2021-2022\31403475.005 Briarcliff Todd ES Survey & Design\CAD Files\BSL.dwg Sep 21, 2021

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL. 914.742.1120

TODD ELEMENTARY SCHOOL
45 INGHAM RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

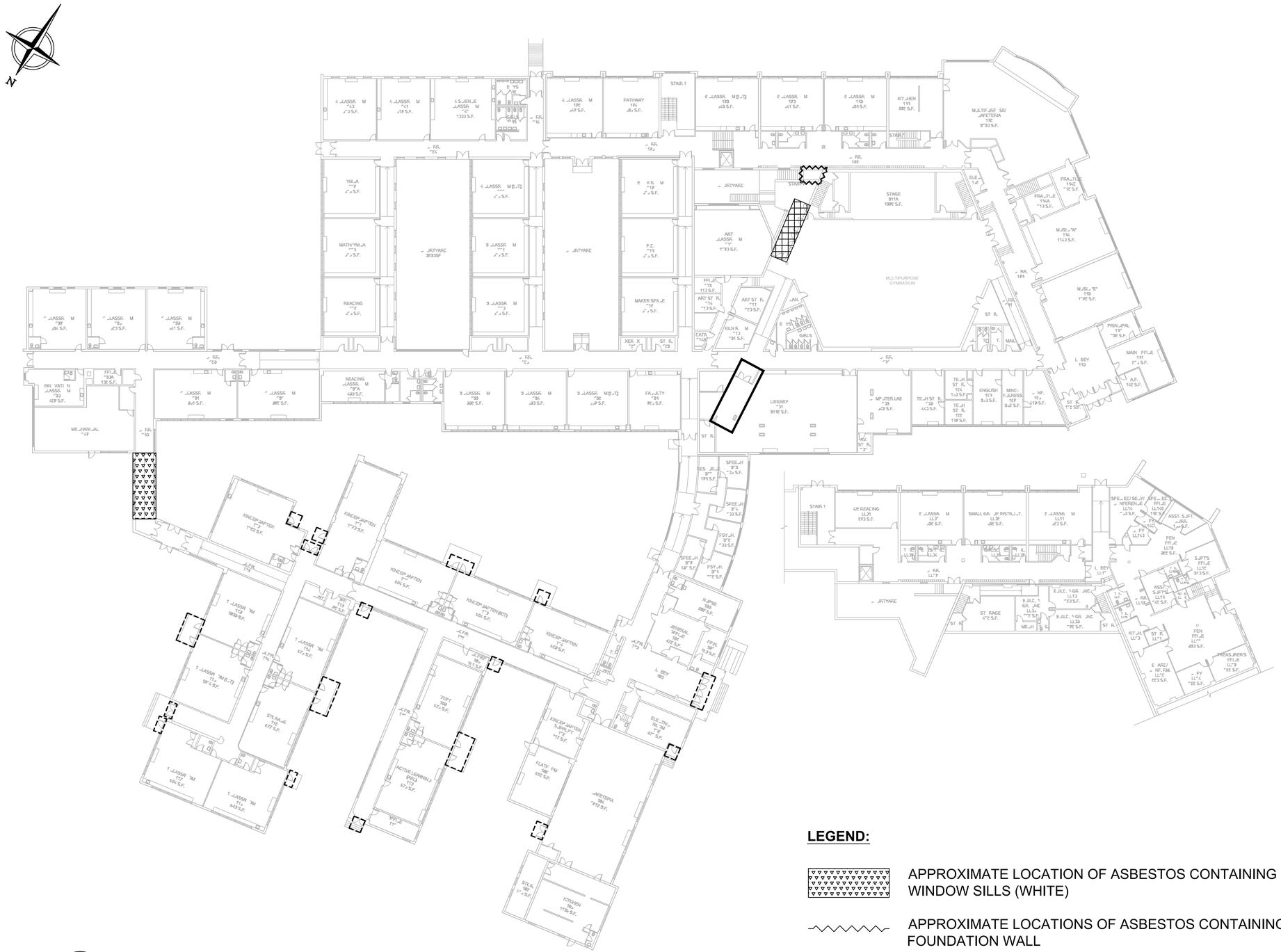
CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

TODD ELEMENTARY SCHOOL

DRAWING TITLE:
BULK SAMPLE LOCATION PLAN FIRST FLOOR

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**BSL001**
	DRAWING NUMBER: 1 OF 2

APPENDIX D:
ASBESTOS CONTAINING MATERIALS LOCATION DRAWINGS



1 ACM LOCATION PLAN - FIRST FLOOR

SCALE: NOT TO SCALE

LEGEND:

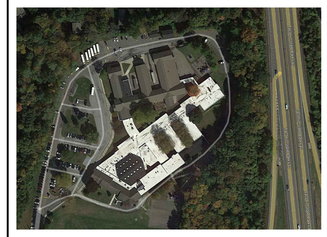
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING CEMENTITIOUS WINDOW SILLS (WHITE)
- APPROXIMATE LOCATIONS OF ASBESTOS CONTAINING TAR AT FOUNDATION WALL
- APPROXIMATE LOCATIONS OF ASBESTOS CONTAINING WOOD DOOR FRAME CAULKING (GRAY)
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING DOOR FRAME CAULKING (BEIGE) AND EXPANSION JOINT CAULKING (GRAY)
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING SEALANT (GRAY) AT BRICK EXPANSION JOINT

\\ennyccifs01\Jobs2\96 MORTON STREET\PNW Boces 2021-2022\3140375.005 Briarcliff Todd ES Survey & Design\CAD Files\ACM.dwg Sep 21, 2021

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT

45 INGHAM ROAD
BRIARCLIFF MANOR, NY 10510

LOCATION PLAN
NTS



ENVIRONMENTAL CONSULTANT

WSP USA SOLUTIONS, INC.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
TEL. 914.742.1120

TODD ELEMENTARY SCHOOL
45 INGHAM RD,
BRIARCLIFF MANOR, NY 10510

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

CONSULTANT SERVICES FOR PHASE 1, 2 & 3 PROJECT SURVEY & DESIGN SERVICE

TODD ELEMENTARY SCHOOL

DRAWING TITLE:
ACM LOCATION PLAN FIRST FLOOR

DRAWN BY: J. LIU	SCALE: NOT TO SCALE
INSP/INV. S. GRUBER	DATE: 09/10/2021
CERTIFICATE NO. 17-42557	DRAWING NUMBER:
CHECKED BY: A. SMOLYAR	**ACM001**
	DRAWING NUMBER: 1 OF 1

APPENDIX E:
LEAD XRF SHOT RESULTS

XRF CALIBRATION CHECK FORM

PAGE 1 OF 4

PROJ. NO.:	31403475.005	DATE:	8/27/21
PROJECT NAME:	Reconstruction	INSPECTOR NAME:	N. Casale & S. Grubes
CLIENT:	Briarcliff SD	INSPECTOR SIGNATURE:	
SITE:	Todd Elementary	PROJ. MANAGER:	A. Smolyar

WSP USA Solutions Inc.
TELEPHONE #: (212) 612-7900
FAX #: (212) 425-1618
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

XRF MAKE/MODEL: RMD LPA-1 (Serial#3675) Heuresis Pb200i (Serial#2150)

LLW#:

JOB#: 08271219

NOTES:

CALIBRATION CHECK – PRIOR TO LEAVING OFFICE

1.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 8:50 AM	TEST #	1	2	3	
	XRF READING	1.0	1.0	1.1	

CALIBRATION CHECK – PRIOR TO LEAVING OFFICE

0.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 8:55 AM	TEST #	4	5	6	
	XRF READING	0.1	0.2	-0.1	

CALIBRATION CHECK – ~~FIELD-START~~ End

1.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 12:03 PM	TEST #	61	62	63	
	XRF READING	1.1	1.1	1.1	

CALIBRATION CHECK – ~~FIELD-END~~/2-HR (circle one)

0.0 mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: 12:06 PM	TEST #	64	65	66	
	XRF READING	0.2	0.1	0.1	

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

CALIBRATION CHECK – FIELD-END/2-HR (circle one)

_____ mg/cm² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE
CALIBRATION TIME: _____	TEST #				
	XRF READING				

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: _____

PROJECT NAME: ~~LPA1 - #3675~~ PB2001 - #2156

CLIENT: _____

PROJECT LOCATION: Todd Elem.

INSPECTOR(S): S. Gruber, N. Casale

PROJ. MANAGER: A. Smelyas

INSPECTION DATE: 8/27/21

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

LLW#: _____ JOB#: _____

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION: COLOR	CONDITION [I / F / P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING (mg/cm²)
7	M PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Ext. Door Fr.	A B C D; RM CTR; FL CL				Mens Bath by 156			0.2
8	M PL S C CB PG CR; B W V CT G FG; OTHER:	Varnish		Door	A B C D; RM CTR; FL CL							-0.1
9	M PL S C CB PG CR; B W V CT G FG; OTHER:	Grey		Door Frame	A B C D; RM CTR; FL CL							0.6
10	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Wall	A B C D; RM CTR; FL CL							-0.1
11	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Upper Wall	A B C D; RM CTR; FL CL							-0.2
12	M PL S C CB PG CR; B W V CT G FG; OTHER:	Red		Rad. Cover	A B C D; RM CTR; FL CL							0.2
13	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		I-Beam	A B C D; RM CTR; FL CL							3.2
14	M PL S C CB PG CR; B W V CT G FG; OTHER:	↓		Ceiling	A B C D; RM CTR; FL CL							1.8
15	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Conduit	A B C D; RM CTR; FL CL							0.5
16	M PL S C CB PG CR; B W V CT G FG; OTHER:	↓		↓	A B C D; RM CTR; FL CL							0.4
17	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Rad. Cover	A B C D; RM CTR; FL CL			Women's Bathroom by 156				0.2
18	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Shelves	A B C D; RM CTR; FL CL		Mail room by 156					0.3
19	M PL S C CB PG CR; B W V CT G FG; OTHER:	Tan		I-Beam	A B C D; RM CTR; FL CL		Closet Across from 155					2.9
20	M PL S C CB PG CR; B W V CT G FG; OTHER:	↓		Ceiling	A B C D; RM CTR; FL CL				↓			3.2
21	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Ceiling	A B C D; RM CTR; FL CL		Storage Room in 209					1.6
22	M PL S C CB PG CR; B W V CT G FG; OTHER:	Tan		Wall	A B C D; RM CTR; FL CL			Library 201				0.2
23	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Window Frame	A B C D; RM CTR; FL CL							0.2
24	M PL S C CB PG CR; B W V CT G FG; OTHER:	White		Rad. Cover	A B C D; RM CTR; FL CL							0.1
25	M PL S C CB PG CR; B W V CT G FG; OTHER:	Tan		Column	A B C D; RM CTR; FL CL							0.2
	M PL S C CB PG CR; B W V CT G FG; OTHER:				A B C D; RM CTR; FL CL							

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass ; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: _____ PROJECT NAME: _____ LPA1 - #3675 PB200i - #2150

CLIENT: _____ PROJECT LOCATION: Todd. Elem.

INSPECTOR(S): N. Casale, S. Gruber

PROJ. MANAGER: A. Smolyar INSPECTION DATE: 8/27/21

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

LLW#: _____ JOB#: _____

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION: COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING [mg/cm²]
26	M PL (S) C CB PG CR; B W V CT G FG; OTHER	Yellow		Wall	A B C D; RM CTR; FL CL	Hall Outside of Special Services						0.2
27	(M) PL S C CB PG CR; B W V CT G FG; OTHER	Red		Handrail	A B C D; RM CTR; FL CL							0.0
28	(M) PL S C CB PG CR; B W V CT G FG; OTHER	↓		Door	A B C D; RM CTR; FL CL							0.1
29	M PL S C (CB) PG CR; B W V CT G FG; OTHER	Yellow		Wall	A B C D; RM CTR; FL CL							-0.1
30	M (PL) S C CB PG CR; B W V CT G FG; OTHER	White		Wall	A B (C) D; RM CTR; FL CL		General Office					-0.4
31	M PL S C CB PG CR; B (W) V CT G FG; OTHER	Red		Wall Trim	A (B) C D; RM CTR; FL CL		Nurses Office					0.1
32	M PL S C CB PG CR; B (W) V CT G FG; OTHER	Red		Door Frame	(A) B C D; RM CTR; FL CL		Nurse's Bathroom					0.3
33	M PL S C CB PG CR; B (W) V CT G FG; OTHER	↓		Door	(A) B C D; RM CTR; FL CL		↓					0.1
34	M (PL) S C CB PG CR; B W V CT G FG; OTHER	Yellow		Wall	A B C (D); RM CTR; FL CL		↓					0.0
35	M PL S C CB PG CR; B (W) V CT G FG; OTHER	Red		Window Frame	A B C D; RM CTR; FL CL		Hall Outside General Office					-0.1
36	(M) PL S C CB PG CR; B W V CT G FG; OTHER	Beige		Door Frame	(A) B C D; RM CTR; FL CL		General Office			Mail Room		0.4
37	(M) PL S C CB PG CR; B W V CT G FG; OTHER	Blue		Door	(A) B C D; RM CTR; FL CL		↓					0.1
38	M PL S C CB PG CR; B (W) V CT G FG; OTHER	Varnish		Window Frame	(A) B C D; RM CTR; FL CL		General Office					0.1
39	M PL S C CB PG CR; B (W) V CT G FG; OTHER:	White		Door Frame	A B C D; RM CTR; FL CL		Large Courtyard					1.3
40	M PL S C CB PG CR; B W (V) CT G FG; OTHER:	Blue		Baseboard	A B C D; RM CTR; FL CL		Corridor 133					0.1
41	(M) PL S C CB PG CR; B W V CT G FG; OTHER:	Yellow		Rad. Cover	A B C D; RM CTR; FL CL		↓					0.2
42	M PL S C CB PG CR; B W (V) CT G FG; OTHER:	Black		Baseboard	A B C D; RM CTR; FL CL		↓					0.0
43	M PL S C CB PG CR; B W V CT G FG; OTHER: Cork board	Yellow		Corkboard	A B C D; RM CTR; FL CL		Hall by 232					0.1
44	M PL (S) C CB PG CR; B V CT (G) FG; OTHER:	↓		Window	A B C D; RM CTR; FL CL		Hall by 225					0.2
45	M PL S C CB PG CR; B (W) V CT G FG; OTHER:	↓		Window Frame	A B C D; RM CTR; FL CL		↓					0.0

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass ; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: _____ PROJECT NAME: _____ LPA1 - #3675 XB200i - #2150

CLIENT: _____ PROJECT LOCATION: Todd Elem.

INSPECTOR(S): N. Casale, S. Gruber PROJ. MANAGER: A. Smolyar INSPECTION DATE: 8/27/21

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

LLW#: _____ JOB#: _____

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION: COLOR	CONDITION [I / F / P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/CR]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	XRF READING [mg/cm²]
46	M PL S (C) CB PG CR B W V CT G FG OTHER:	Yellow		Lower Wall	A B C D RM CTR FL CL		Hall		225			0.2
47	(M) PL S C CB PG CR B W V CT G FG OTHER:	Red		Column	A B C D RM CTR FL CL				↓			0.5
48	M PL S C CB PG CR B (W) V CT G FG OTHER:	White		Door Frame	A B C D RM CTR FL CL		Small Courtyard					0.2
49	M PL S C (CB) PG CR B W V CT G FG OTHER:	Tan		Wall	A B C D RM CTR FL CL				↓			0.0
50	M PL S C (CB) PG CR B W V CT G FG OTHER:	White		Wall	A B C D RM CTR FL CL				↓			0.1
51	M PL S C CB PG CR (B) W V CT G FG OTHER:	Yellow		Wall	A B C D RM CTR FL CL		Hall	Outside	Small Courtyard			0.0
52	(M) PL S C CB PG CR B W V CT G FG OTHER:	Blue		Door Frame	A B C D RM CTR FL CL		Back Room 217					0.6
53	M PL S C (CB) PG CR B W V CT G FG OTHER:	Blue		Wall	A B C D RM CTR FL CL				↓			0.0
54	(M) PL S C CB PG CR B W V CT G FG OTHER:	↓		Rad. Cover	A B C D RM CTR FL CL				↓			0.2
55	(M) PL S C CB PG CR B W V CT G FG OTHER:	Red		Door	A B C D RM CTR FL CL		Gym Courtyard					0.1
56	(M) PL S C CB PG CR B W V CT G FG OTHER:	Red		Door Frame	A B C D RM CTR FL CL				↓			0.5
57	M PL S C CB PG CR B (W) V CT G FG OTHER:	White		Awning	A B C D RM CTR FL CL				↓			1.5
58	(M) PL S C CB PG CR B W V CT G FG OTHER:	Blue		Door Frame	A B C D RM CTR FL CL				↓			0.4
59	(M) PL S C CB PG CR B W V CT G FG OTHER:	Black		Stairs	A B C D RM CTR FL CL				↓			0.1
60	M PL S (C) CB PG CR B W V CT G FG OTHER:	Red		Floor	A B C D RM CTR FL CL		Mech. Room					0.3
	M PL S C CB PG CR B W V CT G FG OTHER:				A B C D RM CTR FL CL							
	M PL S C CB PG CR B W V CT G FG OTHER:				A B C D RM CTR FL CL							
	M PL S C CB PG CR B W V CT G FG OTHER:				A B C D RM CTR FL CL							
	M PL S C CB PG CR B W V CT G FG OTHER:				A B C D RM CTR FL CL							
	M PL S C CB PG CR B W V CT G FG OTHER:				A B C D RM CTR FL CL							

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass ; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

APPENDIX F:
PCB BULK SAMPLE FIELD DATA SHEETS WITH CHAIN OF CUSTODY & LABORATORY RESULTS

Technical Report

prepared for:

WSP USA Solutions Inc. (New York, NY)
96 Morton Street, 8th Floor
New York NY, 10014
Attention: Alexander Smolyar

Report Date: 09/02/2021
Client Project ID: 31403475.005
York Project (SDG) No.: 21H1493

CT Cert. No. PH-0723 New Jersey Cert. No. CT005 and NY037 New York Cert. Nos. 10854 and 12058 PA Cert. No. 68-04440

120 RESEARCH DRIVE STRATFORD, CT 06615 ■ 132-02 89th AVENUE RICHMOND HILL, NY 11418
www.YORKLAB.com (203) 325-1371 FAX (203) 357-0166 ClientServices@yorklab.com

Report Date: 09/02/2021
Client Project ID: 31403475.005
York Project (SDG) No.: 21H1493

WSP USA Solutions Inc. (New York, NY)
96 Morton Street, 8th Floor
New York NY, 10014
Attention: Alexander Smolyar

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on August 30, 2021 and listed below. The project was identified as your project: **31403475.005**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
21H1493-01	A-01/02/03	Caulk	08/19/2021	08/30/2021
21H1493-02	B-04/05/06	Caulk	08/19/2021	08/30/2021
21H1493-03	C-07/08/09	Caulk	08/19/2021	08/30/2021
21H1493-04	D-10/11/12	Caulk	08/19/2021	08/30/2021
21H1493-05	E-13/14/15	Caulk	08/19/2021	08/30/2021
21H1493-06	F-16/17/18	Caulk	08/19/2021	08/30/2021
21H1493-07	G-19/20/21	Caulk	08/19/2021	08/30/2021
21H1493-08	H-22/23/24	Caulk	08/19/2021	08/30/2021
21H1493-09	I-25/26/27	Caulk	08/27/2021	08/30/2021

General Notes for York Project (SDG) No.: 21H1493

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: Cassie L. Mosher **Date:** 09/02/2021

Cassie L. Mosher
Laboratory Manager

Sample Information

Client Sample ID: A-01/02/03 **York Sample ID:** 21H1493-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:35	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 19:35	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 19:35	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.407	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 19:35	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*84.5 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*59.5 %*	*30-140*

Sample Information

Client Sample ID: B-04/05/06 **York Sample ID:** 21H1493-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ

Sample Information

Client Sample ID: B-04/05/06 **York Sample ID:** 21H1493-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
53469-21-9	Aroclor 1242	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 19:49	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 19:49	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 19:49	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 19:49	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*85.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*61.5 %*	*30-140*

Sample Information

Client Sample ID: C-07/08/09 **York Sample ID:** 21H1493-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:02	BJ

Sample Information

Client Sample ID: C-07/08/09 **York Sample ID:** 21H1493-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
37324-23-5	Aroclor 1262	ND		mg/kg	0.342	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:02	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.342	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:02	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.342	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 20:02	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*67.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*50.5 %*	*30-140*

Sample Information

Client Sample ID: D-10/11/12 **York Sample ID:** 21H1493-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.347	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:16	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.347	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 20:16	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*74.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*53.5 %*	*30-140*

Sample Information

Client Sample ID: D-10/11/12 **York Sample ID:** 21H1493-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Sample Information

Client Sample ID: E-13/14/15 **York Sample ID:** 21H1493-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.316	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:30	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.316	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 20:30	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*84.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*64.0 %*	*30-140*

Sample Information

Client Sample ID: F-16/17/18 **York Sample ID:** 21H1493-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB) **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst

Sample Information

Client Sample ID: F-16/17/18 **York Sample ID:** 21H1493-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:43	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 20:43	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,NJDEP	09/01/2021 20:43	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.355	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 20:43	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*96.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*64.5 %*	*30-140*

Sample Information

Client Sample ID: G-19/20/21 **York Sample ID:** 21H1493-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:57	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:57	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:57	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54 NELAC-NY10854,CTDOH,NJDEP	09/01/2021 20:57	BJ

Sample Information

Client Sample ID: G-19/20/21 **York Sample ID:** 21H1493-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12672-29-6	Aroclor 1248	ND		mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:57	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:57	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 20:57	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:57	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.427	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 20:57	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.427	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 20:57	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*86.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*60.5 %*	*30-140*

Sample Information

Client Sample ID: H-22/23/24 **York Sample ID:** 21H1493-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ

Sample Information

Client Sample ID: H-22/23/24 **York Sample ID:** 21H1493-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 19, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11100-14-4	Aroclor 1268	ND		mg/kg	0.362	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 12:54	09/01/2021 21:10	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.362	1	EPA 8082A Certifications:	08/31/2021 12:54	09/01/2021 21:10	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*95.5 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*65.5 %*	*30-140*

Sample Information

Client Sample ID: I-25/26/27 **York Sample ID:** 21H1493-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
21H1493	31403475.005	Caulk	August 27, 2021 3:00 pm	08/30/2021

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
11104-28-2	Aroclor 1221	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
11141-16-5	Aroclor 1232	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
53469-21-9	Aroclor 1242	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
12672-29-6	Aroclor 1248	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
11097-69-1	Aroclor 1254	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
11096-82-5	Aroclor 1260	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
37324-23-5	Aroclor 1262	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
11100-14-4	Aroclor 1268	ND		mg/kg	0.382	1	EPA 8082A Certifications: NELAC-NY10854,NJDEP	08/31/2021 13:07	09/02/2021 03:58	BJ
1336-36-3	* Total PCBs	ND		mg/kg	0.382	1	EPA 8082A Certifications:	08/31/2021 13:07	09/02/2021 03:58	BJ

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*75.0 %*	*30-140*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*53.0 %*	*30-140*

Analytical Batch Summary

Batch ID: BH11755 **Preparation Method:** EPA 3550C **Prepared By:** EMS

YORK Sample ID	Client Sample ID	Preparation Date
21H1493-01	A-01/02/03	08/31/21
21H1493-02	B-04/05/06	08/31/21
21H1493-03	C-07/08/09	08/31/21
21H1493-04	D-10/11/12	08/31/21
21H1493-05	E-13/14/15	08/31/21
21H1493-06	F-16/17/18	08/31/21
21H1493-07	G-19/20/21	08/31/21
21H1493-08	H-22/23/24	08/31/21
BH11755-BLK1	Blank	08/31/21
BH11755-BS1	LCS	08/31/21
BH11755-BSD1	LCS Dup	08/31/21

Batch ID: BH11758 **Preparation Method:** EPA 3550C **Prepared By:** EMS

YORK Sample ID	Client Sample ID	Preparation Date
21H1493-09	I-25/26/27	08/31/21
BH11758-BLK1	Blank	08/31/21
BH11758-BS1	LCS	08/31/21
BH11758-BSD1	LCS Dup	08/31/21

Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BH11755 - EPA 3550C											
Blank (BH11755-BLK1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	ND	0.0166	mg/kg								
Aroclor 1221	ND	0.0166	"								
Aroclor 1232	ND	0.0166	"								
Aroclor 1242	ND	0.0166	"								
Aroclor 1248	ND	0.0166	"								
Aroclor 1254	ND	0.0166	"								
Aroclor 1260	ND	0.0166	"								
Aroclor 1262	ND	0.0166	"								
Aroclor 1268	ND	0.0166	"								
Total PCBs	ND	0.0166	"								
Surrogate: Tetrachloro-m-xylene	*0.0601*		"	*0.0664*		*90.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0385*		"	*0.0664*		*58.0*	*30-140*				
LCS (BH11755-BS1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	0.359	0.0166	mg/kg	0.332		108	40-130				
Aroclor 1260	0.342	0.0166	"	0.332		103	40-130				
Surrogate: Tetrachloro-m-xylene	*0.0571*		"	*0.0664*		*86.0*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0382*		"	*0.0664*		*57.5*	*30-140*				
LCS Dup (BH11755-BSD1)								Prepared: 08/31/2021 Analyzed: 09/01/2021			
Aroclor 1016	0.360	0.0166	mg/kg	0.332		108	40-130		0.333	25	
Aroclor 1260	0.341	0.0166	"	0.332		103	40-130		0.545	25	
Surrogate: Tetrachloro-m-xylene	*0.0575*		"	*0.0664*		*86.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0379*		"	*0.0664*		*57.0*	*30-140*				
Batch BH11758 - EPA 3550C											
Blank (BH11758-BLK1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	ND	0.0166	mg/kg								
Aroclor 1221	ND	0.0166	"								
Aroclor 1232	ND	0.0166	"								
Aroclor 1242	ND	0.0166	"								
Aroclor 1248	ND	0.0166	"								
Aroclor 1254	ND	0.0166	"								
Aroclor 1260	ND	0.0166	"								
Aroclor 1262	ND	0.0166	"								
Aroclor 1268	ND	0.0166	"								
Total PCBs	ND	0.0166	"								
Surrogate: Tetrachloro-m-xylene	*0.0508*		"	*0.0664*		*76.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0355*		"	*0.0664*		*53.5*	*30-140*				

Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BH11758 - EPA 3550C											
LCS (BH11758-BS1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	0.327	0.0166	mg/kg	0.332		98.4	40-130				
Aroclor 1260	0.301	0.0166	"	0.332		90.6	40-130				
Surrogate: Tetrachloro-m-xylene	*0.0542*		*"*	*0.0664*		*81.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0336*		*"*	*0.0664*		*50.5*	*30-140*				
LCS Dup (BH11758-BSD1)								Prepared: 08/31/2021 Analyzed: 09/02/2021			
Aroclor 1016	0.317	0.0166	mg/kg	0.332		95.5	40-130		2.99	25	
Aroclor 1260	0.300	0.0166	"	0.332		90.3	40-130		0.354	25	
Surrogate: Tetrachloro-m-xylene	*0.0528*		*"*	*0.0664*		*79.5*	*30-140*				
Surrogate: Decachlorobiphenyl	*0.0349*		*"*	*0.0664*		*52.5*	*30-140*				
Batch Y1I0210 - BH11681											
Aroclor Reference (Y1I0210-ARC1)								Prepared & Analyzed: 09/01/2021			
Surrogate: Tetrachloro-m-xylene	*0.179*		*ug/mL*	*0.200*		*89.5*					
Surrogate: Decachlorobiphenyl	*0.144*		*"*	*0.200*		*72.0*					

Sample and Data Qualifiers Relating to This Work Order

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H1493

PAGE 1 OF 3

WSP PROJ #: 31403475.005
CLIENT: Briarcliff Manor UFSD
Project Site: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED Various Locations
PROPOSED PROJECT : Reconstruction
DATE(S) OF INSPECTION: 8/14/2021
Inspector(s) Stephen Gruber

WSP
TELEPHONE NO. : (212) 612-7900 **FAX NO.: (212) 363-4341**
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: Lb.labresults@wsp.com
Alexander.Smolyar@wsp.com

TURNAROUND TIME: ☒ 1 WEEK ☐ 48 HR ☐ 72 H R ☐ 96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	A	01	Gray Caulking at Metal cap Flashing	Roof L		
	↓	02	↓ ↓	↓		
	↓	03				
	B	04	~~Stairs~~ Brown Expansion	Stair 6 Courtyard		At wall
	↓	05	Join Caulking	↓ ↓		↓
	↓	06	↓			
	C	07	Gray Expansion Join			
	↓	08	Caulking			
	↓	09	↓ ↓			
	D	10	Beige Door Frame			
	↓	11	Caulking			
	↓	12	↓	↓ ↓		

CHAIN OF CUSTODY

Relinquished by: (print)	(Sign)			Received by: (print)	(Sign)		
STEPHEN GRUBER		8/30/21	80 AM/PM	Jr/York			
Jr/York		8/30/21	1235 AM/PM				
Sec. Francisco/York		8/30/21	18:00 AM/PM	FP Montreal/York	1.6 oc	8/30/21	1928 AM/PM
K. Blocker				K. Blocker		8/30/21	1928 AM/PM

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H1493

WSP PROJ #: 31403475.005
CLIENT: Briarcliff Manor UFSD
Project Site: Todd Elementary School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED Various Locations
PROPOSED PROJECT : Reconstruction
DATE(S) OF INSPECTION: 8/19/2021
Inspector(s) Stephen Gruber

WSP
TELEPHONE N0. : (212) 612-7900 **FAX N0.: (212) 363-4341**
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO:

TURNAROUND TIME: ☒ 1 WEEK
☐48 HR ☐72 H R ☐96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	E	13	White Window Caulking	Courtyard by Classroom 175		
	↓	14	↓	↓		
	↓	15	↓	Classroom 242		
	F	16	Gray Window Frame	Courtyard by Classroom		
	↓	17	Caulking	242		
	↓	18	↓	↓		
	G	19	Creme Stone Joint	Courtyard by Classroom		
	↓	20	Caulking	175		
	↓	21	↓ ↓			
	H	22	Gray door Frame	Kindergarten Courtyard		Weed Trim
	↓	23	Caulking	↓		
	↓	24	↓			

CHAIN OF CUSTODY

Relinquished by: (print) STEPHEN GRUBER	(Sign)	8/30/21	8:00 AM/PM	Relinquished by: (print)	(Sign)	Rec. Francisco York	8/30/21	18:00 AM/PM	Relinquished by: (print) Francisco York	(Sign)	8/30/21 1928 AM/PM
Received by: (print)	(Sign)	8/30/21	12:35 AM/PM	Received by: (print)	(Sign)		/ /	AM/PM	Received by: (print) K. Blocker	(Sign)	8/30/21 1928 AM/PM

1.6 oc

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

21H1493

WSP PROJ #: 31403475.005
CLIENT: Briarcliff Manor UFSD
Project Site: Todd Elementary School
Project Manager: A Smolyar

LOCATION(S) SURVEYED: Various Locations
PROPOSED PROJECT: Reconstruction
DATE(S) OF INSPECTION: 8/27/2021
Inspector(s): STEPHEN GRUBER, NICHOLAS CASALE

WSP
TELEPHONE N0. : (212) 612-7900 FAX N0.: (212) 363-4341
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: Alexander.Smolyar@wsp.com
Lbc.labresults@wsp.com

TURNAROUND TIME: ☒ 1 WEEK ☐ 48 HR ☐ 72 H R ☐ 96 HR ☐ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
	I	~~26~~ 25	Gray Louver Frame Caulking	Exterior adj Rm 123		
	↓	~~27~~ 26	↓	↓ ↓ Rm 234		
	↓	~~28~~ 27	↓	↓		

CHAIN OF CUSTODY

	Relinquished by: (print)	(Sign)			Received by: (print)	(Sign)		
1	STEPHEN GRUBER		8/30/21	8 AM/PM	Rec. From Collins		8/30/21	1800 AM/PM
2			8/30/21	1235 AM/PM			/ /	AM/PM
3					F Knudsen/York		8/30/21	1928 AM/PM
4					K. Blocker		8/30/21	1928 AM/PM

1,6 OC

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions (± 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Arochlors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

APPENDIX G:
COMPANY LICENSE, PERSONAL CERTIFICATIONS AND LABORATORY ACCREDITATIONS

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

WSP USA Solutions Inc.
8th Floor
96 Morton Street

New York, NY 10014

FILE NUMBER:
LICENSE NUMBER: 132876
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 03/31/2021
EXPIRATION DATE: 03/31/2022

Duly Authorized Representative – Craig Napolitano:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

United States Environmental Protection Agency

This is to certify that



Nicholas S Casale

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires September 24, 2022

LBP-I-I207478-1
Certification #

September 10, 2019
Issued On

John Gorman, Chief
Pesticides & Toxic Substances Branch





United States Environmental Protection Agency

This is to certify that



Stephen C Gruber

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires December 12, 2023

LBP-I-I219874-1
Certification #

November 28, 2020
Issued On

Ben Conetta

Ben Conetta, Chief
Chemicals and Multimedia Programs Branch

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. JACKIE DARVISH
ATLAS ENVIRONMENTAL LABS CORP
255 W 36TH STREET SUITE 1503
NEW YORK, NY 10018

NY Lab Id No: 11999

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

	EPA 3050B

Serial No.: 63260

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 500092-0

Atlas Environmental Lab (Asbestos in Bulk)
New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2020-10-01 through 2021-09-30
Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

Atlas Environmental Lab

255 W 36th Street, Suite 1503, New York, NY 10018

Laboratory ID: LAP-208306

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA LAP), LLC accreditation to the ISO/IEC 17025:2017 international standard, General Requirements for the Competence of Testing and Calibration Laboratories in the following:

LABORATORY ACCREDITATION PROGRAMS

☑	**INDUSTRIAL HYGIENE**	Accreditation Expires: August 01, 2023
☑	**ENVIRONMENTAL LEAD**	Accreditation Expires: August 01, 2023
☑	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: August 01, 2023
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached Scope of Accreditation. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2017 and AIHA LAP, LLC requirements. This certificate is not valid without the attached Scope of Accreditation. Please review the AIHA LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Cheryl O. Morton

Cheryl O Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision19.1: 07/28/2021

Date Issued: 07/28/2021

APPENDIX H:
SCOPE OF WORK DRAWINGS

P-1 - TEST FLOORS/
WALLS/ SINKS

A-19- WINDOW REPAIR
TEST WALLS/CAULK

A-13 - PROPOSED
RAILINGS
TEST WALLS/FLOORS

E-1 - TEST WALLS

A-13 - PROPOSED
RAILINGS
TEST WALLS/FLOORS

E-4
TEST
WALLS

E-3
TEST
WALLS

A16

A-11 -
TEST ALL

P-2 TEST
CEILINGS,
SUSPECT
PIPE
WRAP

A-19- WINDOW REPAIR
TEST WALLS/CAULK

A13

P-5 - TEST
WALLS

A19

M-4 - TEST
CEILING

M-6 - NEW UVs
TEST WALLS AND FLOOR

A-13 - PROPOSED
RAILINGS
TEST WALLS/FLOORS

A-9 - TEST
ALL

A-24 - NEW
SECURITY
WINDOW
TEST WALLS

M-2 - NEW
RELIEF AIR
DUCTWORK
TEST CEILING

A-16?
A-30 - TEST ALL EXTERIOR
CAULKED JOINTS & BRICK AT EACH
VINTAGE
P-4?
E-2?
E-8 - TEST WALLS AT ORIGINAL
PANEL BOARDS
E-11?
E-34?

EXISTIING FIRST FLOOR PLAN
TODD ELEMENTARY
BRIARCLIFF U.F.S.D.

06/10/21

BBS ARCHITECTS
LANDSCAPE ARCHITECTS
ENGINEERS

Client

Project Description
Project Cost Breakdown

Date

Braircliff MANOR Todd Elementary PHASE 1

Item #	Todd Elementary Phase 1 (BBS File No.21-274B)
A2	Add fall protection to existing dome skylights (21 locations).
A20	Replace EPDM roof areas (1995).
A22	Install missing gutters and downspouts at pitched roof. Reconnect existing loose or missing downspouts.
M1	Replace six older type rooftop exhaust fans to restore to proper operation, and provide adequate ventilation in the bathroom areas.
M2	Provide a relief air path from classroom 111, which was subdivided from classroom 110.
M3	Ensure that all rooftop exhaust fans are turned on during occupied times. It was observed during our walkthrough that several of the bathroom fans did not appear to be on. Upgrade controls as required.
M4	Cap all unused ducts in room 155 storage room as required by code.
M6	Provide humidity controls on the two unit ventilators in the library to alleviate the musty odor as discussed.
E1	Provide exit lighting, fire alarm pull stations, and raise the light fixture in the small courtyard.
E2	Retrofit the original Metropolitan circuit breaker panel in the slop sink and fill all missing spaces as required by code.
E3	Replace the non-functional exit signs in the larger courtyard, as well as adding pull stations and one horn/strobe unit.
E4	In the other larger courtyard, replace the non-functional exit signs, and add two fire alarm pull stations as required.
E5	In the front courtyard provide pull stations and replace the non-functional exit signs as required.
Total	

Braircliff MANOR Todd Elementary PHASE 2

Item #	Todd Elementary Phase 2 (BBS File No.21-274D)	Loaded Project Cost
A13	Add missing handrails at interior ramps (wall or post mounted).	$ 168,000
A16	(at Storage/Custodial Rms) with rated CMU construction and doors. Extend demising walls to underside of roof deck. (3 locations).	$ 97,450
A19	Repair leaks at Corridor windows (near interior courtyards).	$ 17,500
A24	Security vestibule upgrades (transaction window and security film over existing glazing.	$ 32,900
A29	Replace caulking at masonry control joints and expansion joints.	$ 30,800
A30	Tuckpoint mortar joints and replace damaged brick.	$ 112,000
P1	Provide a separate drinking fountain basin in room 217, and remove the bubbler from the classroom sink as required by code.	$ 5,000
P2	Provide a natural gas leak detection system in the boiler room area.	$ 50,000
E8	Retrofit the original Frank Adams circuit breaker panels, for which replacement parts are no longer available. Assume six panels total.	$ 120,000
E11	Provide hardwired carbon monoxide detectors tied into the building's fire alarm system to replace the current battery and line voltage detectors.	$ 17,500
A9	Renovate and enlarge Nurse's Office toilet for ADA accessibility.	$ 77,000
A11	Renovate and enlarge Toilet Rms (near Rm. 156 and 125) for ADA .	$ 208,325
A12	Provide District-Wide portable lift for ADA accessibility.	$ 77,000
		1,013,475

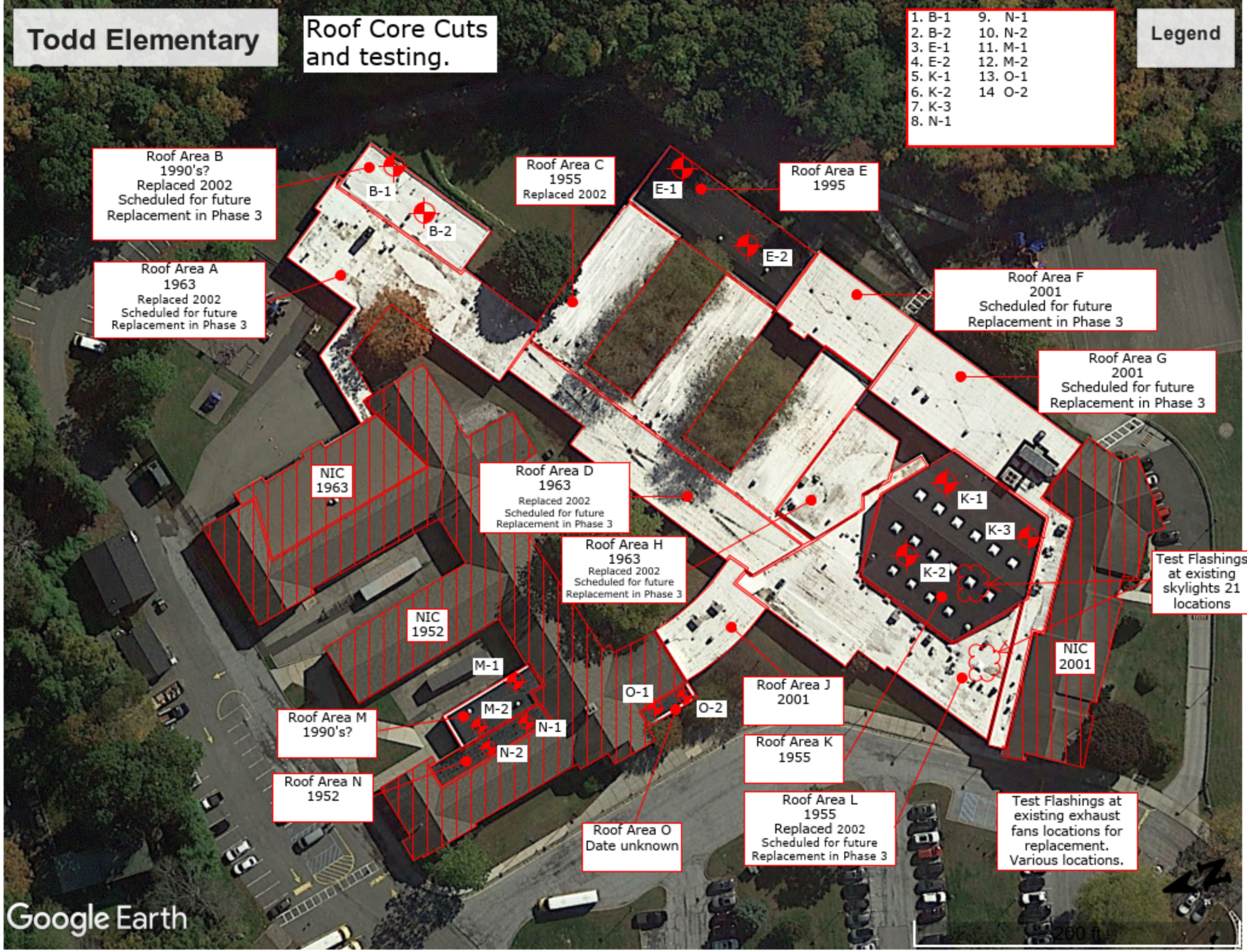
Braircliff MANOR Todd Elementary PHASE 3

	Todd Elementary Phase 3 (BBS File No.21-274F)
A17	Additional storm drainage and piping near Library.
A21	Replace TPO roof areas (2002).
P4	Replace seven waterless urinals with new low flow urinals as discussed.
E27	Replace the screw in fuse type panel in the repair garage with a new 100 amp circuit breaker panel.
E34	Provide surge suppression at the main switchgear location to eliminate power surges.
Total	



VINTAGE PLAN
TODD ELEMENTARY
BRIARCLIFF U.F.S.D.

BBS ARCHITECTS
LANDSCAPE ARCHITECTS
ENGINEERS


Todd Elementary
Roof Core Cuts and testing.
Legend
1. B-1
2. B-2
3. E-1
4. E-2
5. K-1
6. K-2
7. K-3
8. N-1
9. N-1
10. N-2
11. M-1
12. M-2
13. O-1
14 O-2
Roof Area B
1990's?
Replaced 2002
Scheduled for future
Replacement in Phase 3
B-1
B-2
Roof Area C
1955
Replaced 2002
E-1
Roof Area E
1995
E-2
Roof Area A
1963
Replaced 2002
Scheduled for future
Replacement in Phase 3
Roof Area F
2001
Scheduled for future
Replacement in Phase 3
Roof Area G
2001
Scheduled for future
Replacement in Phase 3
NIC
1963
Roof Area D
1963
Replaced 2002
Scheduled for future
Replacement in Phase 3
K-1
K-3
K-2
Roof Area H
1963
Replaced 2002
Scheduled for future
Replacement in Phase 3
Test Flashings at existing skylights 21 locations
NIC
1952
NIC
2001
M-1
M-2
N-1
N-2
O-1
O-2
Roof Area J
2001
Roof Area M
1990's?
Roof Area K
1955
Roof Area N
1952
Roof Area L
1955
Replaced 2002
Scheduled for future
Replacement in Phase 3
Test Flashings at existing exhaust fans locations for replacement. Various locations.
Roof Area O
Date unknown
Google Earth
200 ft

APPENDIX I:
PHOTOGRAPHIC DOCUMENTATION

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

PHOTOGRAPHIC DOCUMENTATION

Client:	Project Name:	WSP Project No.:
Briarcliff Manor Union Free School District	Final Report of Environmental Services for Phase 1, 2 & 3 Project at Todd Elementary School	31403475.005

PHOTO No.: 1

DESCRIPTION:

Exterior, Stair 6 Courtyard

Tar at foundation wall confirmed to be ACM

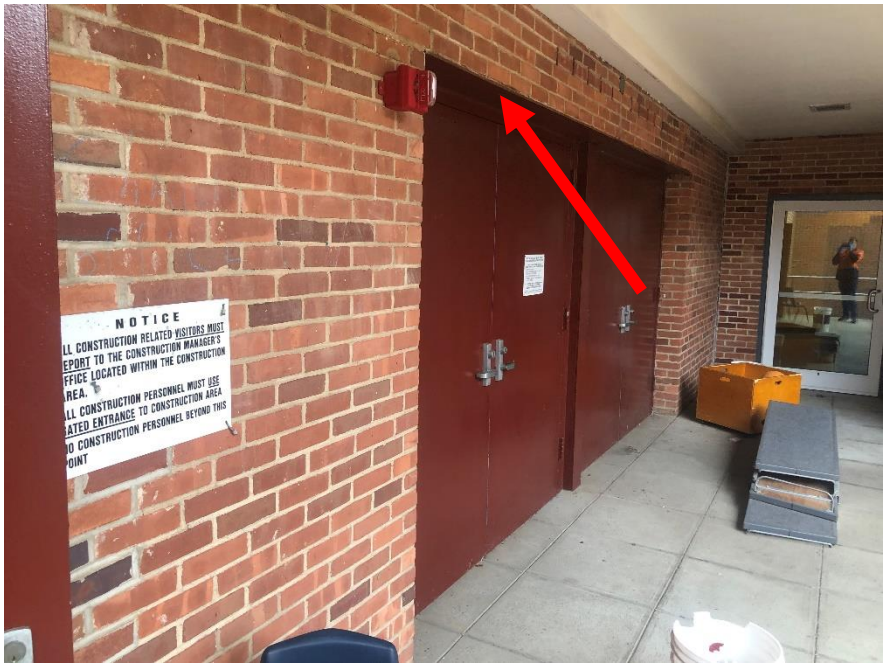


PHOTO No.: 2

DESCRIPTION:

Exterior (1955 & 1963 Bldg.), Stair 6 Courtyard

Beige Door Frame Caulking Confirmed to be ACM



500 Summit Lake Drive, Suite 450 Valhalla, NY 10595	PHOTOGRAPHIC DOCUMENTATION	
Client: **Briarcliff Manor Union Free School District**	Project Name: **Final Report of Environmental Services for Phase 1, 2 & 3 Project at Todd Elementary School**	WSP Project No.: **31403475.005**

PHOTO No.: **3**	
DESCRIPTION: **Exterior (1955 & 1963 Bldg.), Stair 6 Courtyard** Expansion Joint Caulking (Gray) at wall confirmed to be ACM	

PHOTO No.: **4**	
DESCRIPTION: **Exterior (1952 & 1963 Bldg.) (Typical)** Gray Door Frame Caulking confirmed to be ACM (Wooden Trim Doors)	

500 Summit Lake Drive,
Suite 450
Valhalla, NY 10595

PHOTOGRAPHIC DOCUMENTATION

Client:	Project Name:	WSP Project No.:
Briarcliff Manor Union Free School District	Final Report of Environmental Services for Phase 1, 2 & 3 Project at Todd Elementary School	31403475.005

PHOTO No.:
5

DESCRIPTION:

Interior – Corridor 260

Cementitious Windowsill (White)
Confirmed to be ACM

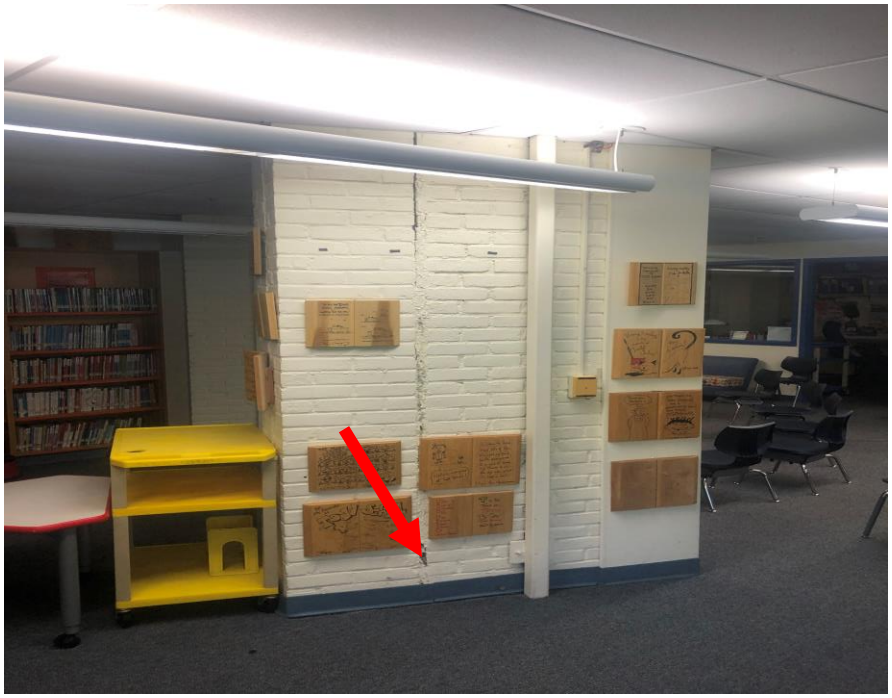


PHOTO No.:
6

DESCRIPTION:

Interior – Library 201

Sealant (beige) at brick expansion joint confirmed to be ACM



APPENDIX J:
FILE SEARCH

EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order: 061927132
Customer ID: LBAP78
Customer PO: 2043465.38
Project ID:

Attention: Marvin Luccioni
Louis Berger U.S., Inc
96 Morton Street
8th floor
New York, NY 10014

Phone: (718) 730-2741
Fax:
Received Date: 12/10/2019 7:04 PM
Analysis Date: 12/11/2019
Collected Date: 12/05/2019

Project: Todd E.S, 45 Ingham Rd, Briacliff Manor, Project # 2043465.38, Briarcliff S.D.

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos
Sample ID 01-01 *061927132-0001*		**Description** Room 110 - Glue Dots, Brown **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	12/11/2019	Brown		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	12/11/2019	Brown		100.00% Other	**None Detected**
Sample ID 01-02 *061927132-0002*		**Description** Room 110 - Glue Dots, Brown **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	12/11/2019	Brown		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	12/11/2019	Brown		100.00% Other	**None Detected**
Sample ID 02-03 *061927132-0003*		**Description** Room 110 - Gypsum Board, Gray **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ White	18.00% Cellulose	8.00% Ca Carbonate 70.00% Gypsum 4.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 02-04 *061927132-0004*		**Description** Room 110 - Gypsum Board, Gray **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ White	15.00% Cellulose	8.00% Ca Carbonate 75.00% Gypsum 2.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 03-05 *061927132-0005*		**Description** Room 110 - Wall Plaster, Brown Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Tan		13.00% Ca Carbonate 35.00% Gypsum 2.00% Mica 50.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**

Initial report from: 12/11/2019 17:38:38

EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order:	061927132
Customer ID:	LBAP78
Customer PO:	2043465.38
Project ID:	

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos
Sample ID 03-06 *061927132-0006*		**Description** Room 110 - Wall Plaster, Brown Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Tan	<1.00% Cellulose	12.00% Ca Carbonate 35.00% Gypsum 53.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 03-07 *061927132-0007*		**Description** Room 110 - Wall Plaster, Brown Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Tan		12.00% Ca Carbonate 38.00% Gypsum 50.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 04-08 *061927132-0008*		**Description** Room 110 - Wall Plaster, White Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Tan/ White		30.00% Ca Carbonate 60.00% Gypsum 10.00% Non-fibrous (other)	**None Detected**
Paint layer present in sample, not included in analysis.					
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 04-09 *061927132-0009*		**Description** Room 110 - Wall Plaster, White Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Tan/ White		25.00% Ca Carbonate 65.00% Gypsum 10.00% Non-fibrous (other)	**None Detected**
Paint layer present in sample, not included in analysis.					
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 04-10 *061927132-0010*		**Description** Room 110 - Wall Plaster, White Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Tan/ White		25.00% Ca Carbonate 60.00% Gypsum 15.00% Non-fibrous (other)	**None Detected**
Paint layer present in sample, not included in analysis.					
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**

Initial report from: 12/11/2019 17:38:38

EMSL Analytical, Inc.
528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order: 061927132
Customer ID: LBAP78
Customer PO: 2043465.38
Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos
Sample ID 05-11 *061927132-0011*		**Description** Elec Room - Ceiling Insulation, White **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ White	12.00% Cellulose 85.00% Min. Wool	3.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 05-12 *061927132-0012*		**Description** Elec Room - Ceiling Insulation, White **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ White	10.00% Cellulose 80.00% Min. Wool	10.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 05-13 *061927132-0013*		**Description** Elec Room - Ceiling Insulation, White (Type 1) **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ White	8.00% Cellulose 85.00% Min. Wool	7.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 06-14 *061927132-0014*		**Description** Elec Room - Ceiling Insulation, Brown (Type 2) **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Tan/ Various	98.00% Cellulose	2.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 06-15 *061927132-0015*		**Description** Elec Room - Ceiling Insulation, Brown (Type 2) **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Tan/ Various	99.00% Cellulose	1.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 06-16 *061927132-0016*		**Description** Elec Room - Ceiling Insulation, Brown (Type 2) **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Tan/ Various	98.00% Cellulose	2.00% Non-fibrous (other)	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**

Initial report from: 12/11/2019 17:38:38

EMSL Analytical, Inc.
528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order: 061927132
Customer ID: LBAP78
Customer PO: 2043465.38
Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos
Sample ID 07-17 *061927132-0017*		**Description** Elec Room - Ceiling Plaster, Brown Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Rust		12.00% Ca Carbonate 18.00% Non-fibrous (other) 70.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 07-18 *061927132-0018*		**Description** Elec Room - Ceiling Plaster, Brown Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Rust	3.00% Min. Wool	15.00% Ca Carbonate 17.00% Non-fibrous (other) 65.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 07-19 *061927132-0019*		**Description** Elec Room - Ceiling Plaster, Brown Coat **Homogeneity** Heterogeneous			
PLM NYS 198.1 Friable	12/11/2019	Brown/ Gray/ Rust		12.00% Ca Carbonate 13.00% Non-fibrous (other) 75.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 08-20 *061927132-0020*		**Description** Elec Room - Ceiling Plaster, White Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Gray		15.00% Ca Carbonate 14.00% Non-fibrous (other) 6.00% Perlite 65.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**
Sample ID 08-21 *061927132-0021*		**Description** Elec Room - Ceiling Plaster, White Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Gray		10.00% Ca Carbonate 13.00% Non-fibrous (other) 7.00% Perlite 70.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**

Initial report from: 12/11/2019 17:38:38

EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order:	061927132
Customer ID:	LBAP78
Customer PO:	2043465.38
Project ID:	

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos
Sample ID 08-22 *061927132-0022*		**Description** Elec Room - Ceiling Plaster, White Coat **Homogeneity** Homogeneous			
PLM NYS 198.1 Friable	12/11/2019	Gray		15.00% Ca Carbonate 14.00% Non-fibrous (other) 6.00% Perlite 65.00% Quartz	**None Detected**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB					**Not Analyzed**
TEM NYS 198.4 NOB					**Not Analyzed**

Initial report from: 12/11/2019 17:38:38

EMSL Analytical, Inc.
528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order:	061927132
Customer ID:	LBAP78
Customer PO:	2043465.38
Project ID:	

Test Report:Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date:	12/10/2019	Sample Receipt Time:	7:04 PM
Analysis Completed Date:	12/11/2019	Analysis Completed Time:	11:04 AM

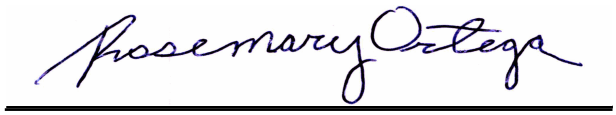
Analyst(s):



Tomas Montes De Oca PLM NYS 198.1 Friable (20)



Tomas Montes De Oca PLM NYS 198.6 NOB (2)



Rosemary Ortega TEM NYS 198.4 NOB (2)

Samples reviewed and approved by:



Daniel Clarke, Asbestos Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.
All samples examined for the presence of vermiculite when analyzed via NYS 198.1.
-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.
This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 12/11/2019 17:38:38

LOUIS BERGER

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 2

LB PROJ 2043465.38
CLIENT: BRIARCLIFF S.D.

LOCATION(S) SURVEYED: Room 110
PROPOSED PROJECT: RENOVATION
DATE(S) OF INSPECTION: 12/05/19
Inspector(s) M. MUCCIONI

PROJECT SITE: TODD E.S. @ 45 INGHAM RD., BRIARCLIFF MANOR
Project Manager:

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: MMUCCIONI@LOUISBERGER.COM

TURNAROUND TIME:
☐ 4 HR. ☒ 24 HRS. ☐ 48 HRS. ☐ 72 HRS.

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01	GLUE DOTS, BROWN	Room 110		
↓	02	↓			
02	03	GYPSUM BOARD, GRAY			CEILING
↓	04	↓			↓
03	05	WALL PLASTER, BROWN COAT			
↓	06	↓			
↓	07	↓			
04	08	WALL PLASTER, WHITE COAT			
↓	09	↓			
↓	10	↓			
05	11	CEILING INSULATION, WHITE	ELEC Room		
↓	12	↓	↓		

CHAIN OF CUSTODY

Relinquished by: (print)	(Sign)		AM/PM	Relinquished by: (print)	(Sign)		AM/PM	Relinquished by: (print)	(Sign)		AM/PM
M. MUCCIONI		12/10/19									
Received by: (print)	(Sign)		AM/PM	Received by: (print)	(Sign)		AM/PM	Received by: (print)	(Sign)		AM/PM
U. McKay		12/10/19									

12/11/19 Jorge Montalvo Oca 12/11/19

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

ARRIVED AT LAB 10 DEC 19 AM 7:04 EARLE PLACE, NY

06192713 2

Page 1 Of 2

OrderID: 061927132

LOUIS BERGER

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

OrderID: 061927132

LB PROJ 2043465.38

CLIENT: BRIARCLIFF S.D.

PROJECT SITE: TODD E.S. @ 45 INGHAM RD., BRIARCLIFF MANOR

Project Manager:

LOCATION(S) SURVEYED: Room 110

PROPOSED PROJECT: RENOVATION

DATE(S) OF INSPECTION: 12/06/19

Inspector(s) M. MUCCIONI

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: MMUCCIONI@LOUISBERGER.COM

TURNAROUND TIME: ☐ 4 HR. ☒ 24 HRS. ☐ 48 HRS. ☐ 72 HRS.

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
05	13	CEILING INSULATION, WHITE (TYPE 1)	ELEC ROOM		
06	14	CEILING INSULATION, BROWN (TYPE 2)			
↓	15	↓			
↓	16	↓			
07	17	CEILING PLASTER, BROWN COAT			
↓	18	↓			
↓	19	↓			
08	20	CEILING PLASTER, WHITE COAT			
↓	21	↓			
↓	22	↓			

19 DEC 10 PM 7:04
CARLE PLACE NY

CHAIN OF CUSTODY

Relinquished by: (print) M. MUCCIONI	(Sign)	12/10/19	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print) U. McKOY	(Sign)	12/10/19	304 AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

12/11/19 Tomás Mentado de Oca 12/11/19

GENERAL NOTES: All Inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

061927132

EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order: 062000260
Customer ID: LBAP78
Customer PO: 2043465.38
Project ID:

Attention: Marvin Luccioni
Louis Berger U.S., Inc
96 Morton Street
8th floor
New York, NY 10014
Project: 2043465.38, Briarcliff S.D., Todd E.S., Room 110

Phone: (718) 730-2741
Fax:
Received Date: 01/06/2020 4:10 PM
Analysis Date: 01/07/2020
Collected Date: 01/03/2020

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos
Sample ID 01-01 *062000260-0001*		**Description**	Room 110 - Glue Dots assoc. w./ Pegboard, Brown		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	01/07/2020	Brown		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	01/07/2020	Brown		100.00% Other	**None Detected**
Sample ID 01-02 *062000260-0002*		**Description**	Room 110 - Glue Dots assoc. w./ Pegboard, Brown		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	01/07/2020	Brown		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	01/07/2020	Brown		100.00% Other	**None Detected**
Sample ID 02-03 *062000260-0003*		**Description**	Room 110 - Pegboard		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	01/07/2020	Green		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	01/07/2020	Green		100.00% Other	**None Detected**
Sample ID 02-04 *062000260-0004*		**Description**	Room 110 - Pegboard		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					**Not Analyzed**
PLM NYS 198.6 VCM					**Not Analyzed**
PLM NYS 198.6 NOB	01/07/2020	Green		100.00% Other	**Inconclusive: None Detected**
TEM NYS 198.4 NOB	01/07/2020	Green		100.00% Other	**None Detected**

Initial report from: 01/07/2020 21:54:30

EMSL Analytical, Inc.
528 Mineola Avenue Carle Place, NY 11514
Tel/Fax: (516) 997-7251 / (516) 997-7528
http://www.EMSL.com / carleplacelab@emsl.com

EMSL Order:	062000260
Customer ID:	LBAP78
Customer PO:	2043465.38
Project ID:	

Test Report:Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date:	1/6/2020	Sample Receipt Time:	4:10 PM
Analysis Completed Date:	1/7/2020	Analysis Completed Time:	1:06 PM

Analyst(s):

Omatie Ramrattan-Scarallo PLM NYS 198.6 NOB (4)

Keith McWilliams TEM NYS 198.4 NOB (4)

Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.
All samples examined for the presence of vermiculite when analyzed via NYS 198.1.
-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.
This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 01/07/2020 21:54:30

LOUIS BERGER

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 1

LB PROJ 20433465.38
CLIENT: BRIARCLIFF S.D.

PROJECT SITE: TODDES.Q
Project Manager: M. LUCCIONI

LOCATION(S) SURVEYED: Room 110
PROPOSED PROJECT: RENOVATION
DATE(S) OF INSPECTION: 01/03/20
Inspector(s) L. NEVAREZ

LOUIS BERGER
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: MLUCCIONI@LOUISBERGER.COM

TURNAROUND TIME:
☐ 4 HR. ☐ 24 HRS. ☒ 48 HRS. ☐ 72 HRS.

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01	GLUE DOTS ASSOC. W/ PEG BOARD, BROWN	Room 110		
↓	02	↓	↓		
02	03	PEG BOARD			
↓	04	↓			

062000260

20 JAN -6 PM 1:10

Page 1 OF 1

CHAIN OF CUSTODY

Relinquished by: (print) M. LUCCIONI	(Sign)	01/06/20	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (print)	(Sign)	1620	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

1-7-20

4/7/20

OrderID: 062000260

565 Taxter Road, Suite 510
Elmsford, New York 10523

HOMOGENEOUS AREA SHEET

Client: Briarcliff Manor UFSD **Project Site:** Todd Elementary School

Inspector(s): Drew Cheskin **Management Planner(s):** Drew Cheskin **Project #:** 2042839.044

HA #	Homogenous Area Description	Material Type	ACM	Friable
01	9”x9” White VAT w/Black Specks and Mastic	M	YES	NO
02	9”x9” Blue VAT w/White Specks and Mastic	M	YES	NO
03	9”x9” Tan VAT w/Black Marbled and Mastic	M	YES	NO
04	9”x9” Orange-Born VAT and Mastic	M	YES	NO
05	9”x9” Gray VAT w/Beige Specks and Mastic	M	YES	NO
06	9”x9” White VAT w/Brown Specks and Mastic	M	YES	NO
07	9”x9” Black VAT w/White Spots and Mastic	M	YES	NO
08	9”x9” Black VAT w/White Marbled and Mastic	M	YES	NO
09	Pipe Elbows	TSI	YES	YES
10	Pipe Insulation	TSI	YES	YES

TSI = Thermal System Insulation S = Surfacing M = Miscellaneous

N



FIRST FLOOR PLAN

0' 5' 10' 20'

PARKING LOT

BASEMENT FLOOR PLAN

0' 5' 10' 20'

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ENVIRONMENTAL CONSULTANT
565 Taxter Road
Elmsford, NY 10523
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

FULLER D'ANGELO P.C.
ARCHITECTS PLANNERS
48 HONEYWOOD ROAD ELMSFORD NEW YORK 10523
TEL. 914.592.2445 FAX. 914.592.1717
WWW.FULLERDANGELO.COM
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BRIARCLIFF UNION FREE SCHOOL DISTRICT

AHERA SITE PLAN

MIDDLE SCHOOL
HIGH SCHOOL
BRIARCLIFF MANOR, UFSD
444 PLEASANTVILLE ROAD.
BRIARCLIFF MANOR, NY 10510

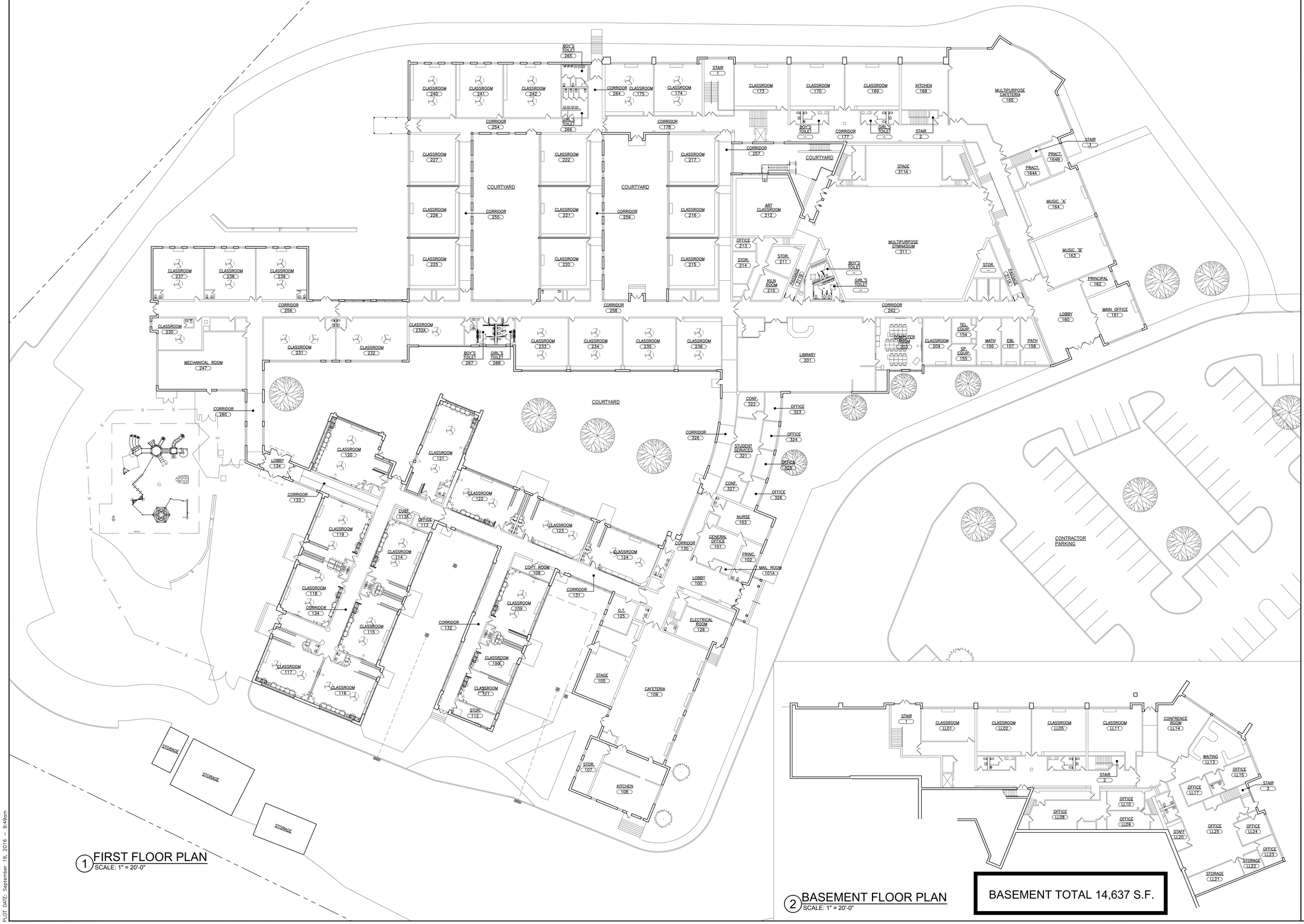
PROJECT TITLE
BRIARCLIFF MANOR U.F.SD.
CAPITAL IMPROVEMENT PROJECT
TODD ELEMENTARY SCHOOL - BID NO
444 PLEASANTVILLE ROAD
BRIARCLIFF MANOR, NY 10510

DRAWING TITLE
SPACE IDENTIFICATION
BASEMENT AND FIRST FLOOR PLAN

DATE: JULY 2019

SCALE: AS NOTED	DRAWING NO.: SP-001
DRAWN BY: J.P.	
CHECKED BY: D.C.	FILE NO.: 2042839.052

FIRST FLOOR TOTAL 107,346 S.F.



1 FIRST FLOOR PLAN
SCALE: 1" = 20'-0"

2 BASEMENT FLOOR PLAN
SCALE: 1" = 20'-0"

BASEMENT TOTAL 14,637 S.F.

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FULLER D'ANGELO P.C. ARCHITECTS PLANNERS
48 SHELLWOOD ROAD ELMSFORD NEW YORK 10523
TEL. 914.592.4444 FAX 914.592.1717
WWW.FULLERDANGELO.COM

S.E.D. CONTROL NUMBER:
66-14-02-02-0-002-014

PROJECT TITLE
BRIARCLIFF MANOR U.F.S.D.
CAPITAL IMPROVEMENT PROJECT
TODD ELEMENTARY SCHOOL- BID NO. 10510
TARRYTOWN ROAD
BRIARCLIFF MANOR, NY 10510

DRAWING TITLE
OVERALL FIRST FLOOR PLAN & BASEMENT FLOOR PLAN

DATE	ISSUED TO
05-17-2013	BID
11-30-2012	SED SUBMISSION

SCALE: AS NOTED	DRAWING NO.: A100
DRAWN BY: F & D	
CHECKED BY: F & D	FILE NO.: 12104.01

PLOT DATE: September 19, 2016 - 9:49am

FILE: I:\12104.00 Briarcliff Manor Capital Improvement Poject Todd Elementary\DRAWINGS\CURRENT\1-F&D\12104-A-100.dwg

SUMMARY OF SPACE

2019
AHERA 3 YEAR RE-INSPECTION REPORT
MANAGEMENT PLAN UPDATE

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT
TODD ELEMENTARY SCHOOL
45 Ingham Road, Briarcliff Manor, NY 10510

Space ID	Description / Common Name	HA	HA Description	Quantity	Assesment	Response Action			Comment
						Remove	Repair	O&M	
1013	Crawlspace under Storage	1	Pipe Insulation	100 LF	7	-	-	100 LF	Unable to locate, May have been Abated
1013	Crawlspace under Storage	2	Pipe Elbow	100 LF	7	-	-	100 LF	Unable to locate, May have been Abated
2057	Safe in Office	3	9"x9" Floor Tile and Associated Mastic	64 SF	X	-	-	64 SF	Green w/ White Stripes
2067	Room 235	3	9"x9" Floor Tile and Associated Mastic	700 SF	X	-	1 SF	700 SF	White w/ Brown Specks, Chipped @ Door
2076	Vestible to Room 232A	3	9"x9" Floor Tile and Associated Mastic	60 SF	X	-	-	60 SF	Unable to locate Funtional Space
2082	Room 232	3	9"x9" Floor Tile and Associated Mastic	900 SF	X	-	-	900 SF	Orange-Brown
2085	Room 231	3	9"x9" Floor Tile and Associated Mastic	900 SF	X	-	-	900 SF	White w/ Brown Specks
2091	JSC by Boiler Room	3	9"x9" Floor Tile and Associated Mastic	15 SF	X	-	5 SF	10 SF	Gray w/ Beige Specks
2110	Art Room Stairs	3	9"x9" Floor Tile and Associated Mastic	60 SF	X	-	-	60 SF	Gray w/ Beige Specks
2116	District Office Stairs	3	9"x9" Floor Tile and Associated Mastic	75 SF	X	-	-	75 SF	Black w/ White Specks
2125	Room 155 - Closet A	3	9"x9" Floor Tile and Associated Mastic	300 SF	X	-	-	300 SF	Gray w/ Beige Specks
2126	Room 155 - Closet B	3	9"x9" Floor Tile and Associated Mastic	10 SF	X	-	-	10 SF	Tan w/ Black Marbled

ASSESSMENT CATEGORIES

1. = Damaged or Significantly Damaged TSI ACBM
2. = Damaged Friable Surfacing ACBM
3. = Significantly Damaged Friable Surfacing ACBM
4. = Damaged or Significantly Damaged Friable Miscellaneous ACBM
5. = ACBM with Potential for Damage
6. = ACBM with Potential for Significant Damage
7. = Any Remaining Friable ACBM or Friable Suspect ACBM
X. = Not Applicable (Material is Nonfriable Surfacing or Miscellaneous Material)

INFORMATION AVAILABLE TO BIDDERS

BBS Architects, Landscape Architects & Engineers, P.C. (BBS), accepts no responsibility for information contained within the items listed below that have been provided by others.

Any questions concerning information contained within these items shall be forwarded via the standard Request for Information process. BBS will forward these Requests for response by the appropriate party.

A. Pre-Construction Survey, Bulk Sampling and Analysis of Suspect Asbestos Containing Materials – Prepared by WSP, 500 Summit Lake Drive, Suite 450 Valhalla, NY 20595 – Tel. (914) 747-1120. Document follows this section.

END OF SECTION

BRIARCLIFF MANOR UNION FREE SCHOOL DISTRICT BID PROPOSAL FORM

Phase 2 Bond Improvements at Briarcliff Manor MS/HS and Todd Elementary School

NAME OF BIDDER: _____

BUSINESS ADDRESS: _____

TELEPHONE NUMBER: _____ **DATE OF BID:** _____

The bidder mentioned above declares and certifies:

First: That said bidder is of lawful age and the only one interested in this bid, and that no one other than said bidder has any interest herein.

Second: That this bid is made without any previous understanding, agreement, or connection with any other person, firm, or corporation making a bid for the same purpose, and is in all respects fair and without collusion or fraud.

Third: That no member of the Board of Education of the **Briarcliff Manor Union Free School District, Town of Briarcliff Manor** , New York, nor any officer or employee or person whose salary is payable as a whole or in part from the treasury of said Board of Education is directly or indirectly interested in this bid or in the supplies, materials, equipment, work, or services to which it relates, or in any portion of the profits thereof.

Fourth: That said bidder has carefully examined the Instruction to Bidders, schedules, and specifications prepared under the direction of the Board of Education, and will, if successful in this bid, furnish and deliver at the prices bid and within the time stated, all materials, supplies, apparatus, goods, wares, merchandise, services, or labor for which this bid is made.

Fifth: Single Prime Contracts: Where the project cost does not exceed $1,500,000 and the Owner has decided to solicit bids from one general contractor, the Bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work in the contract, and the agreed-upon amount to be paid to each, for: (A) Plumbing and gas fitting; (B) Steam heating, hot water heating, ventilating and air condition apparatus and (C) Electric wiring and standard illuminating fixtures.

After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the public

owner, upon a showing presented to the public owner of legitimate construction need for such change, which shall be open to public inspection.

Sixth: That the prices quoted are exclusive of all federal, state, and municipal sales and excise taxes.

Seventh: The undersigned further declares that he has received and examined the following addenda:

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

FOR PROPOSAL FORM TO BE VALID, ALL PAGES OF THE PROPOSAL FORM MUST BE DULY EXECUTED.

Eighth: The Bidder shall check here _____ if the bid has been based upon equivalents in lieu of any kind, type, brand, or manufacturer of material other than those named in the specifications. If checked, the Bidder shall submit the Equivalency Form in accordance with Instructions to Bidders, Paragraph 8B. This item in no way prohibits the Bidder from submitting equivalents after the award of contract.

Ninth: The undersigned further understands and agrees that he is to furnish all labor, materials, equipment, supplies, and other facilities and things necessary and required for the execution and completion of:

Phase 2 Bond Improvements at Briarcliff Manor MS/HS and Todd Elementary School

in strict accordance with the contract documents:

BASE BID GC-1 GENERAL CONSTRUCTION CONTRACT

The General Contractor shall state the complete price to perform all work including, but not limited to, all abatement, demolition, general construction and roofing construction, related to the **High School/Middle School** reconstruction, as shown on the drawings, and specified herein.

BASE BID GC-1 BID PRICE = $_____

Lump Sum Allowance No. 1 = $_____$75,000_
Unforeseen Conditions (See Section 01021)

TOTAL GENERAL CONSTRUCTION
BASE BID GC-1 BID PRICE = $_____
Total Construction Base Bid GC-1 Price written in dollars and cents

$_____
Total Construction Base Bid GC-1 Price written in words

ALTERNATES FOR BASE BID GC-1

1. ALTERNATE NO. 1 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide general construction for Breakout Rooms 500 & 501 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

2. ALTERNATE NO. 2 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide additional wall tile to ceiling at toilet rooms 111a, 111b, 111c, 111d, 158, 160, 181a, 181b, above the base bid wainscot tile height as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

3. ALTERNATE NO. 3 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide additional floor tile removal and abatement at Corridor 'C', floor prep and provide new finish flooring as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

4. ALTERNATE NO. 4 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to scrape existing loose paint from Corridor 'C' ceiling, prep, prime and paint with new finishes as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

5. ALTERNATE NO. 5 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide wall and window demolition at College Conf. room 240 and (2) new windows 'SF-29' at Breakout room 500 and Cafeteria 505 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

6. ALTERNATE NO. 6 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide ceiling tile demolition and provide and install new ceiling tile at Second floor rooms 221, 222, 223, 226, 227, 228, & 229, as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

7. ALTERNATE NO. 7 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide masonry reconstruction as shown on drawing A4.01 and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

8. ALTERNATE NO. 8 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide ceiling tile replacement at High School Chemical Storage Room 236 and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

9. ALTERNATE NO. 9 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide roof modifications at RTU-HVAC 1 as shown on plans and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

10. ALTERNATE NO. 10 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide roof modifications at RTU-X as shown on plans and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

11. ALTERNATE NO. 11 TO GC-1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide roof modifications at Exhaust fans EF-48 and EF-51 as shown on plans and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

BASE BID MC-1 MECHANICAL CONSTRUCTION CONTRACT

The Mechanical Contractor shall state the complete price to perform all work including, but not limited to, all demolition mechanical construction at the **High School**, **Middle School**, as shown on the drawings and specified herein.

BASE BID MC-1 BID PRICE = $_____

Lump Sum Allowance No. 2 = $_____$50,000_
Unforeseen Conditions (See Section 01021)

TOTAL MECHANICAL CONSTRUCTION
BASE BID MC-1 BID PRICE = $_____
Total Construction Base Bid MC-1 Price written in dollars and cents

$_____
Total Construction Base Bid MC-1 Price written in words

ALTERNATES FOR BASE BID MC-1

1. ALTERNATE NO. 1 TO MC-1

The Mechanical Contractor shall state the complete price to be **(added to)** the base bid to provide mechanical construction for Breakout Rooms 500 & 501 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

2. ALTERNATE NO. 2 TO MC-1

The Mechanical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top demolition and installation of new roof top unit HV-1 and associated mechanical work as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____

Bid Price written in words

3. ALTERNATE NO. 3 TO MC-1

The Mechanical Contractor shall state the complete price to be **(added to)** the base bid to provide mechanical demolition and construction at second floor Chemical Storage Room 236 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

4. ALTERNATE NO. 4 TO MC-1

The Mechanical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top demolition and installation of new roof top unit RTU-X and associated mechanical work as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

5. ALTERNATE NO. 5 TO MC-1

The Mechanical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top demolition and installation of new roof top fans, EF-51 and EF-48 and associated mechanical work as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

BASE BID EC-1 ELECTRICAL CONSTRUCTION CONTRACT

The Electrical Contractor shall state the complete price to perform all work including, but not limited to, all demolition and electrical construction at the **High School, Middle School,** as shown on the drawings and specified herein.

BASE BID EC-1 BID PRICE = $_____

Lump Sum Allowance No. 3 = $_____$35,000_
Unforeseen Conditions (See Section 01021)

Lump Sum Allowance No. 4 = $_____$30,000_
For unused data cabling removals (See Section 01021)

TOTAL ELECTRICAL CONSTRUCTION
BASE BID EC-1 BID PRICE = $_____
Total Construction Base Bid EC-1 Price written in dollars and cents

$_____
Total Construction Base Bid EC-1 Price written in words

ALTERNATES FOR BASE BID EC-1

1. ALTERNATE NO. 1 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide electrical construction for Breakout Rooms 500 & 501 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

2. ALTERNATE NO. 2 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top electrical demolition and electrical installation of new unit HV-1 at roof as shown on the drawings and

specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

3. ALTERNATE NO. 3 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide electrical demolition and construction at second floor Chemical Storage Room 236 as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

4. ALTERNATE NO. 4 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top demolition and installation of new roof top unit RTU-X and associated electrical work as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

5. ALTERNATE NO. 5 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide roof top demolition and installation of new roof top fans, EF-51 and EF-48 and associated electrical work as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

6. ALTERNATE NO. 6 TO EC-1

The Electrical Contractor shall state the complete price to be **(added to)** the base bid to provide additional electrical panel replacements as shown on the drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

BASE BID PC-1 PLUMBING CONSTRUCTION CONTRACT

The Plumbing Contractor shall state the complete price to perform all work including, but not limited to, all demolition plumbing construction at the **High School, Middle School,** as shown on the drawings and specified herein.

BASE BID PC-1 BID PRICE = $_____

Lump Sum Allowance No. 5 = $_____$10,000_
Unforeseen Conditions (See Section 01021)

TOTAL PLUMBING CONSTRUCTION
BASE BID PC-1 BID PRICE = $_____
Total Construction Base Bid PC-1 Price written in dollars and cents

$_____
Total Construction Base Bid PC-1 Price written in words

BASE BID GC-2 SINGLE PRIME CONTRACT

The General Contractor shall state the complete price to perform all work including, but not limited to, all abatement, demolition, general construction, mechanical construction, plumbing construction and electrical construction related to the **Todd Elementary School** Interior reconstruction, as shown on the drawings, and specified herein.

BASE BID GC-2 BID PRICE = $_____

Lump Sum Allowance No. 6 = $_____$30,000_
Unforeseen Conditions (See Section 01021)

TOTAL GENERAL CONSTRUCTION
BASE BID GC-2 BID PRICE = $_____
Total Construction Base Bid GC-2 Price written in dollars and cents

$_____
Total Construction Base Bid GC-2 Price written in words

ALTERNATES FOR BASE BID GC-2

1. ALTERNATE NO. 1 TO GC-2

The General Contractor shall state the complete price to be **(added to)** the base bid to provide full height wall tile in lieu of base tile and painted walls at rooms 22, 23, and nurse's office as shown on drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

2. ALTERNATE NO. 2 TO GC-2

The General Contractor shall state the complete price to be **(added to)** the base bid to provide all toilet room renovation at Toilet Room 43 as shown on drawings and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____

Bid Price written in words

3. ALTERNATE NO. 3 TO GC-2

The General Contractor shall state the complete price to be **(added to)** the base bid to provide masonry reconstruction as shown on drawing A4.01/TES and specified herein.

Add: $_____
Bid Price written in dollars and cents

$_____
Bid Price written in words

The Board of Education hereby reserves the right to accept or reject any item set forth individually in Paragraph Nine above. The Owner may determine the lowest bid by adding one base bid to other base bid(s) and/or by adding to or deducting from those base bid(s), additive or deduct alternates, unit prices, or substitutions, if any, which the Owner elects to accept after the opening of bids.

UNIT PRICES

Should the contract work be increased or decreased as per the General Conditions of the Contract, Article 8, Changes in the Work, the bidder hereby agrees that the following unit price is the basis for the extra or credit. The price includes all labor, material, overhead, profit, administration,

insurance, taxes, and incidental or contributory items, or cost to the contractor and/or supplier in connection therewith. The price stipulated below shall be the amount of extra or credit applied to the contract for the increase or decrease in the scope of work.

Unit Prices for General Contractor GC-1

1. Unit Price: Abatement and disposal of vinyl asbestos floor tile and mastic $_____/sf
2. Unit Price: Furnish and install Chapco's Defender Moisture Vapor Barrier moisture mitigation system in preparation of new resilient flooring $_____/sf
3. Unit Price: Glove bag abatement and disposal of pipe fittings (up to 4") $_____/ea
4. Unit Price: sawcutting 2' wide concrete slab, remove, Excavation backfilling and new Reinforced Concrete infill. $_____/lf
5. Unit Price: Furnish and install 2x2 acoustical Square lay-in ceiling tile $_____/sf
6. Unit Price: Furnish and install self-leveling gypsum underlayment $_____/sf
7. Unit Price: Furnish and install 12x12 Vinyl Enhanced Tile finish flooring $_____/sf

Unit Prices for Mechanical Contractor MC-1

1. Furnish and install 6" HWS/R insulation $_____/lf

Unit Prices for Electrical Contractor EC-1

1. Provide removals of unused data cabling in areas of proposed work scope from Point of use back to second floor MDF. $_____/wiring bundle
2. Furnish and install CAT 6E data wiring with jacks and terminations. $_____/ea

Tenth: **BID SECURITY**

Each bidder shall deposit with his bid a bid bond, bank

draft, or certified check in the amount of not less than five percent (5%) of the Base Bid made payable to:

Board of Education, Briarcliff Manor UFSD in the amount:

_____ $(_____)

AND agrees such surety shall be a measure of liquidated damages should he default in delivery of agreement.

Eleventh: **COMPLETION** (Contractor shall fill in number of days)

It is intended that the work under this contract be completed substantially within _____ consecutive calendar days after receipt of authorized letter of intent issued by the District.

Twelfth: **NON-COLLUSIVE BIDDING CERTIFICATION**
General Municipal Law, Section 103-d
(Submit with Bid Proposal Form)

A. By submission of this bid, the bidder and each person signing on behalf of the bidder certifies, and if this is a joint bid each party hereto certifies as to its own organization, under penalty of perjury that to the best of the bidder's knowledge and belief:

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

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit a bid for the purpose of restricting competition.

B. A bid shall not be considered for award nor shall award be made where A-1, 2, and 3 above have not been complied with provided, however, that if in any case the bidder shall so state and shall furnish with a bid a signed statement which sets forth in detail the reasons therefore, where A-1, 2, and 3 above have not

been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department agency, or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that the bidder: (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute without more, a disclosure within the meaning of Paragraph A above.

C. If the bidder is a corporation, the corporation shall be deemed to have been authorized by the Board of Directors of the bidder to make the above certification and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

(Seal of Corporation) _____
Corporate or Company Name

By: _____
Signature Title

Date: _____

Thirteenth: On acceptance of this proposal for said work, the undersigned hereby binds himself or themselves to enter into written contract with the Board of Education within ten (10) days of date of notice of award, and to comply in all respects with the provisions set forth in "Instructions for Bidders" and "General Conditions of Contract" in relation to security for the faithful performance of the terms of said contract.

IF A CORPORATION (Seal of corporation):

NAME ADDRESS

_____ _____
President

_____ _____
Secretary

_____ _____
Treasurer

IF A FIRM:

NAME OF MEMBERS ADDRESS

_____ _____

_____ _____

PROPOSED EQUIVALENT FORM

Project: **Phase 2 Bond Improvements at Briarcliff Manor MS/HS and Todd ES**

Name of Bidder (Corporate Name): _____

Date: _____ Prime Contract For_____

In accordance with Instructions to Bidders, Article 8, the above listed Bidder proposes the following materials, equipment, or methods for consideration by the Architect as equivalents to those specified or shown in the Contract Documents, and for incorporation into the Work at no additional cost to the Owner. The Contractor is aware of the risk of acceptance.

Project Manual Section Number and Specified Product	Proposed Equivalent
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

PROPOSED SUBSTITUTION FORM

The Base Bid Contract Sum proposed by the undersigned on the preceding Bid Proposal Form is based upon all items exactly as shown and described in the Contract Documents. For the Owner's consideration, the Bidder proposes the following substitute materials, equipment, or methods to be used in the work, in lieu of those specified, with a credit for cost savings to the Owner if accepted. Refer to Article 8(c) of the Instructions to Bidders.

	Specified Product and Section Number	Proposed Substitute	Credit Amount
1.	_____	_____	
	_____	_____	$_____
2.	_____	_____	
	_____	_____	$_____
3.	_____	_____	
	_____	_____	$_____

Name of Bidder (Corporate Name): _____

Date: _____ By:_____
Signature of Corporate Officer

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

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

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

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

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

I, _____, being duly sworn, deposes and says that he/she is the

_____ of the _____ Corporation and that neither

the Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

_____

SIGNED

SWORN to before me this

_____ day of _____

201___

Notary Public: _____

DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

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

Name of the Bidder: _____

Address of Bidder: _____

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

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

Have the investment activities ended? _____

If so, what was the date of the last investment activity?_____

If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran?_____

If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any and a copy of the formal plan. _____

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

I, _____ being duly sworn, deposes and says that he/she is the _____ of

the _____ Corporation and the foregoing is true and accurate.

_____
SIGNED

SWORN to before me this

_____ day of _____

201___
Notary Public: _____

IRAN DIVESTMENT ACT COMPLIANCE RIDER

FOR SCHOOL DISTRICTS

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law ("SFL") §165-a and General Municipal Law ("GML") §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the District, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

(a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or

(b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the SFL and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder's certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the SFL. In any case where the bidder or proposer cannot certify that it is not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The District may award a bid to a bidder who cannot make the certificate on a case by case basis if:

(1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

(2) The District makes a determination that the goods or services are necessary for the District to perform its functions and that, absent an exemption, the District would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

STATEMENT OF BIDDER'S QUALIFICATIONS

1. Name of Bidder:

_____

2. Type of Business Entity:

_____

3. If the bidder is a corporation, state the date and place of incorporation of the corporation. If a partnership, state the date of organization and type of partnership. If individually owned, state the date of organization. If the form of your organization is other than those listed above, please describe.

_____

4. For how many years has the bidder done business under its present name, and how many years has your organization been in business as a contractor?

_____

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

_____

_____

5b. Under what other or former names has your organization operated?

_____

_____

6. Have any of the persons listed in Number 5 owned/operated/been shareholders in any other companies? If so, please state name of the person(s) who has owned/operated/been shareholders and name(s) of other companies:

_____

_____

_____

_____

_____

7. Has your organization ever failed to complete any work awarded to it?

_____

_____

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

_____

_____

_____

_____

_____

9. During the three year period preceding the submission of this bid, has the bidder been found guilty of any OSHA Violations? If the answer to this question is yes, describe the nature of the OSHA violation, an explanation of remediation or other steps taken regarding such violation(s).

_____

_____

_____

_____

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

_____

_____

_____

_____

11. During the five year period preceding the submission of this bid, has the bidder been named as a party in any lawsuit in an action involving a claim for personal injury or wrongful death arising from performance or work related to any project in which it has been engaged? If the answer to this question is yes, list all such lawsuits, the index number associated with said suit and the status of the lawsuit at the time of the submission of this bid.

_____

_____

_____

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

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

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

_____

_____

_____

_____

_____

15. Has the bidder, its officers, directors, owner and/or managerial employees been convicted of a crime or been the subject of a criminal indictment during the five years preceding the submission of this bid? If the answer to this question is yes, list the name of the individual convicted or indicated, the charge against the individual and the date of disposition of the charge.

_____

_____

_____

_____

_____

16. During the five year period preceding the bidder's submission of this bid, has the bidder been charged with and/or found guilty of any violations of federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations? If the answer to this question is yes, list the nature of the charge against the bidder, the date of the charge, and the status of the charge at the time of the submission of this bid.

_____

_____

_____

_____

_____

17. Does the bidder have any major construction projects ongoing at the time of the submission of this bid? If the answer to this question is yes, list the projects on which the bidder is currently working, the percentage complete, and the owner, architect, contract amount and the expected date of completion of said project. State total worth of work in progress and under contract.

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

19. Are there any other judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

_____

_____

_____

_____

Dated: By: _____
(Signature)

_____
(Print Name and Title)

Sworn to before me this

_____ day of _____, 201__.

_____
Notary Public

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Payment Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

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

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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

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

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

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

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

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

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

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

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

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

.2 have sent a Claim to the Surety (at the address described in Section 13).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:		Name and Title:	
Address:		Address:	

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Performance Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

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

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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

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

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

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

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

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

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

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

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

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

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

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

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

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

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

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

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

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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AIA® Document A132™ – 2009

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

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

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

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

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

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

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

BBS Architects, Landscape Architects and Engineers P.C.
244E Main Street
Patchogue, New York 11772

The Owner and Contractor agree as follows.

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

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

This document is intended to be used in conjunction with AIA Documents A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

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

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

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

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

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

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Portion of the Work	Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[ ] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below

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

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

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

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

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

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.2.4 Allowances included in the Stipulated Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance

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

§ 4.3.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

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

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

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

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

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

Item	Units and Limitations	Price per Unit ($0.00)

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

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price
§ 4.4.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

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

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

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

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

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

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.4.7 Guaranteed Maximum Price
§ 4.4.7.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.
(Insert specific provisions if the Contractor is to participate in any savings.)

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§ 4.4.7.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

§ 4.4.7.3 Allowances included in the Guaranteed Maximum Price, if any:
(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)

Item	Allowance

§ 4.4.7.4 Assumptions, if any, on which the Guaranteed Maximum Price is based:

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the day of the month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment shall be made by the Owner not later than ( ) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

§ 5.1.4.3 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;

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

.3 Subtract the aggregate of previous payments made by the Owner; and

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.4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to percent (%) of the Contract Sum, less such amounts as the Construction Manager recommends and the Architect determines for incomplete Work and unsettled claims; and

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.5 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

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

§ 5.1.5.1 With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit A, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

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

§ 5.1.5.3 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take the Cost of the Work as described in Exhibit A, Determination of the Cost of the Work;

.2 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work described in that Section at the rate stated in that Section; or if the Contractor's Fee is stated as a fixed sum, an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.3 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;

.4 Subtract the aggregate of previous payments made by the Owner;

.5 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Article 5 or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or withdrawn a Certificate for Payment as provided in Section 9.5 of AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon (1) a mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used

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amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

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

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

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

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

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

§ 5.1.6.4 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.10 of AIA Document A232–2009;

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

.3 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, shall be an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.4 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;

.5 Subtract the aggregate of previous payments made by the Owner;

.6 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.7 Subtract amounts, if any, for which the Construction Manager or Architect have withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A232–2009.

§ 5.1.6.5 The Owner and the Contractor shall agree upon a (1) mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.6.6 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager or Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; that the

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Construction Manager or Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

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

§ 5.2 Final Payment

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

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2009, and to satisfy other requirements, if any, which extend beyond final payment;

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

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

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232–2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232–2009, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A232–2009.

[ ] Litigation in a court of competent jurisdiction.

[ ] Other: *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009.

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

§ 7.2.1 Subject to the provisions of Section 7.2.2 below, the Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.2.2 The Contract may be terminated by the Owner for cause as provided in Article 14 of AIA Document A232–2009; however, the Owner shall then only pay the Contractor an amount calculated as follows:

.1 Take the Cost of the Work incurred by the Contractor to the date of termination;

.2 Add the Contractor's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Sections 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and

.3 Subtract the aggregate of previous payments made by the Owner.

§ 7.2.3 If the Owner terminates the Contract for cause when the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, and as provided in Article 14 of AIA Document A232–2009, the amount, if any, to be paid to the Contractor under Section 14.2.4 of AIA Document A232–2009 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.2.

§ 7.2.4 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders.

§ 7.2.5 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009; in such case, the Contract Sum and Contract Time shall be increased as provided in Section 14.3.2 of AIA Document A232–2009, except that the term 'profit' shall be understood to mean the Contractor's Fee as described in Sections 4.3.2 and 4.4.2 of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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

%

§ 8.3 The Owner's representative:
(Name, address and other information)

§ 8.4 The Contractor's representative:
(Name, address and other information)

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§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

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

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

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

Section	Title	Date	Pages

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

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

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

.1 AIA Document A132™–2009, Exhibit A, Determination of the Cost of the Work, if applicable.

.2 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

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

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.4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232–2009 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232–2009.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232–2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount ($0.00)

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

OWNER *(Signature)*	CONTRACTOR *(Signature)*
(Printed name and title)	*(Printed name and title)*

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Application and Certificate for Payment

The following AIA Document G702 or G732 and G703 shall be utilized.

The General Conditions and Supplemental Conditions (if any) state required accompanying documents.

Applications and Certificates for Payment shall be assembled and transmitted as follows:

- Provide four original Applications and Certificates for Payment if there is a Construction Manager, three originals if not. One original and photocopies are unacceptable.

- If there is a Construction Manager, utilize the Construction Manager-edition AIA Application and Certificate for Payment, and the Construction Manager must have signed all originals before transmitting them to BBS.

- Lien Releases and Affidavits are required for every Application and Certificate for Payment except the first.

- Certified Payroll is required for every Application and Certificate for Payment that includes any amount of labor.

- The first Application and Certificate for Payment will not be processed until acceptable Bonds and Insurances are submitted and approved.

- The first Application and Certificate for Payment that includes any amount of labor, and thus Certified Payroll, must contain OSHA 10 cards. OSHA 10 cards must also be provided on subsequent Applications and Certificates for Payment where any new or additional worker is employed.

- The four or three original Applications and Certificates for Payment shall be complete and separate packages; all attachments must be affixed to every original application.

The Architect/Engineer and/or Construction Manager will not disassemble, rearrange, or reproduce any Application and Certificate for Payment, or portion thereof, to bring them into compliance. Incomplete or improperly arranged Applications and Certificates for Payment will be rejected and returned to the Contractor.

AIA® Document G732™ – 2009

Application and Certificate for Payment, Construction Manager as Adviser Edition

TO OWNER:

PROJECT: Tempalte

APPLICATION NO:

DISTRIBUTION TO:
OWNER
CONSTRUCTION MANAGER
ARCHITECT
CONTRACTOR
FIELD
OTHER

PERIOD TO:

CONTRACT DATE:

PROJECT NOS: / /

FROM CONTRACTOR:

CONTRACT FOR: General Construction

VIA CONSTRUCTION MANAGER:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

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

1. ORIGINAL CONTRACT SUM		$
2. NET CHANGES IN THE WORK		$ 0.00
3. CONTRACT SUM TO DATE *(Line 1 ± 2)*		$ 0.00
4. TOTAL COMPLETED AND STORED TO DATE *(Column G on G703)*		$
5. RETAINAGE:		
a. 0 % of Completed Work *(Column D + E on G703)*	$ 0.00	
b. 0 % of Stored Material *(Column F on G703)*	$ 0.00	
Total Retainage *(Lines 5a + 5b, or Total in Column I on G703)*		$ 0.00
6. TOTAL EARNED LESS RETAINAGE *(Line 4 minus Line 5 Total)*		$ 0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT *(Line 6 from prior Certificate)*		$
8. CURRENT PAYMENT DUE		$ 0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE *(Line 3 minus Line 6)*	$ 0.00	

SUMMARY OF CHANGES IN THE WORK	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month including Construction Change Directives	$	$
TOTALS	$ 0.00	$ 0.00
NET CHANGES IN THE WORK	$ 0.00	

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

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on evaluations of the Work and the data comprising this application, the Construction Manager and Architect certify to the Owner that to the best of their knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ _____

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

CONSTRUCTION MANAGER:

By: _____ Date: _____

ARCHITECT: *(NOTE: If Multiple Prime Contractors are responsible for performing portions of the Project, the Architect's Certification is not required.)*

By: _____ Date: _____

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

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AIA® Document G703™ – 1992

Continuation Sheet

AIA Document, G702™–1992, Application and Certification for Payment, or G736™–2009, Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
						0.00	0.00 %	0.00	
	GRAND TOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0.00 %	$0.00	$0.00

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User Notes: (1915840843)

AGENCY CUSTOMER ID: _____

NEW YORK CONSTRUCTION CERTIFICATE OF LIABILITY INSURANCE ADDENDUM

DATE (MM/DD/YYYY)

THIS ADDENDUM SUMMARIZES SOME OF THE POLICY PROVISIONS IN THE REFERENCED INSURANCE POLICIES AND IS ISSUED AS A MATTER OF INFORMATION ONLY; IT CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. ALL TERMS, EXCLUSIONS AND CONDITIONS IN THE ACTUAL POLICY SHOULD BE CONSULTED FOR A MORE DETAILED ANALYSIS OF COVERAGE, AS THIS ADDENDUM DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES.

AGENCY		NAMED INSURED(S)	
POLICY NUMBER	EFFECTIVE DATE	CARRIER	NAIC CODE

ADDENDUM INFORMATION **CERTIFICATE NUMBER:** **REVISION NUMBER:**

A. Insurer

☐ Admitted / authorized

☐ Excess line or free trade zone

B. General Liability (GL) policy form

☐ ISO / ISO modified

☐ Other

C. Specific operations excluded or restricted (GL policy)

☐ Location: _____

☐ Type of construction: _____

☐ Building height: _____

☐ Classifications [see attached declarations / endorsement]

☐ Designated work [see attached endorsement]

D. Additional insured endorsement (GL policy)

☐ CG 20 10 ☐ CG 20 26 ☐ CG 20 32 ☐ CG 20 33 ☐ CG 20 37 ☐ CG 20 38

☐ Other: #: _____ Title: _____

E. According to the terms of this GL policy, the additional insured has primary and noncontributory coverage

☐ Yes ☐ No and ☐ no other option is available with this insurer

F. Additional insured will receive advance notice if insurer cancels (GL policy)

☐ Yes ☐ No and ☐ no other option is available with this insurer

G. Blanket contractual liability located in the "insured contract" definition (Section V, Number 9, Item f. in the ISO CGL policy) is removed or restricted

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

H. "Insured contract" exception to the employers liability exclusion is removed or modified (GL policy)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

I. GL policy (including endorsements) does not cover the additional insured for claims involving injury to employees of the named insured or subcontractors (not workers' compensation)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

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J. Earth movement, excavation or explosion / collapse / underground property damage is excluded or restricted (GL policy)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

K. Insured vs. insured suits (cross liability in the ISO CGL policy) are excluded or restricted (other than named insured vs. named insured)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

L. Property damage to work performed by subcontractors (exception to the "damage to your work" exclusion in the ISO CGL policy) is excluded or restricted

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

M. Excess / umbrella policy is primary and non-contributory for additional insureds

☐ Yes, by specific policy provision ☐ Yes, by endorsement ☐ No and ☐ no other option is available with this insurer

_____ _____

AUTHORIZED REPRESENTATIVE SIGNATURE DATE (MM/DD/YYYY)

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location And Description Of Completed Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

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THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – AUTOMATIC STATUS FOR OTHER PARTIES WHEN REQUIRED IN WRITTEN CONSTRUCTION AGREEMENT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. **Section II – Who Is An Insured** is amended to include as an additional insured:

1. Any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy; and

2. Any other person or organization you are required to add as an additional insured under the contract or agreement described in Paragraph **1.** above.

Such person(s) or organization(s) is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

a. Your acts or omissions; or

b. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured.

However, the insurance afforded to such additional insured described above:

a. Only applies to the extent permitted by law; and

b. Will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

A person's or organization's status as an additional insured under this endorsement ends when your operations for the person or organization described in Paragraph **1.** above are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or

b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of, or the failure to render, any professional architectural, engineering or surveying services.

2. "Bodily injury" or "property damage" occurring after:

a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or

SAMPLE

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b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

The most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement described in Paragraph **A.1.;** or

2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

SAMPLE

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BBS ARCHITECTS
LANDSCAPE ARCHITECTS
ENGINEERS

FREDERICK W. SEEBA, PE, MANAGING PARTNER
LAWRENCE SALVESEN, AIA, PARTNER
KEVIN J. WALSH, AIA, PARTNER
KENNETH G. SCHUPNER, AIA, PARTNER
JOSEPH B. RETTIG, AIA, PARTNER
GARY W. SCHIEDE, AIA, PARTNER
ROGER P. SMITH, AIA, FOUNDING PRINCIPAL

Date: _____

Owner: _____

Project: _____

Contractor: _____

Dear Sir/Madam:

Reference is made to your contract with _____ for the above referenced Project. By signing below, you hereby acknowledge and agree, that for valuable consideration, the receipt of which is acknowledged, you covenant and agree that BBS Architects, Landscape Architects & Engineers PC, shall be added as an "additional insured" to your casualty and commercial liability insurance policies required under the Contract, including all primary and excess policies, limits, and terms and conditions contained therein, and further agree that an insurance certificate and endorsement confirming that this entity was added as an "additional insured" on such policies of insurance shall be provided by you prior to the commencement of work onthe Project.

In addition, you further covenant and agree to hold harmless, indemnify and defend BBS Architects, Landscape Architects, and Engineers, PC to the same extent that you are required to hold harmless, indemnify and defend the Owner under the Contract, however, Contractor is not responsible for defense and indemnity for claims, demands or suits caused solely by Architect's professional negligence.

Acknowledged and agreed to by:

_____
Name

_____
Signature

_____
Contractor

Rev. 12-31-18

AIA® Document G706™ – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
		ARCHITECT: ☐
	CONTRACT FOR:	CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐
		OTHER: ☐

STATE OF:
COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

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

Indicate Attachment ☐ Yes ☒ No

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

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes: (912617527)

AIA® Document G706A™ – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
		ARCHITECT: ☐
		CONTRACTOR: ☐
	CONTRACT FOR:	SURETY: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	OTHER: ☐

STATE OF:
COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR:	ARCHITECT: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	CONTRACTOR: ☐
		SURETY: ☐
		OTHER: ☐

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

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

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

, OWNER,

as set forth in said Surety's bond.

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

_____
(Surety)

_____
(Signature of authorized representative)

Attest:
(Seal):

_____
(Printed name and title)

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AIA® Document G707A™ – 1994

Consent of Surety to Reduction in or Partial Release of Retainage

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR: n	ARCHITECT: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	CONTRACTOR: ☐
		SURETY: ☐
		OTHER: ☐

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

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves the reduction in or partial release of retainage to the Contractor as follows:

The Surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

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

_____
(Surety)

_____
(Signature of authorized representative)

Attest:
(Seal):

_____
(Printed name and title)

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AIA® Document A232™ – 2009

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

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

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

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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

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

This document is intended to be used in conjunction with AIA Documents A132™–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

Init.
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

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

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

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

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

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

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

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

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

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

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form

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

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

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the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

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

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

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

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

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

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

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

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

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

§ 3.6 Taxes

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

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

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and

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Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- **.1** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

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

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at

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appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

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

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

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

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

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

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

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

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

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

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

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§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

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

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

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

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

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§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar

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required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

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

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

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

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the

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Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

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

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

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ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

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

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

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§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

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

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

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

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for

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Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques,

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sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

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

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

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

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction

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Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

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

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

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

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

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

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

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly

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employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB),encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the

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Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

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

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

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§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the

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Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

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

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

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and

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(2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

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

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

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.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

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.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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Additions and Deletions Report for

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I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 12:14:50 on 07/12/2016 under Order No. 1767259550_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

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(Signed)

_____

(Title)

_____

(Dated)

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SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

(CROSS-REFERENCE AIA DOCUMENT A232/CMa-2009)

1. List of Drawings

The Drawings, which are the graphic and pictorial portions of the Contract Documents that show the design, location and dimension of the Work are as listed within the "List of Drawings" provided with the drawing set. All Work under this Contract shall be executed in accordance with the Contract Documents, which are typically composed of the Project Manual, Specifications and Drawings. The Contract Documents are complimentary as described in the General Conditions. The "List of Drawings" will be incorporated in the Standard Form of Agreement Between the Owner and the Contractor.

2. Provision of Documents

A. Each Prime Contractor is entitled to five printed sets of Drawings, three Project Manuals, and three sets of all Addenda materials. The three sets are inclusive of the original set obtained for bidding purposes. These sets will be provided at the Owners expense exclusive of the original Bid Deposit, which is forfeited by the awarded contractors.

B. Additional sets of Contract Documents will be provided to the contractors for the cost of reproduction and distribution charges. Payment is due upon receipt of the Documents.

C. Reproducible copies of the Drawings shall be provided upon the request of the Prime Contractor and are to be provided for the cost of reproduction and distribution charges. Payment is due upon receipt of the Documents.

D. For expediency, at the discretion of the Architect, Prime Contractors may be directed to pick up documents at the project designated printing facility. This practice will not be permitted without authorization of/and coordination by the Architect.

E. Electronic drawing files, AutoCAD format, may be available, at the discretion of the Architect, for a cost of $25.00 per drawing. Contractors requesting this service will be required to sign a disclaimer. Request for electronic files must be made in writing to the Architects office. This request must include a specific list of drawings required in this format. In response, the architect will verify the drawings requested and will forward the disclaimer for signature. Electronic files will be released upon receipt of payment and a fully executed disclaimer form.

3. Minimum Rates of Wages

A. In accordance with Section 220, Subdivision 3 and 220-d of the Labor Law, the Industrial Commissioner, Department of Labor, State of New

York, has ascertained the prevailing rates of wages which will apply to this Project.

B. The Prevailing Rates of Wages, which are the minimum hourly rates to be paid on this project, shall be indicated in the PW-3, PW-19, PW-202, PW-203, and PW-16 sheets enclosed.

C. Any person or corporation that willfully pays, after entering such contract, less than established wage schedule shall be guilty of a misdemeanor and, upon conviction, shall be punished for such first offense by a fine of $500 or by imprisonment for not more than 30 days or both fined and imprisoned. A second offense carries a heavier penalty.

4. A.I.A. Documents

A. The "General Conditions of the Contract for Construction" Standard A.I.A. Form A232CMa, 2009 edition, will become, under the Agreement, one of the Documents of the Contract and shall govern all Work under this Contract.

B. The following supplements modify the "General Conditions of the Contract for Construction," A.I.A. Document A232CMa, 2009 Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

C. **Article 1 - General Provisions**

1.1 Basic Definitions

Add the following Subparagraph to 1.1.2:

1.1.2.1 Where the term "Contract" or "Prime Contract" is used in the General Conditions, Supplementary Conditions, and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Division 1.

1.2 Correlation and Intent of the Contract Documents

Add new subparagraph 1.2.4:

In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities.

1. Modifications issued after execution of the Agreement.

2. The Agreement Between the Owner and the Contractor.

3. Addenda, issued prior to the execution of the Agreement, with those of later dates having precedence over those of earlier dates.

4. The Supplementary Conditions, Rider to the General Conditions, Special Provisions or Requirements (if any).

5. The General Conditions of the Contract for Construction.

6. Drawings and Specifications.

After execution of the Agreement and during the course of the Work should any ambiguities, discrepancies, omissions, or apparent errors be found on the drawings or in the specifications to which the Contractor has failed to call attention prior to submitting his bid, then the intention of the Contract Documents is to be interpreted by the Architect.

The Architect's decision as to the intent shall be final, and the Contractor hereby agrees to carry out the Work in accordance with the decision of the Architect.

Until such time as an interpretation is issued, it shall be assumed that the Contractor has based his bid on providing the Work in the better quality, greater quantity, or most expensive manner, for Work complete in every detail, even though every item necessarily involved is not particularly mentioned.

If necessary measurements are missing or Work specified or shown in the Contract Documents is obviously incorrect or impossible to execute, or figures fail to check, the Contractor shall call these facts to the attention of the Architect for interpretation as described above.

D. **Article 2 - Owner**

2.3 Owner's Right to Stop the Work

Add new subparagraph 2.3.1

2.3.1 "If the Contractor fails to correct Work which is not in accordance with the requirements of Contract Documents as required by Section 12.2 or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor, or disregards, the instruction of the Architect, Construction Manager or Owner when based on the requirements of the Contract Documents, the Owner, by written order signed personally or by an agent so empowered by the Owner, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated (as determined by the Owner or its agency); however, the

right of Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right either on its behalf or for the benefit of the Contractor or any other person or entity. The Contractor shall stop work upon receipt of said order the written order described herein above may be delivered to and shall be deemed received by the Contractor in the same manner as set forth in paragraph 2.4.1.1."

2.4 Owner's Right to Carry Out the Work

Add after second sentence of 2.4 the following sentence:

If the Owner, Architect or Construction Manager (if applicable) request that any of the Prime Contractors perform additional work which is not included in the Construction Documents and which will result in either additional cost or additional time a fully executed Change Order is required.

The Contractor shall submit a proposal for the additional work. This proposal shall contain a complete itemization of the costs associated with the work inclusive of all labor and materials. All proposals for any work that the Contractor, its Subcontractors or Subcontractors of subcontractors perform in connection with the additional work shall be submitted utilizing the format contained herein below (item 7.2.3). In no event shall the total for overhead and profit on any Change Order exceed fifteen percent (15%) of the cost of the work.

1. Any proposals submitted without an itemized breakdown as indicated herein will be returned for resubmission.

2. For work performed by the Prime Contractor, fifteen percent (15%) overhead and profit is permitted for their labor and material costs.

3. Overhead can only be applied to the cost of labor and materials, including delivery.

4. Overhead and profit is not permitted on rental of equipment and machinery.

5. Equipment and machinery costs shall not include items already on site and under use for the base contract.

6. Additional bond costs shall be 2 % maximum.

7. Insurance costs fall within overhead costs.

8. Subcontractor proposals in connection with the work shall include a maximum of ten percent (10%) overhead and profit for their work.

9. The Prime Contractor is permitted five percent (5%) profit on the work of its Subcontractor as indicated in the Table at 7.2.3.

10. Under no circumstance shall the Contractor or its Subcontractors be entitled to overtime costs unless otherwise agreed and approved by the Owner. (Ref Article 8 – Time)

11. A change in the Contract sum shall only be accomplished by a written Change Order. Payments cannot be issued against a Change Order unless it has been fully executed.

12. Adjustments in time if required will be in accordance with Article 8.

Proposals for additional work shall be submitted in the following format accompanied by sufficient substantiating data to permit a proper evaluation.

	Proposed Change Order	Estimated cost
A	Prime Contractors Materials (itemized quantities & cost)	
B	Prime Contractors Labor (itemized)	
C	Subtotal (A+B)	
D	Any credit due shall be applied here	
E	Overhead 10% of Subtotal	
F	Subtotal (C+D+-E)	
G	Subcontracted work (include itemized quantities and costs and 10% max OH&P)	
H	Subtotal (F+G)	
I	Prime Contractors Profit 5%	
J	Subtotal (H+I)	
K	Equipment and Machinery Rental (itemized)	
L	Bond Costs (2% max)	
M	Total Proposed Change Order (J+K+L)	

E. **Article 3 - Contractor**

3.2 Review of Contract Documents and Field Conditions by Contractor

Add new subparagraph 3.2.5:

3.2.5 The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and that the Drawings, the Specifications and all addenda are sufficient to enable the Contractor to construct the

Work outlined therein in accordance with applicable laws, statues, building codes and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. In addition, if the Contractor performs any construction activity and if it knows or should have know that any of the Contract Documents contains an error, inconsistency or omission, the Contractor shall be responsible for such performance and shall bear the costs for correction thereof.

3.3 Supervision and Construction Procedures:

3.3.2 Insert the following language (noted in *italic)* in Paragraph 3.3.2: *"…and other persons performing portions of the Work under a Contract or other arrangement with the Contractor."*

3.4 Labor and Materials:

Add the following Paragraphs to 3.4:

3.4.4 The Contractor shall check all materials and labor entering into the Work site and shall keep full detailed accounts thereof.

3.4.5 The Contractor acknowledges that it is the Contractor's responsibility to hire all personnel for the proper and diligent execution of the Work and the Contractor shall maintain labor peace for the duration of the Project. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract schedule of the Contract Sum.

3.5 Warranty:

Add the following at the end of 3.5.1:

The Contractor will be responsible for and shall make good any defects due to faulty materials for two (2) years and two (2) years on labor after final payment has been made, except where sections of the Specifications call for a longer period of time.

3.9 Superintendent:

Add the following new subparagraph:

3.9.8 Qualifications of Superintendent: The Contractor shall employ a Superintendent, for the duration of the Project, whose qualifications meet or exceed those listed below. Prior to employing the Superintendent, the Contractor shall submit to the Architect the name of the proposed Superintendent and, if requested by

the Architect, a statement attesting to his qualifications.

1. Five (5) years of experience as a Superintendent in the particular construction discipline required by the Contract.

2. Superintendent on at least two (2) construction projects equal to, or greater than, the Contract Sum for this Contract.

3. Superintendent on at least two (2) projects of similar construction types and procedures as this Project.

3.12 Shop Drawings, Product Data, and Samples:

Add the following to the end of paragraph 3.12.1:

"The shop drawings shall include fabrication, erection, layout, and setting drawings and schedules, wiring and piping diagrams; and any other information required for proper approval of or installation of all parts of the Work specified. If any modifications are required to a standard item, such modifications shall be clearly shown or noted at the time of submission of shop drawings."

Add the following to the end of paragraph 3.12.5:

"All submissions shall be in accordance with Section 01300 Submissions."

Add the following to the end of paragraph 3.12.6:

"Contractor shall be responsible for verification of field dimensions and conditions and shall furnish such information to the Architect when requested. Before Contractor proceeds with the Work in question, the Contractor should field verify all dimensions. In case of doubt about dimensions, he should notify the Architect immediately for instructions."

Add the following new Paragraphs to 3.12:

3.12.11 Samples shall be properly labeled, giving the following information as applicable:

1. Project name and location.

2. Name, finish, and composition of material.

3. Location where material is to be used.

4. When approved, samples shall be so indicated.

5. Labels shall be large enough for approval stamp.

F. **Article 5 - Subcontractors**

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

Add the following Subparagraphs to 5.2.1:

5.2.1.2 Refer to Instructions to Bidders, Section 4, for requirements for delivery of "Contractor's Subcontractor List" to Architect's office after receipt of bids and before award of the Contract."

Delete Subparagraph 5.2.3 in its entirety and substitute the following:

5.2.3 Approval of a subcontractor may be revoked or withdrawn, if, in the opinion of the Architect, such subcontractor evidences an unwillingness or inability to perform his Work in strict accordance with the Contract Documents.

Add the following Paragraph to 5.2:

5.2.5 All subcontracts over $5,000 shall be in writing with copies of written subcontract provided to the Owner upon request.

G. **Article 6 - Construction by Owner or By Other Contractors**

6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts:

Add the following Subparagraph to 6.1.2:

6.1.2.1 The Contractor shall provide for coordination of his activities with the activities of each Prime Contractor. This includes, but is not limited to, the Owner’s own forces or separate Contractor’s employed directly by the Owner.

6.2 Mutual Responsibility:

Add the following Subparagraphs to 6.2.2:

6.2.2.1 Each Prime Contractor shall promptly correct discrepancies or defects in their Work identified by other Prime Contractors as affecting proper execution and results of the Work of the other Prime Contractor.

Add the following Subparagraph to 6.2.5:

6.2.5.1 Claims and other disputes and matters in questions between the Contractor and other Prime Contractors shall be subject to the provisions of Article 15.

Add the following new Subparagraphs:

6.2.6 All required cutting, patching, and restoring shall be neatly done by mechanics skilled in their specific trades, to the satisfaction of the Architect.

6.2.7 The Contractor shall leave all Work of his trade WHOLE, PERFECT, AND COMPLETE at the final completion of the Work.

H. **Article 8 - Time**

8.2 Progress and Completion:

Add the following Subparagraph to 8.2.1

8.2.1.1 The Contractor recognizes that the Project Schedule is of critical importance to the Owner. All aspects of construction must reflect a 'time is of the essence' construction strategy. The 'Bid Schedules' serve as a guide of critical milestone dates to the Project. Failure to meet intermediate milestone dates will jeopardize the overall Project Schedule. If the Contractor's performance of the Work evidences, to the Owner or Architect, that the completion day may be in jeopardy, this will mandate Contractor(s) to increase staff, work overtime, or use other means to recover time, at the costs of those Contractor(s) responsible for such delays. In addition, all costs due to delays in completion of the Work shall be borne by Contractor(s) responsible for delays.

8.3 Delays and Extensions of Time:

Delete Paragraph 8.3.1 and replace with the following:

8.3.1 "If the Contractor is delayed at/in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Owners Representative written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Owner's Representative may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek

an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the Architect, Construction Manager, or the Owner, physical damage to the Project over which the Contractor has no control, labor disputes beyond the control of the Contractor, and unusually severe weather conditions not reasonably anticipated (temperature, rain, or other precipitation within a range of twenty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions) or by fire, unavoidable casualties or by other causes beyond the Contractors reasonable control. Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions. The Contractor agrees not to make claims for financial compensation for delays or acceleration in the performance of the Work resulting from acts or failure to act by the Owner, the Architect, Construction Manager, or the employees, agents, or representatives of the Owner, Construction Manager, or the Architect and agrees that such claim shall be fully compensated by an extension of time to complete the Work, regardless of when granted. Contractor delayed by Work of other Contractors shall make claims against delaying Contractor and not the Owner."

Add the following Subparagraphs to 8.3.1:

8.3.1.4 When the Contract Time has been extended, as provided under this Paragraph 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs or other similar reasons.

Delete paragraph 8.3.2 and replace as follows:

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of this Agreement. A copy of any Claim for extension of time shall be delivered to the Owner, the Architect and the Construction Manager, and the Contractor shall immediately take all steps reasonably possible to lessen the adverse impact of such delay to the Owner.

Delete paragraph 8.3.3 and replace as follows:

8.3.3 In no event shall the Contractor be entitled to monetary damages for delay under the Contract.

A new paragraph 8.3.4 shall be added as follows:

8.3.4 To the extent the Contractor is required to work during overtime hours, weekend, holidays or at other times which are not regularly scheduled, due to the fault of the Contractor, the Contractor shall be responsible for the costs incurred by the Owner, Architect, the Construction Manager and the others attributable to working during periods which have not been ordinarily scheduled. To the extent the Contractor elects to work during these periods to facilitate the schedule, the Owner may, at its sole option, allow the Contractor to do so without the Contractor incurring the additional costs referenced above.

I. **Article 9 - Payments and Completion**

9.2. Schedule of Values:

9.2.1 In the first sentence, after Construction Manager, add "and the Architect".

9.3 Application for Payment:

9.3.1 In the second sentence, delete the words "if required."

Add the following Subparagraphs to 9.3.1.3:

9.3.1.3.1 Until final completion and acceptance of Work in accordance with Paragraph 9.10, the Owner shall pay 95 percent of the amount of each progress payment due the Contractor.

9.3.1.3.2 The application for payment shall be accompanied by the following documentation:

a. A current contractor's lien waiver.

b. Duly executed waivers of Public Improvement liens from all subcontractors and material suppliers representing satisfaction of payment of all amounts requested by the Contractor on behalf of such entities in any previous application for payment.

c. Certified Payroll for all employees of the Contractor and employees of subcontractors performing Work on the Project.

d. For contracts of $250,000 and more, all Contractors and subcontractors must attach a copy

of proof of completion of the OSHA 10 course to the first Certified Payroll submitted and on each succeeding payroll where any new or additional employee is first listed.

e. Such other information which the Owner and/or the Architect request the Contractor furnish in connection with its Application for Payment.

Add the following Subparagraphs to 9.3.2:

9.3.2.4 Additionally, the Contractor must furnish the following information, where payment is requested for materials and equipment stored off the project site, as part of its Application for Payment:

1. Type of material must be specifically identified by the trade contractor.

2. Trade contractor must furnish an invoice from his supplier showing the total value of the material and/or equipment being stored off site.

3. Trade contractor must provide a Certificate of Insurance for the full value of the item plus 10 percent.

9.10 Final Completion and Final Payment:

Add the following Subparagraphs to 9.10.1:

9.10.1.1 "In case the Contractor neglects to carry out the provisions of this clause within a reasonable time after notice, the Owner may cause all defects to be remedied and all repairs to be made without notice to the Contractor and deduct same from any amount so retained and recover the balance, if any, from the Contractor. The order of the Architect as to the conditions of the Work constructed under this Contract, the extent of the remedies applies, and of the repairs made, and of the cost thereof, shall be binding and conclusive upon the Contractor, his assigns, and sureties.

Add the following Subparagraph to 9.10.2:

9.10.2.2 Submittals required above shall be made in accordance with procedures described in Division 1.

Add the following additional Clauses to Paragraph 9.10.4:

.4 Claims for Indemnification;

.5 Claims about which the Owner has given the Contractor written notice;

.6 Claims arising after final payment."

J. **Article 10 - Protection of Persons and Property**

10.2 Safety of Persons and Property:

Add the following Subparagraph to 10.2.2:

10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all Costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fee, in recovering such defense costs from the Contractor.

Add the following new Subparagraph:

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

and Architect.

Add the following Subparagraph to 10.2.12:

10.2.12.1 The Contractor causing damage to the Work of another Contractor shall be responsible for the repair and replacement of such damaged Work. Back charges shall be made when corrections are not made promptly.

10.2.12.2 The Owner reserves the right to pay the Contractor originating the back charge from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the amount due the said responsible Contractor.

10.2.12.3 Contractor originating back charges will determine the amount of the back charges in accordance with Article 7, Changes in the Work, of the General Conditions of the Contract, in order to obtain the Architect's approval.

10.2.12.4 Contractors under direct Contract with the Owner will be expected to take care of back charges originating with Subcontractors under their employ under the terms and conditions as established in the General Conditions of the Contract, Article 5 and Article 6. Contractors under direct Contract with the Owner, and their Sureties, shall indemnify and save the Owner harmless from claims of this type, including paying for legal expenses necessary to remove or settle any liens or other legal claims against the Owner.

K. **Article 11 - Insurance and Bonds**

11.1 Contractor's Liability Insurance:

Add the following Subparagraph to 11.1.2:

11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits indicated in Division 1, Section 1C (submitted on A.I.A. Document G705, Certificate of Insurance) or greater as required by Law.

11.3 Property Insurance:

Add the following to Paragraph 11.3.1.1:

"The form of policy for this coverage shall be Completed Value."

Delete Paragraph 11.3.1.4 in its entirety and substitute the following:

11.3.1.4 The Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit, and stored on the site but not incorporated into the Work as full replacement cost basis without voluntary deductible.

11.4 Performance Bond and Payment Bond:

Add the following to Paragraph 11.4.1:

11.4.1 Bonds shall be obtained from a surety satisfactory to the Owner, licensed to do business in the state where the project is located. The amount of each bond shall be included in the Contract Sum. Each bond shall be maintained throughout the duration of the Project and shall remain in effect for a period of not less than two (2) years following final completion of the work by the Contractor.

Add the following subparagraph to 11.4.1:

11.4.1.4 The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the site, but no later than three (3) days after execution of the Contract, on A.I.A. Document A312, Performance Bond and Payment Bond.

L. **Article 14 - Termination or Suspension of the Contract**

14.1 Termination by the Contractor:

Add the following to 14.1.1:

14.1.1.5 In accordance with Section 103.1, General Municipal Law, if any person when called to testify before a Grand Jury concerning any transaction or contract with the State of New York or a political subdivision thereof, or a public authority, or a public department, agency, or official of any of the foregoing, refuses to sign a waiver of immunity against subsequent criminal prosecution or refuses to answer any relevant questions concerning such transaction or contract; then any such person, or any firm, partnership, or corporation of which he is a member, partner, director, or official shall be disqualified for a period of five (5) years after such refusal from submitted bids to, receiving awards, or entering into any contract with, any municipal corporation or department or agency or official thereof.

If such person refuses to sign a waiver of immunity

or to answer any relevant questions as aforesaid, then this Contract may be canceled or terminated by the Owner without the Owner incurring any penalty or damages by virtue of such cancellation or termination.

14.1.1.6 In accordance with Section 109, General Municipal Law, the Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract for the Work herein specified, or his right, title, or interest therein, or his power to execute the Contract, to any other person or corporation without the previous consent in writing of the Board of Education.

If the Contractor, without previous written consent of the Board of Education, shall assign, transfer, convey, sublet, or otherwise dispose of the Contract for the Work specified herein, or his power to execute the Contract, to any other person or corporation, the Board of Education shall be relieved of and discharged from any and all liability and obligations growing out of the Contract to the Contractor, and to the persons or corporation to which the Contract shall have been assigned, transferred, conveyed, sublet, or otherwise disposed of, and the Contractor, and his assignees, transferees, or sublessees shall forfeit and lose all monies theretofore earned under the Contract, except so much as may be required to pay his employees.

The above provisions of this paragraph shall not hinder, prevent, or affect any assignment by the Contractor for the benefit of his creditors made pursuant to the laws of the State of New York.

Article 15 – Claims and Disputes

15.1 Claims:

Add to Paragraph 15.1.2:

Failure to do so shall be an irrevocable waiver of the Claim.

Modify Paragraph 15.1.5.1 as follows:

Delete the text after "notice" in line 2 and substitute the following text and sentence, "shall be given by the Contractor to the Architect within 7 days of its commencement. The failure to give such notice shall constitute an irrevocable waiver of the Claim.

Delete from the second sentence the following, "of cost and"

In the event of a continuing delay, only one claim is necessary.

Add the following Subparagraphs to 15.1.5.1:

15.1.5.1.1 An application for extension of time must set forth in detail the nature of each alleged cause of delay, the dates upon which such cause of delay began and ended, the number of days attributable to each of such causes, and the probable effect of such causes on the previously approved progress schedule.

15.1.5.1.2 Failure to strictly comply with these requirements may, at the discretion of the Owner, be deemed sufficient cause on the previously approved progress schedule.

Add the following Subparagraph to 15.1.5.2:

15.1.5.2.1 In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

Add the following paragraph to 15.1:

15.1.7 The Owner shall not be liable to the Contractor and/or Subcontractor for financial Claims or monetary damages of any nature caused by or arising out of delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make any hereby waives any Claim for damages for delay, including, but not limited to, those resulting from increase labor or material costs; directions given or not given by the Owner, Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or review of shop drawings and requests for instruction(s); or, on account of any delay, obstruction or hinderance for any cause whatsoever by the Owner, Architect, or any other contractor on this Project, whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefore shall be an extension of time if appropriate. IT IS EMPHASIZED THAT NO MONETARY RECOVERY MAY BE OBTAINED BY THE

CONTRACTOR FOR DELAY AGAINST THE OWNER, CONSTRUCTION MANAGER, OR ARCHITECT BASED ON ANY REASON AND THAT THE CONTRACTOR'S SOLE REMEDY, IF APPROPRIATE, IS ADDITIONAL TIME.

15.2 Initial Decision:

Add to end of 15.2.1:

Add the following text at the end of the third sentence of this Subparagraph:…"provided, with respect to Claims submitted more than one year after payment is due, the decision by the Architect shall not be a condition precedent to litigation, and the Claim not need be submitted to the Architect.

Add the following Paragraph 15.2.9:

"Within 10 days of a written request, the Contractor will make available to the Owner or its representative books, records, or other documents in its possession or to which it has access relating to a claim and shall require its Subcontractors, regardless of tier, and materialmen to do likewise."

Add the following new article in its entirety:

Article 16-Indemnification

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

16.1.2 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, the Architect, the Architect's consultants, and agents and employees of them from and against claims, damages, losses and expenses, including but not limited to, attorneys' fees arising out of or resulting from performance of its work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction, of tangible

property including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this paragraph 16.1.2. The Contractor's indemnity obligations under this Paragraph 16.1.2 shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, the Construction Manager, the Architect, the Architect's consultants and agents and employees of any of them under any applicable statute, rule or regulation including the New York Statute, Occupational Safety and Hazardous Act, and the Federal Occupational Safety and Hazardous Act. In claims against any person or entity indemnified under this paragraph 16.1.2 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this paragraph 16.1.2 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

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

16.1.4 The Contractor shall indemnify and hold harmless the Owner, the Construction Manager, and the Architect of and from any and all liability for violation of any laws and regulations applicable to the Contractor's work and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from

the Contractor.

16.1.5 The Contractor shall indemnify and hold harmless the Owner, the Construction Manager, and the Architect of and from any and all liability for claims made by third parties, including subcontractors, in connection with this Agreement and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

END OF SECTION

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Briarcliff Manor UFSD

Greg O'Connor
187 Wolf Road
Suite 205
Albany NY 12205

Schedule Year	2022 through 2023
Date Requested	04/25/2022
PRC#	2022004545

Location	Briarcliff Manor HS, Todd ES
Project ID#	21-274C-D
Project Type	General Construction, Mechanical Construction, Plumbing Construction, Electrical Construction

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2022 through June 2023. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

There are very few exceptions to this rule. Complete information regarding these exceptions is available on the "Request for a dispensation to work overtime" form (PW30) and "4 Day / 10 Hour Work Schedule" form (PW 30.1).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid

or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Briarcliff Manor UFSD

Greg O'Connor
187 Wolf Road
Suite 205
Albany NY 12205

Schedule Year 2022 through 2023
Date Requested 04/25/2022
PRC# 2022004545

Location Briarcliff Manor HS, Todd ES
Project ID# 21-274C-D
Project Type General Construction, Mechanical Construction, Plumbing Construction, Electrical Construction

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
[ ] (01) General Construction
[ ] (02) Heating/Ventilation
[ ] (03) Electrical
[ ] (04) Plumbing
[ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, https://dol.ny.gov/public-work-and-prevailing-wage
If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.ny.gov* or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

• **Civil Penalty**	First offense: Up to $2,500 per employee Subsequent offense(s): Up to $5,000 per employee
• **Criminal Penalty**	First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year. Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at:

https://dol.ny.gov/public-work-and-prevailing-wage

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5156		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is $250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training “prior to the performing any work on the project.”

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.)*
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is $3 million in Bronx, Kings, New York, Queens and, Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Westchester County General Construction

Boilermaker — 11/01/2022

JOB DESCRIPTION Boilermaker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2022
Boilermaker	$ 63.38
Repairs & Renovations	63.38

SUPPLEMENTAL BENEFITS

Per Hour:	
Boilermaker	32% of hourly Wage Paid
Repair $ Renovations	Wage Paid + $ 25.38

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY
See (D, O) on OVERTIME PAGE
Repairs & Renovation see (B,E,Q)

HOLIDAY
Paid: See (8, 16, 23, 24) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 12, 15, 16, 22, 23, 24, 25) on HOLIDAY PAGE
NOTE: *Employee must work in pay week to receive Holiday Pay.
**Employee gets 4 times the hourly wage rate for working Labor Day.

REGISTERED APPRENTICES
Wage per hour:
(1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

Apprentice(s)	32% of Hourly Wage Paid Plus Amount Below
1st Term	$ 19.41
2nd Term	20.26
3rd Term	21.11
4th Term	21.96
5th Term	22.82
6th Term	23.68
7th Term	24.52

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter — 11/01/2022

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2022
Piledriver	$ 58.16 + 9.54*

Dockbuilder $ 58.16
+ 9.54*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker $ 44.54

OVERTIME PAY
See (B, E2, O) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour
(1)year terms:

1st	2nd	3rd	4th
$24.60 + 5.05*	$30.20 + 5.05*	$38.58 + 5.05*	$46.97 + 5.05*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All Terms: $ 31.03

8-1556 Db

Carpenter **11/01/2022**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2022

Carpet/Resilient
Floor Coverer $ 55.05
+ 8.25*
*This portion is not subject to overtime premiums

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS
Per hour:
$ 39.40

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr.
Apprentices See (5,6,11,13,16,18,19,25)
Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wage per hour - (1) year terms:

1st	2nd	3rd	4th
$ 24.80 + 1.85*	$ 27.80 + 2.35*	$ 32.05 + 2.85*	$ 39.93 + 3.85*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 14.80	$ 15.80	$ 18.90	$ 19.90

8-2287

Carpenter — 11/01/2022

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2022

Marine Construction:

Marine Diver	$ 73.03
	+ 9.54*
Marine Tender	$ 62.11
	+ 9.54*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker	$ 44.54

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms.

1st year	$ 24.60
	+ 5.05*
2nd year	30.20
	+ 5.05*
3rd year	38.58
	+ 5.05*
4th year	56.97
	+ 5.05*

*This portion is not subject to overtime premiums

Supplemental Benefits
Per Hour:

All terms	$ 31.03

8-1456MC

Carpenter — 11/01/2022

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2022

Building	
Millwright	$ 57.80
	+ 12.62*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Millwright $ 43.16

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18,19) on HOLIDAY PAGE.

Overtime See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms:

1st.	2nd.	3rd.	4th.
$31.24	$36.69	$42.14	$53.04
+ 6.75*	+ 7.92*	+ 9.09*	+ 11.43*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:
One (1) year terms:

1st.	2nd.	3rd.	4th.
$29.01	$31.54	$34.72	$39.14

8-740.1

Carpenter — 11/01/2022

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per Hour:

	07/01/2022
Timberman	$ 53.05
	+ 10.01*

*This portion not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per Hour:

	07/01/2022
	$ 43.75

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms:

1st	2nd	3rd	4th
$22.42	$27.53	$35.18	$42.84
+ 5.30*	+ 5.30*	+ 5.30*	+5.30*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All terms $ 30.74

8-1556 Tm

Carpenter — 11/01/2022

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES
Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.
Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.
Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES

Per hour:	07/01/2022	10/18/2022
Core Drilling:		
Driller	$ 42.27 + 2.30*	$ 43.38 + 2.50*
Driller Helper	33.47 + 2.30*	34.47 + 2.50*

Note: Hazardous Waste Pay Differential:
For Level C, an additional 15% above wage rate per hour
For Level B, an additional 15% above wage rate per hour
For Level A, an additional 15% above wage rate per hour
Note: When required to work on water: an additional $ 3.00 per hour.

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
Per hour:

Driller and Helper	$ 28.30

OVERTIME PAY
See (B, G, P) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway — 11/01/2022

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

WAGES
WAGES:(per hour)
Applies to CAPRENTER BUILDING/HEAVY & HIGHWAY/TUNNEL:

	07/01/2022	07/01/2023 Additional	07/01/2024 Additional	07/01/2025 Additional
Base Wage	$ 38.95 +$6.65*	$ 1.25**	$ 1.25**	$ 1.25**

*For all hours paid straight or premium.
**To be allocated at a later date.

SHIFT DIFFERENTIAL: When it is mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 32.88

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY
BUILDING:
Paid: See (1) on HOLIDAY PAGE.
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.
- Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:
Paid: See (5, 6, 25) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
- Holidays that fall on Sunday will be observed Monday
- Must be employed during the five (5) work days immediately preceding a holiday or during the five (5) work days following the paid holiday to receive holiday pay
- If Employee is entitled to a paid holiday, the Employee is paid the Holiday wage and supplemental benefits whether they work or not. If Employee works the Holiday, the Employee will receive holiday pay (including supplemental benefits), plus the applicable premium wage for working the Holiday. If Employee works in excess of 8 hours on Holiday, then benefits will be paid for any hours in excess of 8 hours.

REGISTERED APPRENTICES
1 year terms at the following wage rates:

1st	2nd	3rd	4th	5th
$ 19.48	$ 23.37	$ 25.32	$ 27.27	$ 31.16
+3.57*	+3.57*	+3.57*	+3.57*	+3.57*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms $ 16.28

11-279.1B/HH

Electrician — 11/01/2022

JOB DESCRIPTION Electrician **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour:	07/01/2022	03/09/2023
Service Technician	$ 35.40	$ 36.40

Service and Maintenance on Alarm and Security Systems.

Maintenance, repair and /or replacement of defective (or damaged) equipment on, but not limited to, Burglar - Fire - Security - CCTV - Card Access - Life Safety Systems and associated devices. (Whether by service contract of T&M by customer request.)

SUPPLEMENTAL BENEFITS

Per hour:		
Journeyworker:	$ 20.18	$ 21.07

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

9-3H

Electrician — 11/01/2022

JOB DESCRIPTION Electrician **DISTRICT** 8

ENTIRE COUNTIES
Westchester

WAGES

Per hour:	07/01/2022
*Electrician/A-Technician	$ 53.75
Teledata	53.75

*All new installations of wiring, conduit, junction boxes and light fixtures for projects with a base bid of more than $325,000. For projects with a base bid of $325,000 or less, see Maintenance and Repair rates.

Note: On a job where employees are required to work on bridges over navigable waters, transmission towers, light poles, bosun chairs, swinging scaffolds , etc. 40 feet or more above the water or ground or under compressed air, or tunnel projects under construction or where assisted breathing apparatus is required, they will be paid at the rate of time and one-half for such work except on normal pole line or building construction work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	$ 54.39

OVERTIME PAY

See (A, G, *J, P) on OVERTIME PAGE

*NOTE: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

	07/01/2022
1st term	$ 15.00
2nd term	16.00
3rd term	18.00
4th term	20.00
MIJ 1-12 months	25.00
MIJ 13-18 months	28.50

Supplemental Benefits per hour:

	07/01/2022
1st term	$ 10.82
2nd term	13.05
3rd term	14.39
4th term	15.72
MIJ 1-12 months	13.49
MIJ 13-18 months	13.87

8-3/W

Electrician — 11/01/2022

JOB DESCRIPTION Electrician **DISTRICT** 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour

	07/01/2022
Electrician -M	$ 28.50
H - Telephone	28.50

All work with a base bid amount of $325,000 or less. Including repairs and /or replacement of defective electrical and teledata equipment, all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls, and washing and cleaning of foregoing fixtures.

*If the project exceeds $375,000 due to changes in the scope of work, an Electrician/A Technician must be part of the labor ratio.

SUPPLEMENTAL BENEFITS

	07/01/2022
Electrician & H - Telephone	$ 13.87

OVERTIME PAY

See (B, G, *J, P) on OVERTIME PAGE

*Note: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

8-3m

Elevator Constructor **11/01/2022**

JOB DESCRIPTION Elevator Constructor **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES
Rockland: Entire County except for the Township of Stony Point
Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES
Per hour:

	07/01/2022	03/17/2023
Elevator Constructor	$ 75.14	$ 77.49
Modernization & Service/Repair	59.09	60.89

Four(4), ten(10) hour days may be worked at straight time during a week, Monday thru Friday.

NOTE- In order to use the '4 Day/10 Hour Work Schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 IS NOT SUBMITTED you will be liable for overtime payments for work over the allotted hours per day listed.

SUPPLEMENTAL BENEFITS
Per Hour:

Elevator Constructor	$ 43.914	$ 45.574
Modernization & Service/Repairs	42.787	44.412

OVERTIME PAY
Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:
*Note:1st, 2nd, 3rd Terms are based on Average wage of Constructor & Modernization.
Terms 4 thru 9 Based on Journeyman's wage of classification Working in.

6 MONTH TERMS:

1st Term*	2nd & 3rd Term*	4th & 5th Term	6th & 7th Term	8th & 9th Term
50%	50%	55%	65%	75%

SUPPLEMENTAL BENEFITS

Elevator Constructor		
1st Term	$ 0.00	$ 0.00
2nd & 3rd Term	34.772	36.024
4th & 5th Term	35.606	36.943
6th & 7th Term	37.052	38.448
8th & 9th Term	38.497	39.953

Modernization & Service/Repair		
1st Term	$ 0.00	$ 0.00
2nd & 3rd Term	34.672	35.694
4th & 5th Term	35.195	36.525
6th & 7th Term	36.571	37.948
8th & 9th Term	37.938	39.38

JOB DESCRIPTION Elevator Constructor **DISTRICT** 1

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES
Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford
Rockland: Only the Township of Stony Point.
Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2022	01/01/2023
Mechanic	$ 64.63	$ 67.35
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

Four (4), ten (10) hour days may be worked for New Construction and Modernization Work at straight time during a week, Monday thru Thursday or Tuesday thru Friday.

***Four (4), ten (10) hour days are not permitted for Contract Work/Repair Work

NOTE - In order to use the '4 Day/10 Hour Work Schedule' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule', form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour

	07/01/2022	01/01/2023
Journeyperson/Helper	$ 36.885*	$ 37.335*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE
Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
Wages per hour:

0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyperson/Helper

1-138

Glazier **11/01/2022**

JOB DESCRIPTION Glazier **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	7/01/2022	11/01/2022
Glazier	$ 59.59	$ 60.34
*Scaffolding	61.55	62.55
Glass Tinting & Window Film	30.11	30.11
**Repair & Maintenance	30.11	30.11

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 24' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative contract value is under $148,837. All Glass tinting, window film, regardless of material or intended use, and all affixing of decals to windows or glass.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2022	11/01/2022
Journeyworker	$ 37.55	$ 38.05
Glass tinting &	22.01	22.01
Window Film Repair & Maintenance	22.01	22.01

OVERTIME PAY

See (B,H,V) on OVERTIME PAGE.
For 'Repair & Maintenance' and 'Glass Tinting & Window Film' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE
For 'Repair & Maintenance' and 'Glass Tinting & Window Film' Only
Paid: See(5, 6, 16, 25)
Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:
(1) year terms at the following wage rates:

	7/01/2022	11/01/2022
1st term	$ 21.15	$ 21.45
2nd term	29.07	29.45
3rd term	35.20	35.65
4th term	47.38	47.98
Supplemental Benefits: (Per hour)		
1st term	$ 17.15	$ 17.35
2nd term	24.42	24.67
3rd term	27.06	27.36
4th term	32.15	32.55

8-1087 (DC9 NYC)

Insulator - Heat & Frost — 11/01/2022

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2022	05/31/2023
Insulator	$ 58.25	+ $ 2.00
Discomfort & Additional Training**	61.30	+ $ 2.00
Fire Stop Work*	31.15	+ $ 2.00

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring; garb or equipment worn against the body not customarily worn by insulators;psychological evaluation;special training, including but not limited to "Yellow Badge" radiation training

Note: Additional $0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	$ 36.10
Discomfort & Additional Training	38.09
Fire Stop Work:	
Journeyworker	18.41

OVERTIME PAY
See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.
*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES
(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
$ 31.15	$ 36.56	$ 41.98	$ 47.41

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
$ 32.67	$ 38.39	$ 44.12	$ 49.85

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	$ 18.41
2nd term	21.94
3rd term	25.48
4th term	29.03

Discomfort & Additional Training Apprentices:

1st term	$ 19.41
2nd term	23.14
3rd term	26.88
4th term	30.62

8-91

Ironworker — 11/01/2022

JOB DESCRIPTION Ironworker **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2022	01/01/2023 Additional
Stone Derrickmen Rigger	$ 72.26	+ $ 1.64
Stone Handset Derrickman	70.11	+ $ 1.11

SUPPLEMENTAL BENEFITS
Per hour:

Stone Derrickmen Rigger	$ 42.10
Stone Handset Derrickman	42.09

OVERTIME PAY
See (B, D1, *E, Q, **V) on OVERTIME PAGE
*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter.
** Benefits same premium as wages on Holidays only

HOLIDAY
Paid: See (18) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 25) on HOLIDAY PAGE
Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES
Wage per hour:

Stone Derrickmen Rigger:

	1st	2nd	3rd	4th
07/01/2022	$ 35.58	$ 50.89	$ 56.71	$ 62.48

Supplemental benefits:
Per hour:

07/01/2022	21.61	31.97	31.97	31.97

Stone Handset:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th
07/01/2022	34.50	49.43	54.99	61.00

Supplemental benefits:
Per hour:

07/01/2022	21.60	31.96	31.96	31.96

9-197D/R

Ironworker — 11/01/2022

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2022	01/01/2023
Ornamental	$ 46.65	Additional
Chain Link Fence	46.65	$ 1.25
Guide Rail	46.65	

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker: $ 62.04

OVERTIME PAY
See (B, B1, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Apprentices Hired after 9/1/18:
1 year terms

1st Term	$ 20.63
2nd Term	24.22
3rd Term	27.80
4th Term	31.38

Supplemental Benefits per hour:

1st Term	$ 17.90
2nd Term	19.15
3rd Term	20.41
4th Term	21.67

4-580-Or

Ironworker — 11/01/2022

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
PER HOUR:

	07/01/2022	01/01/2023
Ironworker:		Additional
Structural	$ 55.70	$ 1.75
Bridges		
Machinery		

SUPPLEMENTAL BENEFITS
PER HOUR PAID:

Journeyman	$ 85.35

OVERTIME PAY
See (B, B1, Q, *V) on OVERTIME PAGE
*NOTE: Benefits are calculated for every hour paid

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:

6 month terms at the following rate:

1st	$ 28.97
2nd	29.57
3rd - 6th	30.18

Supplemental Benefits
PER HOUR PAID:

All Terms	$ 59.18

4-40/361-Str

Ironworker — 11/01/2022

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Rockland: Southern section - south of Convent Road and east of Blue Hills Road.

WAGES

Per hour:	07/01/2022	07/01/2023
Reinforcing &		Additional
Metal Lathing	$ 56.90	$ 1.50
"Base" Wage	$ 55.20 plus $ 1.70	

"Base" Wage is used to calculate overtime hours only.

SUPPLEMENTAL BENEFITS
Per hour:

Reinforcing & Metal Lathing	$ 41.18

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Only $23.50 per Hour for non worked hours

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half	$ 47.68
Double Time	$ 54.18

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE
*Note: Work performed after first 4 Hours.

REGISTERED APPRENTICES
(1) year terms at the following wage rates:

1st term	2nd term	3rd term	4th Term
Wage Per Hour:			
$ 22.55	$ 23.60	$ 24.60	$ 37.18
"Base" Wage			
$ 21.00	$ 22.00	$ 23.00	$ 35.60
plus $1.55	plus $1.60	plus $1.60	plus $1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENIFITS
Per Hour:

1st term	2nd term	3rd term	4th Term
$ 18.17	$ 17.17	$ 16.22	$ 22.50

4-46Reinf

Laborer - Building — 11/01/2022

JOB DESCRIPTION Laborer - Building **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES

Per hour	07/01/2022
Laborer	$ 39.05 plus $5.45**
Laborer - Asbestos & Hazardous Materials Removal	$ 43.50*

* Abatement/Removal of:
- Lead based or lead containing paint on materials to be repainted is classified as Painter.
- Asbestos containing roofs and roofing material is classified as Roofer.

** This portion is not subject to overtime premium.

NOTE: Upgrade/Material condition work plan for work performed during non-outage under a wage formula of 90% wage/100% fringe benefits at nuclear power plants.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022
Journeyworker	$ 29.50

OVERTIME PAY
See (B, E, E2, Q, *V) on OVERTIME PAGE
*Note: For Sundays and Holidays worked benefits are at the same premium as wages.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
LABORER ONLY
Hourly terms at the following wage:

Level A	Level B	Level C	Level D
0-1000	1001-2000	2001-3000	3001-4000
$ 27.07	$ 30.89	$ 34.72	$ 38.54

Supplemental Benefits per hour:

Apprentices	
All terms	$ 22.20

8-235/B

Laborer - Heavy&Highway **11/01/2022**

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
PUTNAM: APPLIES TO ALL HEAVY & HIGHWAY WORK EXCLUDING HIGHWAYS, STREETS, AND BRIDGES

GROUP I: Blaster, Quarry Master, Curbs/Asphalt Screedman, Pipe Jacking and Boring Operations Operator, Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drillers(jumbo, joy, wagon, air track, hydraulic), Drill Operator, Self Contained Rotary Drill, Curbs, Raker, Bar Person, Concrete Finisher.

GROUP III: Pavement Breakers, Jeeper Operator, Jack Hammer, Pneumatic Tools (all), Gas Driller, Guniting, Railroad Spike Puller, Pipelayer, Chain Saw, Deck winches on scows, Power Buggy Operator, Power Wheelbarrow Operator, Bar Person Helper, Compressed Airlance, Water Jet Lance.

GROUP IV: Concrete Laborers, Asph. Worker, Rock Scaler, Vibrator Oper., Bit Grinder, Air Tamper, Pumps, Epoxy (adhesives, fillers and troweled on), Barco Rammer, Concrete Grinder, Crack Router Operator, Guide Rail-digging holes and placing concrete and demolition when not to be replaced, distribution of materials and tightening of bolts.

GROUP V: Drillers Helpers, Common Laborer, Mason Tenders, Signal Person, Pit Person, Truck Spotter, Powder Person, Landscape/Nursery Person, Dump Person, Temp. Heat.

GROUP VIA: Asbestos/Toxic Waste Laborer-All removal (Roads, Tunnels, Landfills, etc.) Confined space laborer, Bio-remediation, Phyto-remediation, Lead or Hazardous material, Abatement Laborer.

Wages:(per hour)	07/01/2022
GROUP I	$ 47.13*
GROUP II	45.78*
GROUP III	45.38*
GROUP IV	45.03*
GROUP V	44.68*
GROUP VIA	46.68*
Operator Qualified	
Gas Mechanic(A Mech)	57.13*
Flagperson	38.33*

*NOTE: To calculate overtime premiums, deduct $0.10 from above wages

SHIFT WORK: A shift premium will be paid on Public Work contracts for off-shift or irregular shift work when mandated by the NYS D.O.T. or other Governmental Agency contracts. Employees shall receive an additional 15% per hour above current rate for all regular and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker:
First 40 Hours
Per Hour $ 26.82
Over 40 Hours
Per Hour 20.32

OVERTIME PAY
See (B, E, P, R, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
NOTE: For Holiday Overtime: 5, 6 - Code 'S' applies
For Holiday Overtime: 8, 15, 25, 26 - Code 'R' applies

REGISTERED APPRENTICES

	1st term 1-1000hrs	2nd term 1001-2000hrs	3rd term 2001-3000hrs	4th term 3001-4000hrs
07/01/2022	$ 25.37	$ 29.94	$ 34.51	$ 38.98

Supplemental Benefits per hour:

1st term	$ 4.70 - After 40 hours: $ 4.45
2nd term	$ 4.80 - After 40 hours: 4.45
3rd term	$ 5.30 - After 40 hours: 4.85
4th term	$ 5.85 - After 40 hours: 5.35

8-60H/H

Laborer - Tunnel 11/01/2022

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 11

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES
Chenango: Townships of Columbus, Sherburne and New Berlin.
Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES
Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2022
Class 1	$ 53.45
Class 2	55.60
Class 4	62.00
Class 5	44.80

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional $ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:
- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS
Per hour:

Benefit 1	$ 34.45
Benefit 2	51.60
Benefit 3	68.75

Benefit 1 applies to straight time hours, paid holidays not worked.
Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.
Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE
When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES
FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician 11/01/2022

JOB DESCRIPTION Lineman Electrician **DISTRICT** 6

ENTIRE COUNTIES

Westchester

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment/operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

Below rates apply to electrical overhead and underground distribution and maintenance work and overhead and underground transmission line work, electrical substations, switching structures, continuous pipe-type underground fluid or gas filled transmission conduit and cable installations, maintenance jobs or projects, railroad catenary installations and maintenance, third rail installations, the bonding of rails and the installation of fiber optic cable. (Ref #14.04.01)

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Tech, Welder	$ 59.01	$ 60.41	$ 61.91
Crane, Crawler Backhoe	59.01	60.41	61.91
Cable Splicer-Pipe Type	64.91	66.45	68.10
Digging Mach Operator	53.11	54.37	55.72
Cert. Welder-Pipe Type	61.96	63.43	65.01
Tractor Trailer Driver	50.16	51.35	52.62
Groundman, Truck Driver	47.21	48.33	49.53
Equipment Mechanic	47.21	48.33	49.53
Flagman	35.41	36.25	37.15

Additional $1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid
Journeyman Lineman or Equipment Operators with Crane License	$ 27.90 *plus 7% of the hourly wage paid	$ 29.40 *plus 7% of the hourly wage paid	$ 30.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata — 11/01/2022

JOB DESCRIPTION Lineman Electrician - Teledata **DISTRICT** 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Cable Splicer	$ 36.28	$ 37.73	$ 39.24	$ 40.81
Installer, Repairman	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Teledata Lineman	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Tech., Equip. Operator	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Groundman	$ 18.25	$ 18.98	$ 19.74	$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Journeyman	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting — 11/01/2022

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

ENTIRE COUNTIES
Westchester

WAGES
Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
(Ref #14.01.03)

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Technician	$ 53.60	$ 54.73	$ 55.95
Crane, Crawler Backhoe	53.60	54.73	55.95
Certified Welder	56.28	57.47	58.75
Digging Machine	48.24	49.26	50.36
Tractor Trailer Driver	45.56	46.52	47.56
Groundman, Truck Driver	42.88	43.78	44.76
Equipment Mechanic	42.88	43.78	44.76
Flagman	32.16	32.84	33.57

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

Journeyman Lineman or Equipment Operators with Crane License	$ 27.90 *plus 7% of the hourly wage paid	$ 29.40 *plus 7% of the hourly wage paid	$ 30.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.
Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES
WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWestLT

Mason - Building — 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2022	12/05/2022 Additional	06/05/2023 Additional
Tile Setters	$ 62.01	$ 0.73	$ 0.73

SUPPLEMENTAL BENEFITS
Per Hour:
$ 26.13*
+ $10.02

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
Work beyond 10 hours on Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage per hour:

(750 hour) term at the following wage rate:

Term: 1st 1-750	2nd 751-1500	3rd 1501-2250	4th 2251-3000	5th 3001-3750	6th 3751-4500	7th 4501-5250	8th 5251-6000	9th 6001-6750	10th 6501-7000
$21.23	$26.11	$33.26	$38.14	$41.67	$45.04	$48.60	$53.47	$56.25	$60.33

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$12.55* +$.69	$12.55* +$.74	$15.16* +$.84	$15.16* +$.88	$16.75* +$1.28	$18.30* +$1.33	$19.35* +$1.70	$19.40* +$1.75	$17.45* +$5.90	$22.80* +$6.42

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building — 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2022	06/01/2023
Bricklayer	$ 44.79	$ 45.89
Cement Mason	44.79	45.89
Plasterer/Stone Mason	44.79	45.89
Pointer/Caulker	44.79	45.89

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:
Irregular work day requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 37.00	$ 37.95

OVERTIME PAY
OVERTIME:
Cement Mason — See (B, E, Q, W) on OVERTIME PAGE.
All Others — See (B, E, Q) on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE
Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Building

Wages per hour:	07/01/2022
Mosaic & Terrazzo Mechanic	$ 59.21
Mosaic & Terrazzo Finisher	57.60

SUPPLEMENTAL BENEFITS
Per hour:

Mosaic & Terrazzo Mechanic	$ 26.21* + $11.73
Mosaic & Terrazzo Finisher	$ 26.21* + $11.72

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (A, E, Q) on OVERTIME PAGE
07/01/2022- Deduct $7.00 from hourly wages before calculating overtime.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Easter Sunday is an observed holiday.Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES
Wages Per hour:

1st 0-1500	2nd 1501-3000	3rd 3001-3750	4th 3751-4500	5th 4501-5250	6th 5251-6000
$ 22.82	$ 29.34	$ 31.32	$ 36.55	$ 41.77	$ 46.99

Supplemental Benefits per hour:

$4.62* +$6.56	$5.94* +$8.43	$15.73* +$11.24	$18.35* +$13.11	$20.97* +$14.99	$23.59* +$16.85

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2022
Building-Marble Restoration:	
Marble, Stone &	$ 46.60
Terrazzo Polisher, etc	

SUPPLEMENTAL BENEFITS
Per Hour:
Journeyworker:

Building-Marble Restoration:	
Marble, Stone &	
Polisher	$ 29.77

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*ON SATURDAYS, 8TH HOUR AND SUCCESSIVE HOURS PAID AT DOUBLE HOURLY RATE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1ST TERM APPRENTICE GETS PAID FOR ALL OBSERVED HOLIDAYS.

REGISTERED APPRENTICES
WAGES per hour:

900 hour term at the following wage:

1st	2nd	3rd	4th
1-900	901-1800	1801-2700	2701
$ 32.61	$ 37.28	$ 41.94	$ 46.60

Supplemental Benefits Per Hour:

27.07	27.97	28.87	29.77

9-7/24-MP

Mason - Building — 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES
Wages: 07/01/2022

Marble Cutters & Setters $ 62.17

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker $ 38.27

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6751	6751-7500
$ 24.88	$ 27.97	$ 31.08	$ 34.17	$ 37.29	$ 40.39	$ 43.51	$ 46.61	$ 52.82	$ 59.05

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 20.55	$ 22.04	$ 23.52	$ 25.01	$ 26.47	$ 27.96	$ 29.42	$ 30.91	$ 33.86	$ 36.81

9-7/4

Mason - Building — 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2022	12/05/2022	06/05/2023
		Additional	Additional
Tile Finisher	$ 47.60	$ 0.59	$ 0.58

SUPPLEMENTAL BENEFITS
Per Hour:

$ 22.16*
+ $9.85

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
*Work beyond 10 hours on a Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88A-tf

Mason - Building — 11/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2022
Marble, Stone, etc.	
Maintenance Finishers:	$ 27.01

Note 1: An additional $2.00 per hour for time spent grinding floor using "60 grit" and below.
Note 2: Flaming equipment operator shall be paid an additional $25.00 per day.

SUPPLEMENTAL BENEFITS
Per Hour:

Marble, Stone, etc	
Maintenance Finishers:	$ 14.40

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*Double hourly rate after 8 hours on Saturday

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1st term apprentice gets paid for all observed holidays.

REGISTERED APPRENTICES
WAGES per hour:

	07/01/2022
0-750	$ 21.67
751-1500	22.38
1501-2250	23.10
2251-3000	23.80
3001-3750	24.87
3751-4500	26.29
4501+	27.01

Supplemental Benefits:
Per hour:

0-750	11.52
751-1500	11.90
1501-2250	12.29

2251-3000	12.67
3001-3750	13.25
3751-4500	14.01
4501+	14.40

9-7/24M-MF

Mason - Building / Heavy&Highway 11/01/2022

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per hour:

	07/01/2022
Marble-Finisher	$ 48.97

SUPPLEMENTAL BENEFITS
Journeyworker:
per hour

Marble- Finisher	$ 35.76

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
Work beyond 8 hours on a Saturday shall be paid at double the rate.

HOLIDAY
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
When an observed holiday falls on a Sunday, it will be observed the next day.

9-7/20-MF

Mason - Heavy&Highway 11/01/2022

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2022	06/01/2023
Bricklayer	$ 45.29	$ 46.39
Cement Mason	45.29	46.39
Marble/Stone Mason	45.29	46.39
Plasterer	45.29	46.39
Pointer/Caulker	45.29	46.39

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:
Irregular work day requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 37.00	$ 37.95

OVERTIME PAY
Cement Mason See (B, E, Q, W)
All Others See (B, E, Q,)

HOLIDAY
Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

- Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.
- Supplemental Benefits are not paid for paid Holiday
- If Holiday is worked, Supplemental Benefits are paid for hours worked.
- Whenever an Employee works within three (3) calendar days before a holiday, the Employee shall be paid for the Holiday.

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building — 11/01/2022

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES
Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES
NOTE: Construction surveying
Party Chief--One who directs a survey party
Instrument Man--One who runs the instrument and assists Party Chief.
Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour)	07/01/2022
Building Construction:	
Party Chief	$ 76.64
Instrument Man	60.50
Rodman	40.64
Steel Erection:	
Party Chief	79.41
Instrument Man	62.85
Rodman	43.48
Heavy Construction-NYC counties only: (Foundation, Excavation.)	
Party Chief	84.60
Instrument man	63.79
Rodman	54.52

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2022
Building Construction	$ 26.69* +$ 7.40
Steel Erection	27.29* +$ 7.40
Heavy Construction	25.25* +$ 7.15

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:
16.45

OVERTIME PAY
See (A, B, E, Q) on OVERTIME PAGE
Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.
Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY
Paid: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

9-15Db

Operating Engineer - Building 11/01/2022

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES
GROUP I:
Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc.(Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist(Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull(Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker(Air Ram), Paver(Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie(Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper(sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-Grout-Fireproofing. Roller(Under 4 Ton),Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station(Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane(75 ton and over).

Group VI-A: Welder Certified
GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2022	03/06/2023	03/04/2024
GROUP I			
Cranes- up to 49 tons	$ 65.03	$ 66.23	$ 67.43
Cranes- 50 tons to 99 tons	67.28	68.53	69.77
Cranes- 100 tons and over	76.77	78.21	79.64
GROUP I-A	56.97	58.01	59.04
GROUP I-B	52.52	53.48	54.41
GROUP II	54.98	55.98	56.97
GROUP III-A	52.97	53.94	54.88
GROUP III-B	50.44	51.35	52.25
GROUP IV-A	52.44	53.40	54.33
GROUP IV-B	44.38	45.17	45.94
GROUP V	47.83	48.69	49.53
Group VI-A	55.93	56.96	57.96
GROUP VI-B			
Utility Man	45.39	46.21	47.00
Warehouse Man	47.57	48.52	49.26

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.
Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour.
Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour.
Loader operators over 5 cubic yard capacity additional .50 per hour.
Shovel operators over 4 cubic yard capacity additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 29.87	$ 30.57	$ 31.32

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

8-137B

Operating Engineer - Heavy&Highway — 11/01/2022

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES
GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck),
Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2022	03/06/2023	03/04/2024
Group I	$ 65.97	$ 67.27	$ 68.63
Group I-A	58.16	59.26	60.42
Group I-B	61.28	62.46	63.70
Group II-A	55.70	56.74	57.84
Group II-B	57.44	58.52	59.67
Group III	54.72	55.74	56.81
Group IV	49.74	50.63	51.57
Group IV-B	42.71	43.43	44.19
Group V			
Engineer All Tower, Climbing and Cranes of 100 Tons	74.73	76.24	77.82
Hoist Engineer(Steel)	67.67	69.01	70.41
Engineer(Pile Driver)	72.16	73.61	75.13
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	56.99	58.06	59.19

SHIFT DIFFERENTIAL:
A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity $0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity $1.00 per hour over the rate listed in the Wage Schedule.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday; Friday may be used as a make-up day.

NOTE - In order to use the 4 Day/10 Hour Work schedule Registration for Use of 4 Day/10 Hour Work Schedule, form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker:	$ 32.60 up to 40 Hours	$ 33.75 up to 40 hours	$ 34.85 up to 40 hours
	After 40 hours $ 23.40* PLUS $ 1.20 on all hours worked	After 40 hours $ 24.50* PLUS $ 1.25 on all hours worked	After 40 hours $ 25.55* PLUS $ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY

See (B, E, P, *R, **U) on OVERTIME PAGE

HOLIDAY
Paid:..... See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies
** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES
(1)year terms at the following rate.

1st term	$ 29.08	$ 29.63	$ 30.21
2nd term	34.90	35.56	36.25
3rd term	40.71	41.48	42.30
4th term	46.53	47.41	48.34
Supplemental Benefits per hour:			
	24.55	25.70	26.85

8-137HH

Operating Engineer - Heavy&Highway — 11/01/2022

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 9

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES
Dutchess: South of the North city line of Poughkeepsie

WAGES
Party Chief - One who directs a survey party
Instrument Man - One who runs the instrument and assists Party Chief
Rodman - One who holds the rod and in general, assists the Survey Crew
Categories cover GPS & Underground Surveying

Per Hour:	07/01/2022
Party Chief	$ 81.72
Instrument Man	61.43
Rodman	52.40

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2022
All Categories	
Straight Time:	$ 25.25* plus $7.15
Premium:	
Time & 1/2	$ 37.88* plus $7.15
Double Time	$ 50.50* plus $7.15

Non-Worked Holiday Supplemental Benefits:
$ 16.45

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY
Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel — 11/01/2022

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler, Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2022	03/06/2023	03/04/2024
GROUP I	$ 65.97	$ 67.27	$ 68.63
GROUP I-A	58.16	59.26	60.42
GROUP I-B	61.28	62.46	63.70
GROUP II-A	55.70	56.74	57.84
GROUP II-B	57.44	58.52	59.67
GROUP III	54.72	55.74	56.81
GROUP IV-A	49.74	50.63	51.57
GROUP IV-B	42.71	43.43	44.19
GROUP V-A			
Engineer-Cranes	74.73	76.24	77.82
Engineer-Pile Driver	72.16	73.61	75.13
Hoist Engineer	67.67	69.01	70.41
Jersey Spreader/Post Hole Digger	56.99	58.06	59.19

SHIFT DIFFERENTIAL:
A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive $0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional $2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional $3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional $1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional $0.50 per hour.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker:

	$ 32.60 up to 40 hours After 40 hours $23.40 plus $1.20 on all hours worked	$ 33.75 up to 40 hours After 40 hours $24.50 plus $1.25 on all hours worked	$ 34.85 up to 40 hours After 40 hours $25.55 plus $1.25 on all hours worked

OVERTIME PAY
See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.
Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES
(1)year terms at the following rates:

1st term	$ 29.08	$ 29.63	$ 30.21
2nd term	34.90	35.56	36.25
3rd term	40.71	41.48	42.30
4th term	46.53	47.41	48.34

Supplemental Benefits per hour:

All terms	$ 24.55	$ 25.70	$ 26.85

8-137Tun

Operating Engineer - Marine Dredging — 11/01/2022

JOB DESCRIPTION Operating Engineer - Marine Dredging **DISTRICT** 4

ENTIRE COUNTIES
Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES
These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2022	10/01/2022
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	$ 42.66	$ 43.94
CLASS A2 Crane Operator (360 swing)	38.02	39.16
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer	36.89	38.00

Licensed Boat, Crew Boat Operator

CLASS B2 Certified Welder	34.73	35.77
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	33.78	34.79
CLASS C2 Boat Operator	32.69	33.67
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	27.16	27.97

SUPPLEMENTAL BENEFITS
Per Hour:
THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	$ 11.40 plus 6% of straight time wage, Overtime hours add $ 0.63	$ 11.85 plus 6% of straight time wage, Overtime hours add $ 0.63
All Class C	$ 11.10 plus 6% of straight time wage, Overtime hours add $ 0.48	$ 11.60 plus 6% of straight time wage, Overtime hours add $ 0.50
All Class D	$ 10.80 plus 6% of straight time wage, Overtime hours add $ 0.33	$ 11.35 plus 6% of straight time wage, Overtime hours add $ 0.38

OVERTIME PAY
See (B2, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Survey Crew - Consulting Engineer — 11/01/2022

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Dutchess: That part in Duchess County lying South of the North City line of Poughkeepsie.

WAGES
Feasibility and preliminary design surveying, any line and grade surveying for inspection or supervision of construction.

Per hour: Survey Classifications	07/01/2022
Party Chief	$ 46.44
Instrument Man	38.60
Rodman	33.64

SUPPLEMENTAL BENEFITS
Per Hour:

All Crew Members:	$ 21.60

OVERTIME PAY
OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.
*Doubletime paid on the 9th hour on Saturday.

HOLIDAY
Paid: See (5, 6, 7, 11, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

9-15dconsult

Painter — 11/01/2022

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2022
Brush	$ 51.45*
Abatement/Removal of lead based or lead containing paint on materials to be repainted.	51.45*
Spray & Scaffold	$ 54.45*
Fire Escape	54.45*
Decorator	54.45*
Paperhanger/Wall Coverer	53.83*

*Subtract $ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:	
Paperhanger	$ 33.15
All others	30.88
Premium	37.72**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One (1) year terms at the following wage rate.

Per hour:	07/01/2022
Appr 1st term...	$ 19.95*
Appr 2nd term...	25.56*
Appr 3rd term...	31.00*
Appr 4th term...	41.52*

*Subtract $ 0.10 to calculate premium rate.

Supplemental benefits:

Per Hour:	
Appr 1st term...	$ 15.22
Appr 2nd term...	18.90
Appr 3rd term...	21.81
Appr 4th term...	27.58

8-NYDC9-B/S

Painter — 11/01/2022

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Suffolk, Westchester

PARTIAL COUNTIES
Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceaderhurst, East Rockaway, Gibson, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on the South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave., Rockville Centre is the boundary line up to Lawson Blvd. turn right going west all the above territory. Starting at Union Turnpike and Lakeville Rd. going north to Northern Blvd. the west side of Lakeville road to Northern blvd. At Northern blvd. going east the district north of Northern blvd. to Port Washington Blvd. West of Port Washington blvd.to St.Francis Hospital then north of first traffic light to Port Washington and Sands Point, Manor HAven, Harbour Acres.

WAGES

Per hour:	07/01/2022
Drywall Taper	$ 51.45*

*Subtract $ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	$ 30.88

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages - Per Hour:

1500 hour terms at the following wage rate:

1st term	$ 19.95*
2nd term	25.56*
3rd term	31.00*
4th term	41.52*

*Subtract $ 0.10 to calculate premium rate.

Supplemental Benefits - Per hour:
One year term (1500 hours) at the following dollar amount.

1st year	$ 15.22
2nd year	18.90
3rd year	21.81
4th year	27.58

8-NYDCT9-DWT

Painter - Bridge & Structural Steel — 11/01/2022

JOB DESCRIPTION Painter - Bridge & Structural Steel **DISTRICT** 8

ENTIRE COUNTIES
Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per Hour:
STEEL:

Bridge Painting:	07/01/2022	10/01/2022
	$ 53.00	$ 54.50
	+ 9.63*	+ 10.10*

ADDITIONAL $6.00 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS
Per Hour:
Journeyworker:

$ 10.90	$ 11.78
+ 30.60*	+ 30.75*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY
See (B, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage - Per hour:
Apprentices: (1) year terms

1st year	$ 21.20	$ 21.80
	+ 3.86	+ 4.04
2nd year	$ 31.80	$ 32.70
	+ 5.78	+ 6.06
3rd year	$ 42.40	$ 43.60
	+ 7.70	+ 8.08

Supplemental Benefits - Per hour:

1st year	$ .25	$ .25
	+ 12.24	+ 12.34
2nd year	$ 10.90	$ 10.90
	+ 18.36	+ 18.51
3rd year	$ 10.90	$ 10.90
	+ 24.48	+ 24.68

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping — 11/01/2022

JOB DESCRIPTION Painter - Line Striping **DISTRICT** 8

ENTIRE COUNTIES
Albany, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Nassau, Orange, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per hour:

Painter (Striping-Highway):	07/01/2022
Striping-Machine Operator*	$ 31.53
Linerman Thermoplastic	38.34

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour paid:
Journeyworker:

Striping Machine Operator:	$ 10.03
Linerman Thermoplastic:	10.03

OVERTIME PAY
See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES
One (1) year terms at the following wage rates:

1st Term:	$ 15.00
2nd Term:	18.92
3rd Term:	25.22

Supplemental Benefits per hour:

1st term:	$ 9.16
2nd Term:	10.03
3rd Term:	10.03

8-1456-LS

Painter - Metal Polisher — 11/01/2022

JOB DESCRIPTION Painter - Metal Polisher **DISTRICT** 8

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2022
Metal Polisher	$ 37.78
Metal Polisher*	38.80
Metal Polisher**	41.78

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS
Per Hour: 07/01/2022

Journeyworker:

All classification	$ 11.24

OVERTIME PAY
See (B, E, P, T) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2022
1st year	$ 16.00
2nd year	17.00
3rd year	18.00

1st year*	$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 7.99
2nd year	7.99
3rd year	7.99

8-8A/28A-MP

Plumber — 11/01/2022

JOB DESCRIPTION Plumber **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
Per hour:

	07/01/2022
Plumber and Steamfitter	$ 60.21

SHIFT WORK:
When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 40.01

OVERTIME PAY
See (B, E, E2, Q, V) on OVERTIME PAGE
OVERTIME:... See on OVERTIME PAGE.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1)year terms at the following wages:

1st Term	$ 22.36
2nd Term	25.66
3rd Term	29.63
4th Term	42.28
5th Term	45.36

Supplemental Benefits per hour:

1st term	$ 16.54
2nd term	18.46
3rd term	21.96
4th term	28.95
5th term	30.68

8-21.1-ST

Plumber - HVAC / Service — 11/01/2022

JOB DESCRIPTION Plumber - HVAC / Service **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Putnam, Westchester

PARTIAL COUNTIES
Delaware: Only the townships of Middletown and Roxbury
Ulster: Entire County(including Wallkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour:	07/01/2022
HVAC Service	$ 41.68
	+ $ 4.32*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker HVAC Service	
	$ 27.79

OVERTIME PAY
See (B, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
HVAC SERVICE

(1)year terms at the following wages:

1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.
$ 18.87	$ 22.36	$ 27.91	$ 34.33	$ 37.25
+$2.37*	+$2.67*	+$3.22*	+$3.84*	+$4.07*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices	07/01/2022
1st term	$ 20.30
2nd term	21.62
3rd term	23.07
4th term	25.05
5th term	26.47

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations 11/01/2022

JOB DESCRIPTION Plumber - Jobbing & Alterations **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Putnam, Westchester

PARTIAL COUNTIES
Ulster: Entire county (including Wallkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour:	07/01/2022
Journeyworker:	$ 46.79

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker $ 33.56

OVERTIME PAY
See (B, *E, E2, Q, V) on OVERTIME PAGE
*When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year terms at the following wages:

1st year	$ 20.25
2nd year	22.48
3rd year	24.40
4th year	34.25
5th year	36.19

Supplemental Benefits per hour:

1st year	$ 10.98
2nd year	12.92
3rd year	16.89
4th year	22.82
5th year	24.77

8-21.3-J&A

Roofer — 11/01/2022

JOB DESCRIPTION Roofer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2022	05/01/2023 Additional
Roofer/Waterproofer	$ 45.25 + $7.00*	$ 2.00

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS
Per Hour: $ 30.62

OVERTIME PAY
See (B, H) on OVERTIME PAGE
Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year term

1st	2nd	3rd	4th
$ 15.84	$ 22.63 + 3.50*	$ 27.15 + 4.20*	$ 33.94 + 5.26*

Supplements:

1st	2nd	3rd	4th
$ 3.88	$ 15.48	$ 18.50	$ 23.04

* This portion is not subjected to overtime premiums.

Sheetmetal Worker **11/01/2022**

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2022
SheetMetal Worker	$ 45.25
	+ 3.52*

*This portion is not subject to overtime premiums.

SHIFT WORK
For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS
Journeyworker $ 45.20

OVERTIME PAY
OVERTIME:.. See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 16.79	$ 18.88	$ 21.00	$ 23.08	$ 25.20	$ 27.30	$ 29.89	$ 32.43
+ 1.41*	+ 1.58*	+ 1.76*	+ 1.94*	+ 2.11*	+ 2.29*	+ 2.46*	+ 2.64*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices	
1st term	$ 19.37
2nd term	21.81
3rd term	24.21
4th term	26.65
5th term	29.06
6th term	31.48
7th term	33.42
8th term	35.40

8-38

Sheetmetal Worker **11/01/2022**

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2022

Sign Erector $ 53.79

NOTE: Structurally Supported Overhead Highway Signs(See STRUCTURAL IRON WORKER CLASS)

SUPPLEMENTAL BENEFITS
Per Hour: 07/01/2022

Sign Erector $ 53.33

OVERTIME PAY
See (A, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Per Hour:
6 month Terms at the following percentage of Sign Erectors wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
35%	40%	45%	50%	55%	60%	65%	70%	75%	80%

SUPPLEMENTAL BENEFITS
Per Hour:

07/01/2022

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 14.34	$ 16.26	$ 18.17	$ 20.10	$ 28.02	$ 30.47	$ 33.72	$ 36.27	$ 38.77	$ 41.29

4-137-SE

Sprinkler Fitter — 11/01/2022

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES
Per hour 07/01/2022

Sprinkler Fitter $ 48.98

SUPPLEMENTAL BENEFITS
Per hour

Journeyperson $ 29.13

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES
Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 23.70	$ 26.34	$ 28.72	$ 31.35	$ 33.99	$ 36.62	$ 39.25	$ 41.89	$ 44.52	$ 47.15

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 8.37	$ 8.37	$ 19.76	$ 19.76	$ 20.01	$ 20.01	$ 20.01	$ 20.01	$ 20.01	$ 20.01

1-669.2

Teamster - Building / Heavy&Highway — 11/01/2022

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Westchester

WAGES
GROUP A: Straight Trucks (6-wheeler and 10-wheeler), A-frame, Winch, Dynamite Seeding, Mulching, Agitator, Water, Attenuator, Light Towers, Cement (all types), Suburban, Station Wagons, Cars, Pick Ups, any vehicle carrying materials of any kind.
GROUP AA: Tack Coat
GROUP B: Tractor & Trailers (all types).
GROUP BB: Tri-Axle,14 Wheeler
GROUP C: Low Boy (carrying equipment).
GROUP D: Fuel Trucks, Tire Trucks.

GROUP E: Off-road Equipment (over 40 tons): Athey Wagons, Belly Dumps, Articulated Dumps, Trailer Wagons.
GROUP F: Off-road Equipment (over 40 tons) Euclid, DJB.
GROUP G: Off-road Equipment (under 40 tons) Athey Wagons, Belly Articulated Dumps, Trailer Wagons.
GROUP H: Off-road Equipment(under 40 tons), Euclid.
GROUP HH: Off-road Equipment(under 40 tons) D.J.B.
GROUP I: Off-road Equipment(under 40 tons) Darts.
GROUP II: Off-road Equipment(under 40 tons) RXS.

WAGES:(per hour)

	07/01/2022
GROUP A	$ 46.07*
GROUP AA	49.07*
GROUP B	46.69*
GROUP BB	46.19*
GROUP C	48.82*
GROUP D	46.52*
GROUP E	47.07*
GROUP F	48.07*
GROUP G	46.82*
GROUP H	47.44*
GROUP HH	47.82*
GROUP I	47.57*
GROUP II	47.94*

* To calculate premium wage, subtract $ .20 from the hourly wage.

Note: Fuel truck operators on construction sites addit. $5.00 per day.
For work on hazardous/toxic waste site addit. 20% of hourly rate.

Shift Differential: When mandated by the contracting agency, DOT, or any governmental agency contracts shall receive a shift differential of fifteen (15%) above the wage rate.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyworker

First 40 hours	$ 33.87
41st-45th hours	14.88
Over 45 hours	0.75

OVERTIME PAY
See (B, E, P, R) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

8-456

Welder 11/01/2022

JOB DESCRIPTION Welder **DISTRICT** 1

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES
Per hour 07/01/2022

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

(AA)	Time and one half of the hourly rate after 7 and one half hours per day
(A)	Time and one half of the hourly rate after 7 hours per day
(B)	Time and one half of the hourly rate after 8 hours per day
(B1)	Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday. Double the hourly rate for all additional hours
(B2)	Time and one half of the hourly rate after 40 hours per week
(C)	Double the hourly rate after 7 hours per day
(C1)	Double the hourly rate after 7 and one half hours per day
(D)	Double the hourly rate after 8 hours per day
(D1)	Double the hourly rate after 9 hours per day
(E)	Time and one half of the hourly rate on Saturday
(E1)	Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
(E2)	Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E3)	Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
(E4)	Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E5)	Double time after 8 hours on Saturdays
(F)	Time and one half of the hourly rate on Saturday and Sunday
(G)	Time and one half of the hourly rate on Saturday and Holidays
(H)	Time and one half of the hourly rate on Saturday, Sunday, and Holidays
(I)	Time and one half of the hourly rate on Sunday
(J)	Time and one half of the hourly rate on Sunday and Holidays
(K)	Time and one half of the hourly rate on Holidays
(L)	Double the hourly rate on Saturday
(M)	Double the hourly rate on Saturday and Sunday
(N)	Double the hourly rate on Saturday and Holidays
(O)	Double the hourly rate on Saturday, Sunday, and Holidays
(P)	Double the hourly rate on Sunday
(Q)	Double the hourly rate on Sunday and Holidays
(R)	Double the hourly rate on Holidays
(S)	Two and one half times the hourly rate for Holidays

(S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.

(T) Triple the hourly rate for Holidays

(U) Four times the hourly rate for Holidays

(V) Including benefits at SAME PREMIUM as shown for overtime

(W) Time and one half for benefits on all overtime hours.

(X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

(1)	None
(2)	Labor Day
(3)	Memorial Day and Labor Day
(4)	Memorial Day and July 4th
(5)	Memorial Day, July 4th, and Labor Day
(6)	New Year's, Thanksgiving, and Christmas
(7)	Lincoln's Birthday, Washington's Birthday, and Veterans Day
(8)	Good Friday
(9)	Lincoln's Birthday
(10)	Washington's Birthday
(11)	Columbus Day
(12)	Election Day
(13)	Presidential Election Day
(14)	1/2 Day on Presidential Election Day
(15)	Veterans Day
(16)	Day after Thanksgiving
(17)	July 4th
(18)	1/2 Day before Christmas
(19)	1/2 Day before New Years
(20)	Thanksgiving
(21)	New Year's Day
(22)	Christmas
(23)	Day before Christmas
(24)	Day before New Year's
(25)	Presidents' Day
(26)	Martin Luther King, Jr. Day
(27)	Memorial Day
(28)	Easter Sunday

(29) Juneteenth

New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12240

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By: (Check Only One) ☐ Contracting Agency ☐ Architect or Engineering Firm ☐ Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone: ( ) Fax: ( )
E-Mail:

2. NY State Units (see Item 5)

- ☐ 01 DOT
- ☐ 02 OGS
- ☐ 03 Dormitory Authority
- ☐ 04 State University Construction Fund
- ☐ 05 Mental Hygiene Facilities Corp.
- ☐ 06 OTHER N.Y. STATE UNIT
- ☐ 07 City
- ☐ 08 Local School District
- ☐ 09 Special Local District, i.e., Fire, Sewer, Water District
- ☐ 1O Village
- ☐ 11 Town
- ☐ 12 County
- ☐ 13 Other Non-N.Y. State (Describe)

3. SEND REPLY TO ☐ check if new or change)
Name and complete address:

Telephone:( ) Fax: ( )
E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

- ☐ New Schedule of Wages and Supplements.
  APPROXIMATE BID DATE :
- ☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: https://applications.labor.ny.gov/EDList/searchPage.do

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 11/07/2022

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC	*****6775	ADVENTURE MASONRY CORP.		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC		AGOSTINHO TOME		405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		ANTONIO ESTIVEZ		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC	*****2591	AVI 212 INC.		260 CROPSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		BIAGIO CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL		BRUCE P. NASH JR.		5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****0225	C&D LAFACE CONSTRUCTION, INC.		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025

NYSDOL Bureau of Public Work Debarment List 11/07/2022

Article 8

DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL		CANTISANI & ASSOCIATES LTD		442 ARMONK RD MOUNT KISCSO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CANTISANI HOLDING LLC			06/12/2018	06/12/2023
DOL	DOL		CARMEN RACHETTA		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	02/03/2025
DOL	DOL		CARMENA RACHETTA		8531 OSWEGO ROAD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****3812	CARMODY "2" INC			06/12/2018	06/12/2023
DOL	DOL	*****1143	CARMODY BUILDING CORP	CARMODY CONTRACTING AND CARMODY CONTRACTING CORP.	442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY CONCRETE CORPORATION			06/12/2018	06/12/2023
DOL	DOL		CARMODY ENTERPRISES, LTD.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY INC		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3812	CARMODY INDUSTRIES INC			06/12/2018	06/12/2023
DOL	DOL		CARMODY MAINTENANCE CORPORATION		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY MASONRY CORP		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	AG		CESAR J. AGUDELO		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER J MAINI		19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****1927	CONSTRUCTION PARTS WAREHOUSE, INC.	CPW	5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	AG		DEBRA MARTINEZ		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		DOMENICO LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025

NYSDOL Bureau of Public Work Debarment List 11/07/2022

Article 8

DOL	DOL		EAST COAST PAVING		2238 BAKER RD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		FRANK BENEDETTO		19 CATLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL	*****4722	FRANK BENEDETTO AND CHRISTOPHER J MAINI	B & M CONCRETE	19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	NYC		FRANK MAINI		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		GEOFF CORLETT		415 FLAGGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		GIOVANNI LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	NYC	*****3164	GLOBE GATES INC	GLOBAL OVERHEAD DOORS	405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	DOL		GREGORY S. OLSON		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3228	HEIGHTS ELEVATOR CORP.		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DOL	*****5131	INTEGRITY MASONRY, INC.	M&R CONCRETE	722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.A. HIRES CADWALLADER		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JAMES C. DELGIACCO		722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JAMES LIACONE		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JAMES RACHEL		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****5368	JCH MASONRY & LANDSCAPING INC.		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024

DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	AG		JOHN ANTHONY MASSINO		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JOHN F. CADWALLADER		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4612	JOHN F. CADWALLADER, INC.	THE GLASS COMPANY	P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN LUCIANO			05/14/2018	05/14/2023
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	AG	*****0600	JOHNCO CONTRACTING, INC.		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JORI PEDERSEN		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		JOSE CHUCHUCA		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JOSEPH MARTINO		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	DOL		JOY MARTIN		2404 DELAWARE AVE NIGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KATIE BURDICK		2238 BAKER RD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****3490	L & M CONSTRUCTION/DRYWALL INC.		1079 YONKERS AVE YONKERS NY 10704	08/07/2018	08/07/2023
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LAVERN GLAVE		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	AG	*****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DA	*****4460	LONG ISLAND GLASS & STOREFRONTS, LLC		4 MANHASSET TRL RIDGE NY 11961	09/06/2018	09/06/2023
DOL	AG	*****4216	LOTUS-C CORP.		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026

DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MASONRY CONSTRUCTION, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3333	MASONRY INDUSTRIES, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		MATINA KARAGIANNIS		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2023
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL		MAURICE GAWENO		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		MICHAEL LENIHAN		1079 YONKERS AVE UNIT 4YONKERS NY 10704	08/07/2018	08/07/2023
DOL	AG		MICHAEL RIGLIETTI		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	AG		MSR ELECTRICAL CONSTRUCTION CORP.		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	DOL	*****3684	NATIONAL LAWN SPRINKLERS, INC.		645 N BROADWAY WHITE PLAINS NY 10603	05/14/2018	05/14/2023
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL	*****1845	OC ERECTERS, LLC A/K/A OC ERECTERS OF NY INC.		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	01/30/2018	01/30/2023
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	AG	*****7015	RCM PAINTING INC.		69-06 GRAND AVENUE 2ND FLOORMASPETH NY 11378	02/07/2018	02/07/2023
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025

DOL	DOL		REGINALD WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD MACONE		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL	*****9148	RICHARD TIMIAN	RICH T CONSTRUCTION	108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		RODERICK PUGH		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL	*****4880	RODERICK PUGH CONSTRUCTION INC.		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		ROSEANNE CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****7730	S C MARTIN GROUP INC.		2404 DELAWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC	*****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL	*****1961	SHANE BURDICK	CENTRAL TRAFFIC CONTROL, LLC.	2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE BURDICK		2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE NOLAN		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024

DOL	DOL	*****0816	SOLAR ARRAY SOLUTIONS, LLC		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANOU, JR. A/K/A STEVE PAPASTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		STEVEN MARTIN		2404 DELWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TALAILA OCAMPA		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****6392	V.M.K CORP.		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	NYC		VIKTAR PATONICH		2630 CROPSEY AVE BROOKLYN NY 11214	10/30/2018	10/30/2023

NYSDOL Bureau of Public Work Debarment List 11/07/2022

Article 8

DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC		VITO GARGANO		1535 RICHMOND AVE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		WHITE PLAINS CARPENTRY CORP		442 ARMONK RD	06/12/2018	06/12/2023
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL	*****4043	WINDSHIELD INSTALLATION NETWORK, INC.		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4730	XGD SYSTEMS, LLC	TDI GOLF	415 GLAGE AVE #302STUART FL 34994	10/31/2018	10/31/2023

GOVERNING LAWS

This project is governed by, but not limited to, the following laws:

-- General Municipal Law, Section 101, regarding separate contracts when total project exceeds $50,000.

-- General Municipal Law, Section 103-d, regarding non-collusive bidding clause.

-- General Municipal Law, Section 106-b, regarding payment of contractors and subcontractors.

-- General Municipal Law, Section 108, regarding Worker's Compensation Insurance.

-- General Municipal Law, Section 109, regarding non-assignment of public contract.

-- Labor Law, Section 220, subdivision 2, regarding 40-hour week, 8-hour day.

-- Labor Law, Section 220-d, regarding wage rates and supplements.

-- Labor Law, Section 220-3, regarding anti-discrimination.

-- Labor Law, Section 222-a, regarding elimination of dust hazard.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1A - SCHEDULES AND REPORTS

CONTENTS:

1. Summary of the Work
2. Laws, Ordinances, Taxes, and Permits
3. Plan of Operations and Progress Schedule
4. Sequence of Work
5. Contractor's Examination
6. Notification of Owner and Architect
7. Access and Movement of Materials and Personnel
8. Job Meetings
9. Equal Opportunity
10. Wage Rates

1. SUMMARY OF THE WORK:

A. All work as shown on the drawings and as specified herein.

2. LAWS, ORDINANCES, TAXES, AND PERMITS:

A. Taxes and Permits:

1. Exempt from New York State Sales Tax.

2. Exempt from Federal Excise Tax.

3. Not subject to building permit fees.

B. Laws and Ordinances:

The Project is subject to and Contractor shall comply with:

1. New York State Wage Rate Requirements.

2. Federal Occupational Safety and Health Administration Standards.

3. Applicable local, state, and other governing safety regulations.

3. PLAN OF OPERATIONS AND PROGRESS SCHEDULES:

A. In order to facilitate coordination and fitting, the Contractor shall prepare a "Plan of Operations and Progress Schedule" which shall show concisely the manner in which work will be started, prosecuted, and completed.

B. After approval of the above document, the Contractor shall be responsible for seeing that it is adhered to and for ascertaining that proper coordination is maintained between work of all Contracts.

4. SEQUENCE OF WORK:

A. It is intended that the work under this Contract be executed without interruption of and with minimum interference with school operations.

B. Notify utility companies as required by local ordinance and State Law.

C. Ascertain location of utilities inside and outside of building before commencing demolition work of any kind.

D. Take precautions to protect the adjacent spaces and surfaces from flying or falling debris. Prevent dust and dirt from rising and clean any dust created by this work.

E. Contractor shall not employ any labor, materials, or means whose employment or utilization during the course of the work tend to or in any way cause or result in strikes, work stoppages, delays, suspension of work, or similar troubles by workmen under his employ, his Subcontractors, or any of the trades working in or about the premises where work of this Contract is being performed.

F. The work shall be done with due care; the Contractor will be held responsible for any damage which may be caused thereby to any part or parts of existing structures, site, or items designated to remain. Before proceeding with demolition work, ascertain need for and accomplish any required protection measures. Embedded anchorage and attachments shall be removed to permit proper patching. Contractor will be liable for damage caused to any parts of existing structure or work designated to remain.

G. Where removal work occurs or where new and old work join, the immediate adjacent surfaces or so much thereof as is required by the involved conditions shall be cut, removed, patched, repaired, or refinished, and left in as good a condition as existed prior to the commencing of the work. The materials and workmanship employed shall conform to that of the original work.

H. The Contractor shall establish and maintain a rate of work progress so as to insure completion of the construction operations within the time stipulated in the Agreement.

I. Where materials or construction are to be applied or attached to existing surfaces or construction and to have included in his bid all costs for preparatory work on such surfaces or construction as necessary to permit the proper execution of the required work.

J. Upon completion of all work under this Section, the Contractor shall remove all tools, materials, plant, apparatus, and rubbish of any sort. The premises shall be left clean, neat, and orderly to the entire satisfaction of the Architect.

5. CONTRACTOR'S EXAMINATION:

A. Contractor shall take all field measurements as required and shall satisfy himself as to the nature of equipment and facilities required for and the conditions under which he will be obliged to carry out the execution of the work in every particular which might in any way affect the cost thereof. The submission of a Proposal will be construed as conclusive evidence that such an examination has been made, and no subsequent claims for additional costs of labor, materials, appliances, equipment, etc., or for difficulties encountered which could have been foreseen has such an examination been made, will be recognized.

6. NOTIFICATION OF OWNER AND ARCHITECT:

A. Before starting any work relating to existing utilities or school services, the Contractor will be required to give 24 hours notice to the Architect and Owner and obtain their approval in writing before proceeding with such work.

B. All work involving active utility or school service shall be performed with the utmost dispatch and without discontinuance or disruption of such services except as and when approved by the Owner.

7. ACCESS AND MOVEMENT OF MATERIALS AND PERSONNEL:

A. The direction of the Owner as to access to the existing building and the limits within which each Contractor shall control the movements of his personnel and materials shall be strictly followed. Generally, the movement of Contractor's personnel within the premises shall be restricted to the minimum necessary for the performance of required work. Under no circumstances shall Contractor's personnel at any time enter upon any portions of the building or premises where such entry is not strictly necessitated by the work required under this Contract. The Contractor shall rigidly enforce these restrictions; violation thereof shall be cause for dismissal of the offender.

B. Delivery of equipment and materials shall be confined to the limits designated, and storage shall be where directed by the Owner. Temporary enclosures necessary for such storage shall be provided by the Contractor and shall be removed when no longer required.

C. All work in the existing building shall be performed with the least possible annoyance to the occupants of the building.

8. JOB MEETINGS:

A. Pre-Construction Conference: Upon receiving notice that he has been awarded the Construction Contract for the project, and within ten (10) days of such notice, the Contractor shall make an appointment to meet with the Architect and his representative(s), and shall also instruct his Subcontractors or their representatives to be made personally known to each other and to plan and initiate the most favorable course of the upcoming construction work.

B. Regular Job Meeting: The Contractor, Architect, and those Subcontractors whose presence is necessary, shall attend periodic meetings for the purpose of discussing the progress and execution of the work. These meetings shall be held at a time and place designated by the Owner's Representative. The proceedings of these meetings will be recorded by the Owner's Representative and a copy will be subsequently furnished the Contractor for his use. It will be the Contractor's responsibility to distribute copies, as may be required, to his Subcontractors.

9. EQUAL OPPORTUNITY (LABOR LAW SECTION 220-3):

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post, in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provisions of the non-discrimination clause.

B. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

C. The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding a notice to be provided advising the said labor union or worker's representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor shall comply with Executive Order 11246, Federal Equal Employment Opportunity, unless exempt, in accordance with Section 203 of this order.

10. WAGE RATES:

A. The Labor Law of New York State provides, among other things, that it shall be the duty of the fiscal officer to make a determination of the schedule of wages to be paid to all laborers, workmen, and mechanics employed on public work projects including supplements for welfare, pension, retirement, vacation, and other benefits, in accordance with prevailing practice in the locality. The Contractor shall comply with all requirements of this law as it applies to this project and locality.

B. The rates of wages determined by the New York State Industrial Commissioner pursuant to the Labor Law are set forth as per the schedule contained within this Project Manual.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1B - TEMPORARY SERVICES AND MISCELLANEOUS REQUIREMENTS

CONTENTS:

1. Scope
2. Temporary Utilities
3. Temporary Barricades
4. Fire Protection
5. Parking and Traffic Control
6. Restoration of Premises
7. Cutting and Patching
8. Rough Openings and Routine Items
9. Water Tightness
10. Miscellaneous Requirements

1. SCOPE:

A. Provide, maintain, and remove when no longer required temporary services and utilities as specified, except as may be otherwise provided by the Owner; include costs of obtaining permits, labor, equipment, fixtures, lamps, and similar items as well as duties, levies, or taxes imposed.

2. TEMPORARY UTILITIES:

A. Water and electricity for construction purposes in quantities judged reasonable by the Architect will be furnished to the Contractor by the Owner without charge. The Contractor shall ascertain where these services will be available, make temporary connections as required, and remove same upon completion.

B. Temporary toilets: The Owner will allow the use of certain toilets within the building during the course of the work, maintain in sanitary condition, and, upon completion of the work, surrender them to the Owner in as good condition as found.

3. TEMPORARY BARRICADES:

A. Temporary closures and barricades, as may be required to maintain and protect the new and existing work and to protect the public from danger, shall be provided.

B. Protect temporary closures and barricades to guard new and existing work from vandalism during and after working hours.

4. FIRE PROTECTION AND PREVENTION:

A. Each Prime Contractor shall take all precautions required to prevent fires as a result of his operations. Flame cutting torches, blow torches, or welding tools shall be used in strict accordance with applicable safety rules and regulations.

B. When welding tools or torches of any type are in use, the Prime Contractor using such equipment shall have available a fire extinguisher of the Multi-Purpose Type ABC in the immediate vicinity of the work. The fire extinguishers shall be provided and maintained by said Contractor in usable condition at all times.

C. In addition to the requirements of Paragraphs A and B above, the General Work Contractor shall provide fire extinguishers in working order located at intervals throughout the construction operations. These extinguishers shall not be removed from their mounting except to be tested or for the purpose of fighting a fire. They shall be relocated as necessary by the General Work Contractor when progress of the work demands. These fire extinguishers will remain the property of the General Work Contractor.

D. Keep fire hydrants on or adjacent to the work accessible to fire fighting equipment at all times.

5. PARKING AND TRAFFIC CONTROL:

A. Parking on site will be at the Owner's discretion and approval only.

B. Protect existing roads and repair damage caused to road or site.

6. RESTORATION OF PREMISES:

A. Walls and floor areas and any other surfaces that are broken, damaged, pitted, or otherwise defective as a result of receiving, handling, or storage of materials or the performance of any work under any Contract, or by reason of neglect of any Contractor, shall be fully restored to the satisfaction of the Owner, and the full cost, therefore, shall be borne by the Contractor.

B. Sites shall be cleaned daily and restored to original condition at completion of construction operations.

C. Roll-offs shall be located so as not to interfere with school operations, and paving or landscaping shall be restored when removals are completed.

7. CUTTING AND PATCHING:

A. Cutting and patching covers adjustment to, necessary reworking, or removal of elements of construction in both new and existing work to comply with work of the Contract documents. The following definitions for cutting and patching apply:

1. Cutting: Physical modification or removal of construction work (walls, floors, ceilings, roofs, etc.) or installed materials (doors, windows, panels, etc.), both new, factory-finished, and existing.
2. Patching: Restoration or replacement of construction work (walls, floors, ceilings, roofs, etc.), both new, factory-finished, and existing. Patching shall include installation of new finish, materials, and reconstruction of walls, floors, etc. All patching shall match adjacent materials and finishes unless otherwise indicated.

B. Each Prime Contractor, unless otherwise indicated, shall hire a qualified General Contractor to provide all equipment, labor, material, and incidentals necessary for cutting and patching as required for the installation of his work in new or existing walls, floors, and ceilings.

C. Each Prime Contractor will be held responsible for his own and his Subcontractors' work in cutting and patching and the correction of the work of other Prime Contractors if damaged by him.

D. Each Prime Contractor shall bear the expense of all cutting, patching, repairing, or replacing of the work of other trades made necessary by any fault, error, or tardiness on the part of or damage done by him. He shall employ and pay the Contractor whose work is involved.

E. In existing structures, each Prime Contractor shall, unless otherwise indicated, hire a General Contractor to do all cutting, patching, repairing, or replacing of General Work required for the removal of existing work or installation of his new work. Secure approval before cutting.

F. In no case may floors, walls, or ceilings that are waterproofed be cut for the admission of any equipment or materials nor may any structural member be pierced without written permission.

G. Where roofing or waterproofing membranes must be cut to accommodate the work of any Prime Contractor, such Prime Contractor shall employ a qualified roofing Contractor to do all required cutting, patching, and repairs of the roofing or waterproofing, and then only after approval of the methods proposed by the Architect and/or any agency that may have a roof bond or guarantee/warranty in force.

1. Approval of all materials, methods, and roofing Contractor used in cutting, patching, and repairing existing roofing membrane shall be obtained from agency, or agencies, holding a roof bond or guarantee/warranty in force.

8. ROUGH OPENINGS AND ROUTINE ITEMS:

A. Each Prime Contractor will provide all openings, chases, recesses, lintels, and bucks in new or existing construction that are required for the admission of his work.

B. Each Prime Contractor shall furnish all necessary information (i.e. location and size of openings, chases, etc., and other built-in field conditions) to the other Prime Contractors in ample time for the installation of his work.

1. Ample time shall mean:
   a. In concrete work, before reinforcing is placed.
   b. In masonry, before wall construction reaches location of opening, chase, or other item.
   c. In drywall, before second or finish face is applied.

2. This paragraph shall not be construed to include any items in earth such as trenches, etc.

9. WATER TIGHTNESS:

A. Each Prime Contractor shall be held responsible for the water tightness of his respective products, materials, and workmanship as installed in the job. This includes all work either specified to be watertight or inferred by general practice to be watertight. All walls, roofs, glazing, windows, doors, sleeves, through foundation or walls, flashings, and other items shall be in a watertight condition before final payment is requested.

B. If a Prime Contractor feels that the details or materials, as drawn or specified, are not satisfactory to produce a watertight job, he shall so inform the Architect before installation. The Prime Contractor shall submit his proposed substitution or alternative method of doing the work for the Architect's approval. Any approved change shall be executed by the Prime Contractor and made watertight at no additional cost to the Owner.

C. Any proposed changes encountered during the bidding procedure may be submitted in the proper form and time to the Architect for consideration as a change to be covered by ADDENDA.

10. MISCELLANEOUS REQUIREMENTS:

A. Contractor shall verify all existing conditions prior to proceeding with new work installations.

B. Contractor shall be responsible for all verification of dimensions shown.

C. Contractor shall retain all existing fire exit locations with the school complex during construction as necessary to provide safe egress to all inhabitants as per State and Local Codes.

D. Contractor shall seal all areas of construction to prevent dust and debris from entering areas other than location of installation.

E. Contractor shall meet all OSHA requirements for sanding and sealing as required.

F. Contractor shall protect all existing walls, equipment, and apparatus from damage during the construction process.

G. Contractor shall construct Architect/O.S.H.A. approved, code compliant barricades and construction area separation between all proposed work and student occupied spaces. There shall be no interference with required educational capabilities during the construction of this project while classes are in session.

H. Contractor shall relocate any existing H.V.A.C. intake/discharge units as to prevent the distribution of any demolition/construction related fumes and dust during the course of the entire project. Relocate same to original functioning position upon project completion.

I. All construction materials, equipment, personnel, debris, dust, fumes, noise, smells, etc. shall be isolated from building occupants and other vehicular traffic by way of "special necessary construction" during the entire construction process. provide all required temporary stairs, ramps, fire alarm systems, fire extinguishers, illuminated exit signs, door hardware, and floor finishes needed to maintain all occupied spaces safe and code compliant at all times.

J. Contractor must provide schedules of work which include a minimum of 48 hours or manufacturer's recommended time for "baking out" and exhausting of volatile organic compounds used during construction prior to building occupancy. Provide and maintain at the site "MSDS" forms indicating safe times before occupancy of spaces.

K. The District must provide a continuously updated written emergency exit plan which provides for the relocation of all students and staff immediately upon a break in the above required "separation of construction areas" as to minimize exposure to all students and staff. Coordinate with all contractors, building staff, and students for their use.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1C - INSURANCE REQUIREMENTS

CONTENTS:

1. General Requirements
2. Certificates of Insurance
3. Types of Coverage and Minimum Limits
4. Continuity

1. GENERAL REQUIREMENTS:

A. In addition to the requirements specified under Article 11 of the General Conditions and the insurance required by law, the Contractor shall, before commencing work under this Contract and during the period of construction to the date of final acceptance by the Owner, purchase, effect, and maintain insurance coverage as described in this section.

B. No Subcontractor shall be permitted to undertake any portion of this Contract without first having presented to the Contractor certification attesting to similar coverages as are required of the Contractor under this section. Such certification shall be issued to and in a form acceptable to the Contractor.

C. The Contractor agrees to effectuate the naming of the Owner and the Architect as additional insureds on the Contractor's insurance policies, with the exception of Workers' Compensation and NY State Disability.

D. Each policy naming the Owner and Architect (and Construction Manager when applicable) as additional insureds must:

   1. Be an insurance policy from an A.M. Best A-rated or better insurer, licensed to conduct business in New York State; and
   2. State that the Contractor’s coverage is primary and non-contributory coverage for the Owner, its Board of Education, employees and volunteers.

E. The Contractor agrees to indemnify the Ownder for any applicable deductibles and self-insured retentions.

2. CERTIFICATES OF INSURANCE:

A. Certificates of Insurance shall be transmitted in duplicate to the Architect for forwarding to the Owner, and any Certificate found to be incomplete or not according to the proper form will be returned as being unsatisfactory. A letter of transmittal from each insurance company involved must be submitted certifying that the certificate is issued pursuant to their authorization.

B. The Owner, Architect (and Constuction Manager when applicable) must be listed as an additional insured by using standard or other endorsements

that extend coverage to the Owner, Architect (and Constuction Manager when applicable) for both on-going operations (CG 20 38) and products and completed operations (CG 20 37), latest version. The decision to accept an endorsement rests solely with the Owner. A completed copy of the endorsement(s) must be attached to the certificate of insurance. The certificate of insurance must describe the specific services provided by the Contractor (e.g., roofing, carpentry, or plumbing) that are covered by the liability policies. At the Owner's request, the Contractor will provide copies of the declarations pages of its liability and umbrella/excess policies with a list of endorsements and forms. If so requested, the Contractor will provide a copy of the policy endorsements and forms. A fully completed New York Construction Certificate of Liability Insurance addendum (ACORD 855 2014/05) must be included with the certificates of insurance. For any "Yes" answers on Items G through L on this addendum, additional details must be provided to the Owner in writing. Contracts with subcontractors shall require them to provide the same additional insured coverages and documents.

C. Certificates shall contain:
   1. Name and address of the insured.
   2. Job location and title of the Contract.
   3. Policy number and expiration date.
   4. Issuance date of Certificate.
   5. Types of coverage included.
   6. Limit of Liability for each type used.
   7. Types of operations covered (Classifications).
   8. Types of operations or of coverages specifically excluded.
   9. Thirty (30) day cancellation or non-renewal notice.
   10. Owner, Architect or Owner representatives as additional insured.
   11. Hold Harmless Clause indemnifying Owner, Architect or Owner representatives
   12. Name of Insurance Company.
   13. Counter Signature of Resident Agent in State of project location.

D. No Certificate covering policies containing escape clauses or exclusions contrary to the Owner's interests will be accepted.

E. The delivery of Certificates of Insurance authorizes the Owner or Architect to make direct inquiry of and to receive direct response from the insurance carrier regarding questions arising during the performance of the Work which are pertinent to the coverages under the policies.

3. TYPES AND MINIMUM LIMITS OF COVERAGE:

A. The Contractor will obtain and keep in full force and effect during the term of the Contract, at the Contractor's sole cost and expense, the following insurance:

B. Commercial General Liability Insurance
   - $1,000,000 per occurrence/ $2,000,000 aggregate
   - $2,000,000 Products and Completed Operations
   - $1,000,000 Personal and Advertising Injury
   - $100,000 Fire Damage
   - $10,000 Medical Expense
   - The general aggregate must apply on a per-project basis.

C. Automobile Liability

- $1,000,000 combined single limit for owned, hired and borrowed and non-owned motor vehicles.

D. Workers' Compensation and NYS Disability Insurance

- Statutory Workers' Compensation (C-105.2 or U-26.3); and New York State Disability Insurance (DB-120.1) for all employees. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable. A person seeking an exemption must file a CE-200 form with New York State. The form can be completed and submitted directly to the Workers' Compensation Board online.

E. Builders Risk

- Must be purchased by the Contractor to include the interests of the Owner and Contractor jointly in a form satisfactory to the Owner. The limits must reflect the total completed value – all material and labor costs and provide coverage for fire, lightning, explosion, extended coverage, vandalism, malicious mischief, windstorm, hail and/or flood.

F. Umbrella/Excess Liability Insurance

- Umbrella/Excess coverage must be on a follow-form basis.

- With the exception of contracts that require work above a height of one story (ten feet), all contracts for less than or equal to $1,000,000 will require an Umbrella/Excess Policy with limits of $5,000,000 per occurrence/$5,000,000 aggregate.

- All contracts for more than $1,000,000 or that require work above a height of one story (ten feet) will require an Umbrella/Excess Policy with limits of $10,000,000 per occurrence/$10,000,000 aggregate.

G. Asbestos, Lead and/or Hazardous Material Work

- Asbestos/Lead Abatement Insurance: $2,000,000 per occurrence/$2,000,000 aggregate including products and completed operations.

- Coverage for the Contractor's operations including, but not limited to removal, replacement, enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it must pre-date the inception of the Contract. If the Contractor is using motor vehicles for transporting hazardous materials, the Contractor must maintain pollution liability broadened coverage (ISO Endorsement CA 9948) as well as proof of MCS 90.

- Coverage must extend for a period of three years following final completion of the Work.

- o Testing Company Errors and Omission Insurance: $1,000,000 per occurrence/$2,000,000 aggregate for the testing and other professional acts of the Contractor.

H. The Contractor will obtain and keep in full force and effect during the term of this Contract, at the Contractor's sole cost and expense, Owners Contractors Protective (OCP) Insurance. The Owner will be the named insured on all OCP policies and there will be no additional insureds. The OCP Insurance must be from a carrier licensed to conduct business in New York State.

1. With the exception of Contracts that require work above a height of one story (ten feet), all Contracts for less than or equal to $1,000,000 will require an OCP Insurance Policy with limits of $1,000,000 per occurrence/$2,000,000 aggregate.
2. All Contracts for more than $1,000,000 or that require work above a height of one story (ten feet) will require an OCP Insurance Policy with limits of $2,000,000 per occurrence/$4,000,000 aggregate.

I. Contractor's Contingent Liability: The Contractor shall procure, pay for, and maintain such insurance as will protect the Contractor from his contingent liability for damages and for injury to the person or property of another which may arise from the operations of all Subcontracts under this Contract.

J. Contractor's and Employees' Equipment: The Contractor assumes responsibility for all injury to or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of Contractor's employees from whatever cause arises.

4. CONTINUITY:

A. Contractor acknowledges that failure to obtain the foregoing insurance on behalf of the Owner constitutes a material breach of contract and subjects the Contractor to liability for damages, indemnification and all other legal remedies available to the Owner. The Contractor must provide the Owner with proof satisfactory to the Owner in the Owner's sole and absolute discretion that the above requirements have been met prior to the commencement of Work.

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

C. The Contractor shall require all Subcontractors to carry the same insurance coverages and limits of liability, as are required to be carried by the Contractor and adjusted to the nature of Subcontractors' operations and submit proof of same to the Owner for approval prior to start of any Work. The Contractor shall also require that Subcontractors require Sub-Subcontractors to carry the same insurance coverages and limits of liability, as are required to be carried by the Contractor and adjusted to the nature of Sub-Subcontractors' operations and submit proof of same to the Owner for approval prior to the start of any Work. This includes, but is not limited to requiring that Subcontractors and Sub-Subcontractors name the Owner as an additional insured by using endorsements CG 2038 and CG 2037 or their equivalents and providing Acord 855 NY Form. In the event the Contractor fails to obtain the required certificates of insurance and other required proof of insurance from the Subcontractor or its subs and a claim is made or suffered, the Contractor shall, to the fullest extent of the law, indemnify, defend, and hold harmless the Owner, the Owner's Board of Education, the Architect, Engineers, Consultants, and Sub-consultants and their agents, employees, officers, or representatives from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

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

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

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

G. Before commencement of its Work, the Contractor shall obtain and pay for such insurance as may be required to comply with its obligations pursuant to the Contract, including, but not limited to any indemnification and hold harmless provisions.

H. Review and acknowledgment of the Certificate of Insurance or other proof of insurance by the Owner or the Architect shall not relieve or decrease the liability of the Contractor hereunder.

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

J. In the event of loss by fire or other insured hazard during the term of the Contract, the Contractor shall cooperate with the Owner and Architect and the insurance adjusters in all procedures incidental to the expeditious adjustment of the loss and shall during this period maintain progress of construction. The Contractor will not be relieved from his obligations for the proper execution of his Contract except that the time of completion may be extended for such number of days as may have been delayed by reason of such loss, as determined by the Architect.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1D - PRODUCT APPROVAL STANDARD

CONTENTS:

1. Definitions
2. Proof of Compliance
3. Inclusion of Specification of Non-Specified Products
4. Consideration of Equivalents After Award of Contract

1. DEFINITIONS:

A. The term "product" shall include material, equipment, assembly methods, manufacturer, brand, tradename, or other description.

B. Reference to be approved equal or similar terms mean that approval of the Architect is required.

2. PROOF OF COMPLIANCE:

A. Whenever the Contract Documents require that a product be in accordance with Federal Specifications, ASTM Designation, ANSI Specification, or other Association Standard, the Contractor shall present an affidavit from the manufacturer of a proposed product certifying that it complies therewith.

B. Where requested or specified, submit supporting test data to substantiate compliance.

3. INCLUSION IN SPECIFICATION OF NON-SPECIFIED PRODUCTS:

A. If a Contractor has based his bid upon products, materials, or items not specifically described or named in the specifications, he may be required, prior to Award of Contract, to submit the names, types, brand, or manufacturer of products included in his bid for the specified items.

B. Supporting data documenting wherein the proposed materials, products, or equipment may vary from those specified may be required and will be the responsibility of the Contractor.

C. The risk of whether bid equivalents will be accepted will be borne by the Contractor.

4. CONSIDERATION OF EQUIVALENTS AFTER AWARD OF CONTRACT:

A. Equivalent products will be considered after Award of Contract if:

1. Previously accepted or specified product is not available because of strike, lock out, bankruptcy, or discontinuance of its manufacture.
2. Specified performance or guarantee cannot be attained in the Contractor's judgement.

B. Additional products, when submitted for consideration, must be accompanied by documentation attesting to the foregoing and establish equivalency in the judgement of the Architect, the burden of proof for which shall be the Contractors.

C. Request for product changes, other than equivalents, if accepted, shall be effected by Change Order.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1E - ALTERNATES

1. GENERAL REQUIREMENTS:

A. Each Contractor shall state in his Proposal the amount to be added or deducted from his Base Bid for the difference in cost between the work described under each Alternate and the corresponding work specified under his Base Bid.

B. Alternate bids shall reflect the increase or decrease in cost of all work of every nature which may be affected thereby, and no subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.

C. Except as otherwise described or approved, material and workmanship required by the Alternates differ from the requirements shown on the drawings or specified for corresponding items, the Alternate's construction and materials will be subject to the approval of the Architect.

D. Submit shop drawings and samples of the work under each accepted Alternate as per "General Conditions" requirements.

END OF SECTION

SECTION 011200 - MULTIPLE CONTRACT SUMMARY MIDDLE/HIGH SCHOOL & TODD ES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Project consists of Interior Alterations, Miscellaneous Renovations and/or Reconstruction at:

1. Briarcliff Manor Middle/High School (SED Control No. 66-14-02-02-0-004-023)
   444 Pleasantville Rd.
   Briarcliff manor, NY 10510

And,

2. Todd Elementary School (SED Control No. 66-14-02-02-0-002-021)
   45 Ingham Rd.
   Briarcliff Manor, NY 10510

B. Owner Identification: Briarcliff Manor Union Free School District
   45 Ingham Rd.
   Briarcliff Manor, NY 10510

C. Architect Identification: The Construction Documents, Dated November 16, 2022 - Issued for Bid, were prepared for the Project by BBS Architects, Landscape Architects & Engineers.

D. Construction Manager Identification: Savin Engineers, P.C., 3 Campus Drive, Pleasantville, New York, 10570, has been engaged as Construction Manager for this Project to serve as an advisor to Owner and provide assistance in administering the Contract for Construction between Owner and each Prime Contractor, according to a separate contract between Owner and Construction Manager.

E. The Work consists of Capital Improvements, Interior Alterations, Miscellaneous Renovations and/or Reconstruction as described in the Contract Documents (Drawings and Specifications).

1. The Work includes abatement of known or suspected hazardous materials, interior renovations and/or reconstruction at the Briarcliff Manor Middle/High School and Todd Elementary School.

2. All materials, assemblies, forms and methods of construction and service equipment shall comply with the requirements of the latest edition of the New York State Building Code.

1.3 DRAWINGS INCLUDED IN CONTRACT DOCUMENTS

A. Refer to List of Drawings located on Title Sheet of the Drawings.

1.4 CONTRACT

A. The owner will award the following Construction Contracts for the Project in order to complete all work as indicated and specified:

Phase 2 Bond Improvements at Briarcliff Manor Middle/High School and Todd Elementary School:

- **Base Bid GC-1 General Construction Contract at Middle/High School**
- **Base Bid MC-1 Mechanical Construction Contract at Middle/High School**
- **Base Bid EC-1 Electrical Construction Contract at Middle/High School**
- **Base Bid PC-1 Plumbing Construction Contract at Middle/High School**

- **Base Bid GC-2 General Construction Single Prime Contract at Todd ES**

B. In each case, the Contractor agrees to accept the site, as it exists and to remove any encumbrances, which interfere with proper fulfillment of the Work, without change in the Contract Sum.

C. Accommodate the Owner's intention to continue occupying the existing building, including the playfields, and parking areas, etc., and to conduct normal school operations during construction.

1. Cooperate with the Owner's personnel in maintaining and facilitating access to the school building and its facilities by school personnel, school staff, and the public, while construction is still in progress.

2. Emergency access at driveways and building entrances: Keep driveways and entrances serving the occupied school building clear and available to the Owner, the Owner's employees, and the public, and to emergency vehicles at all times. Do not obstruct access to these areas or use such areas for parking, construction equipment or storage of materials.

3. Schedule construction operations so as to minimize conflicts with, and interruptions to, daily school function. Coordinate necessary interruptions with Construction Manager Owner's personnel.

4. The existing building must remain operational at all times, therefore the Contractors are responsible to maintain all systems such as, but not limited to fire alarm, clocks, public address system, electric service, telecommunication service, gas service, and heating system, etc.

D. The Contractor shall cooperate with other Prime Contractors and Vendors for any separate Contracts that the Owner may award.

1.6 MULTIPLE PRIME CONTRACTS

A. The Project will be constructed under a Multiple Prime contracting agreement for the Middle/High School project and a single Prime Contract for Todd Elementary School. Prime Contracts are separate contracts between the Owner and separate contractors, representing significant construction activities. Each prime contract is performed concurrently with and closely coordinated with construction activities performed on the Project under other prime contracts.

B. Contract Documents indicate the work of each prime Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

1. Phasing
2. Existing site conditions
3. Alternates
4. Allowances
5. Delegated Design where specified
6. Cutting and Finish Patching
7. Miscellaneous Steel associated with each Contract Work.

8. Firestopping of all penetrations
9. Daily Cleaning (All Contracts are responsible for daily cleaning)
10. Final Cleanup (All Contracts are responsible for their final cleanup.)

C. Prime Contract Work: Each Prime Contract can be summarized as follows:

1. The **BASE BID GC-1 GENERAL CONSTRUCTION CONTRACT** includes Abatement, demolition, General Construction related to the **Middle/High School** Interior reconstruction as shown on the drawings and specified herein. It also includes administrative and coordination responsibilities. Work under this prime Contract includes, but is not limited to the following:

TABLE OF CONTENTS
All Items A. thru Y.

DIVISION 1 - GENERAL REQUIREMENTS
All of Division 1

DIVISION 2 – SITE WORK
Section 02320 – Excavation, Backfill & Compaction
Section 02506 – Abandonment of Existing Storm Water Systems

DIVISION 3 – CONCRETE
Section 03300 – Cast In Place Concrete
Section 03320 – Concrete Slab on Grade
Section 03650 – Self Leveling Gypsum-Portland Cement Underlayment

DIVISION 4 – MASONRY
Section 04200 – Unit Masonry

DIVISION 05 – METALS
Section 05100 – Structural Steel
Section 05300 – Metal Deck
Section 05400 – Cold Formed Metal Framing
Section 05514 – Steel Railings
Section 05516 – Aluminum Railings

DIVISION 06 – WOOD - PLASTICS
Section 06100 – Rough Carpentry
Section 06164 – Exterior Gypsum Sheathing
Section 06200 – Finish Carpentry

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Section 07190 – Under Slab Vapor Barrier
Section 07200 – Building Insulation
Section 07210 – Fireproofing Insulation
Section 07240 – Exterior Insulation and Finish System
Section 07271 – Self Adhered Non-Permeable Air Barrier Membrane
Section 07542 – TPO Roofing System
Section 07600 – Flashing and Sheet Metal
Section 07800 – Roof Accessories
Section 07910 – Joint Sealers
Section 07950 – Expansion Joint Covers

DIVISION 08 – DOORS AND WINDOWS

Section 08110 – Steel Doors and Frames
Section 08211 – Flush Wood Doors
Section 08330 – Roll-Up Coiling Fire Doors
Section 08412 – Fireframes Aluminum Entrances Storefronts
Section 08525 – Transaction Window
Section 08630 – Metal-Framed Skylights

Section 08800 – Glass and Glazing
Section 08806 – Fire Rated Glazing
Section 08870 – Security Window Film
Section 08710 – Door Hardware
Section 08930 – Metal Glazing Panels

DIVISION 09 – FINISHES
Section 09250 – Gypsum Wallboard
Section 09300 – Ceramic Tile
Section 09510 – Acoustic Ceiling Systems
Section 09650 – Resilient Flooring
Section 09651 – Rubber Stair Treads
Section 09680 – Carpeting
Section 09699 – Water Vapor Emission Control System for Concrete Slabs
Section 09900 – Painting

DIVISION 10 - SPECIALTIES
Section 10100 – Visual Display Products
Section 10441 – Signage
Section 10520 – Fire Extinguishers, Cabinets
Section 10601 – Polymer Toilet Partitions
Section 10800 – Toilet Accessories

DIVISION 12 - FURNISHINGS
Section 12462 - Laminate Clad Casework
Section 12530 – Manual Operated Roller Shades

DIVISION 14 - CONVEYING SYSTEMS
Section 14220 – Vertical Wheelchair Lift

2. The **BASE BID GC-2 (Single Prime Contract) GENERAL CONSTRUCTION CONTRACT WORK at Todd Elementary School,** includes all Abatement, demolition, general construction, mechanical construction, plumbing construction and electrical construction related to **Todd Elementary School** interior reconstruction, as shown on the drawings and specified herein. It also includes administrative and coordination responsibilities. Work under this Single Prime Contract includes, but is not limited to the following:

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All Items A. thru Y.

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All of Division 1

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Section 02320 – Excavation, Backfill & Compaction

DIVISION 3 – CONCRETE
Section 03300 – Cast In Place Concrete
Section 03320 – Concrete Slab on Grade
Section 03650 – Self Leveling Gypsum-Portland Cement Underlayment

DIVISION 4 – MASONRY
Section 04200 – Unit Masonry

DIVISION 05 – METALS
Section 05100 – Structural Steel
Section 05300 – Metal Deck
Section 05400 – Cold Formed Metal Framing
Section 05514 – Steel Railings
Section 05516 – Aluminum Railings

DIVISION 06 – WOOD - PLASTICS
Section 06100 – Rough Carpentry
Section 06164 – Exterior Gypsum Sheathing
Section 06200 – Finish Carpentry

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Section 07190 – Under Slab Vapor Barrier
Section 07200 – Building Insulation
Section 07210 – Fireproofing Insulation
Section 07240 – Exterior Insulation and Finish System
Section 07271 – Self Adhered Non-Permeable Air Barrier Membrane
Section 07910 – Joint Sealers
Section 07950 – Expansion Joint Covers

DIVISION 08 – DOORS AND WINDOWS
Section 08110 – Steel Doors and Frames
Section 08211 – Flush Wood Doors
Section 08412 – Fireframes Aluminum Entrances Storefronts
Section 08630 – Metal-Framed Skylights

Section 08800 – Glass and Glazing
Section 08806 – Fire Rated Glazing
Section 08870 – Security Window Film
Section 08710 – Door Hardware
Section 08930 – Metal Glazing Panels

DIVISION 09 – FINISHES
Section 09250 – Gypsum Wallboard
Section 09300 – Ceramic Tile
Section 09510 – Acoustic Ceiling Systems
Section 09650 – Resilient Flooring
Section 09651 – Rubber Stair Treads
Section 09680 – Carpeting
Section 09699 – Water Vapor Emission Control System for Concrete Slabs
Section 09900 – Painting

DIVISION 10 - SPECIALTIES
Section 10100 – Visual Display Products
Section 10441 – Signage
Section 10520 – Fire Extinguishers, Cabinets
Section 10601 – Polymer Toilet Partitions
Section 10800 – Toilet Accessories

DIVISION 12 - FURNISHINGS

Section 12462 - Laminate Clad Casework
Section 12530 – Manual Operated Roller Shades

DIVISION 15 - MECHANICAL

Section 15010 – General Mechanical Requirements
Section 15014 – Codes, Standards, and Permits
Section 15018 – Motors and Electrical Work
Section 15050 – Basic Mechanical Materials and Methods
Section 15100 – Valves
Section 15135 – Thermometers & Gauges
Section 15215 – Vibration Isolation
Section 15250 – Mechanical Insulation
Section 15290 – Duct Insulation
Section 15511 – Fire Stopping
Section 15515 – Hydronic Specialties
Section 15650 – Heating, Ventilation, and Air Conditioning
Section 15657 – Electrical Work
Section 15755 – Exhaust Fans
Section 15800 – Air Distribution
Section 15802 – Inspection, Testing & Balancing
Section 15806 – Fire Dampers
Section 15891 – Ductwork
Section 15893 – Duct Accessories
Section 15895 – Diffusers, Registers, & Grilles
Section 15990 – HVAC Testing Adjusting Balancing
Section 15995 – Mechanical Systems Commissioning
Section 15997 – Mechanical Testing Requirements

DIVISION 15A - PLUMBING

Section 15011A – Plumbing General Provisions
Section 15013A – Codes, Standards, and Permits
Section 15014A – Schedule of Equivalency
Section 15015A – Maintenance Instructions
Section 15050A – Plumbing Basic Materials and Methods
Section 15052A – Access to Plumbing Work
Section 15057A – Plumbing Identification Systems
Section 15060A – Cutting and Patching
Section 15180A – Plumbing Insulation
Section 15411A – Plumbing Domestic Water Piping Systems
Section 15412A – Plumbing Sanitary Piping System
Section 15440A – Plumbing Fixtures & Trim
Section 15511A – Fire Stopping
Section 15985A – Plumbing, Testing, Adjusting and Balancing

DIVISION 16 - ELECTRICAL

Section 16010 – General Provisions
Section 16060 – Grounding and Bonding
Section 16100 – Basic Materials and Methods
Section 16470 – Panelboards
Section 16472 – Mandatory UL participation
Section 16475 – Circuit Breakers
Section 16511 – Firestopping
Section 16671 – Transient Voltage Surge Suppression (TVSS)
Section 16720EX – Fire Alarm System – (Expand Existing System)

3. The **BASE BID MC-1 MECHANICAL CONSTRUCTION CONTRACT** includes all demolition and Mechanical/Plumbing construction related to the **Middle/High School** as shown on the drawings, and specified herein. Work under this contract includes but is not limited to the following:

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ALL ITEMS A. thru Y.

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ALL OF DIVISION 1

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Section 07210 – Fireproofing Insulation
Section 07910 – Joint Sealers

DIVISION 08 – DOORS & FRAMES (OPENINGS)
Section – Access Doors

DIVISION 10 – ACESSORIES
Section –

DIVISION 15 - MECHANICAL
Section 15010 – General Mechanical Requirements
Section 15014 – Codes, Standards, and Permits
Section 15018 – Motors and Electrical Work
Section 15050 – Basic Mechanical Materials and Methods
Section 15100 – Valves
Section 15135 – Thermometers & Gauges
Section 15160 - Expansion Compensation
Section 15215 – Vibration Isolation
Section 15250 – Mechanical Insulation
Section 15290 – Duct Insulation
Section 15291 – Duct Insulation - Exterior
Section 15510 - Hot-Chilled Water Piping
Section 15511 – Fire Stopping
Section 15530 - Refrigeration Piping Systems
Section 15600 – Less than 2 Ton VRF System Indoor Evaporator Units
Section 15610 – MagicAire Fan Coil Unit
Section 15620 – MagicAire High Efficiency Direct Drive Air Handling Unit
Section 15650 – 6 to 42 tons Capacity VRF System Outdoor Units
Section 15777 – Unit Ventilators
Section 15806 – Fire Dampers
Section 15891 – Ductwork
Section 15893 – Duct Accessories
Section 15895 – Diffusers, Registers, & Grilles
Section 15990 – HVAC Testing Adjusting Balancing
Section 15995 – Mechanical Systems Commissioning

4. The **BASE BID EC-1 ELECTRICAL CONSTRUCTION CONTRACT** includes all demolition and Electrical construction related to the **Middle/High School** as shown on the drawings and specified herein. It also includes administrative and coordination responsibilities. Work under this prime Contract includes, but is not limited to the following:

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ALL ITEMS A. thru Y.

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ALL OF DIVISION 1

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Section 07210 – Fireproofing Insulation
Section 07910 – Joint Sealers

DIVISION 08 – DOORS & FRAMES (OPENINGS)
Section – Access Doors

DIVISION 10 – ACESSORIES
Section –

DIVISION 16 - ELECTRICAL
Section 16010 – General Provisions
Section 16060 – Grounding and Bonding
Section 16100 – Basic Materials and Methods
Section 16470 – Panelboards
Section 16472 – Mandatory UL participation
Section 16475 – Circuit Breakers
Section 16511 – Firestopping
Section 16671 – Transient Voltage Surge Suppression (TVSS)
Section 16720EX – Fire Alarm System – (Expand Existing System)

DIVISION 27 – COMMUNICATIONS
Section –

DIVISION 28 – SECURITY
Section –

5. The **BASE BID PC-1 PLUMBING CONSTRUCTION CONTRACT** includes all demolition and Plumbing Construction related to the **Middle/High School** as shown on the drawings and specified herein. It also includes administrative and coordination responsibilities. Work under this Prime Contract includes, but is not limited to the following:

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ALL ITEMS A. thru Y.

DIVISION 1 GENERAL REQUIREMENTS
ALL OF DIVISION 1

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Section 07210 – Fireproofing Insulation
Section 07910 – Joint Sealers

DIVISION 08 – DOORS & FRAMES (OPENINGS)
Section – Access Doors

DIVISION 10 – ACESSORIES
Section –

DIVISION 15A - PLUMBING
Section 15011A – Plumbing General Provisions
Section 15013A – Codes, Standards, and Permits
Section 15014A – Schedule of Equivalency
Section 15015A – Maintenance Instructions

Section 15050A – Plumbing Basic Materials and Methods
Section 15052A – Access to Plumbing Work
Section 15057A – Plumbing Identification Systems
Section 15060A – Cutting and Patching
Section 15180A – Plumbing Insulation
Section 15411A – Plumbing Domestic Water Piping Systems
Section 15412A – Plumbing Sanitary Piping System
Section 15413a - Plumbing Storm Water Piping Systems
Section 15440A – Plumbing Fixtures & Trim
Section 15511A – Fire Stopping
Section 15985A – Plumbing, Testing, Adjusting and Balancing

1.7 MISCELLANEOUS

A. The following additional requirements for the **Middle/High School General Construction Contract GC-1** include, but are not limited to the following:

1. Furnish all dumpsters for building construction, for use by all MEP trades; except for demolition where mechanical, electric and plumbing demolition and electrical demolition of light fixtures, each Prime to provide their own individual dumpsters.
2. Daily and weekly cleanup of the site and building(s) area(s).
3. Temporary site protection, bridging and fencing. Furnish, install and maintain sidewalk bridges as required for the safe travel of school occupants from emergency exits in the existing school building. The scope includes preparation and submittal of an engineered shop drawing of the sidewalk bridge.
4. All blocking and in walls for use by other trades. Other trades shall identify the locations of required blocking.
5. Blocking where necessary for installation of work under the contract for general construction.
6. Install Access Panels provided by other Prime Contractors.
7. Finish patching associated with this Contract Work. Other Prime Contracts are responsible for their own cutting and patching unless noted otherwise.
8. Install sleeves and other materials provided by other Contracts. Coordinate location of material installation with other Prime Contractors.
9. Protection of work after installation.
10. Fire and smoke stop.
11. Interior floor, wall and ceiling expansion joints as per the contract documents.
12. Framing for soffits, interior and exterior.
13. All Interior Architectural Woodwork
14. All louvers, Casework, Interior Millwork and Architectural Woodwork.
15. General Contractor to produce a draft CPM Schedule with 10 days and coordinated CPM Schedule within 15 days of award and updated monthly for the duration of the project, MEP to provide their schedules to the General Contractor. Provide Baseline General Construction Schedule incorporating the other Prime Contracts Schedules with the General Construction Schedule, and provide an update to the construction schedule on a monthly basis for the duration of the project as part of the monthly payment requisition process.
16. Fire Protection specialties including fire extinguishers and cases.
17. Install sleeves and other materials provided by other Prime Contracts.
    Coordinate location of material installation with other Prime Contractors
18. All Exterior Concrete Equipment Pads as required by other Prime Contractors, coordinate sizes and locations with other Primes.
19. Establishing and Maintaining Project Monuments for benchmarks / elevations.
20. This Contract includes the purchasing and installation of doors and door hardware Refer to Specification 087100 Door Hardware and High School Drawings for information on the doors and door hardware. GC to coordinate installation with Owner and its security vendors.
21. This contract is responsible to protect existing flooring and other finishes in all areas of work affected under this contract.

22. Temporary sanitary facilities. Minimum one unit per 10 workers and separate unit for women with lock as it applies to each School.

B. The following additional requirements for the **Middle/High School Mechanical Contract MC-1** include, but are not limited to the following:
   1. Identify the locations of and required blocking for their installations by General Construction Contractor Contract GC-1.
   2. Provide Access Panels, dimensions and locations to General Construction Contractor GC-1 for installation.
   3. Raising of all Roof Top Units (RTUs) and other roof mounted equipment identified on the Contract Drawings and/or Specifications
   4. Cutting and Finish patching associated with this Contract Work. Other Contracts are responsible for their own cutting and patching unless noted otherwise.
   4 Daily and Weekly Cleanup of the Site and building(s) area(s).
   5 Provide sleeves and other materials including dimensions and locations to the Contractor 1-GC for installation.
   6 Protection of work after installation.
   7 Fire and smoke stop.
   8 Interior floor, wall and ceiling expansion joints as per the contract documents for installation of Mechanical work.
   9 Excavation and Backfill for all site MEP installations, this work is to be coordinated with local utility as required Within the building footprint and to 5'-0" outside the building footprint
   10. General Contractor to produce a draft CPM Schedule with 10 days and coordinated CPM Schedule within 15 days of award and updated monthly for the duration of the project. MEP primes to provide their input for the monthly updated schedule that is to be provided by the GC. The General Construction Master Schedule, shall be updated on a monthly basis for the duration of the project as part of the monthly payment requisition process.
   11. Provide sleeves and other material to be installed by the General Contractor, coordinate dimensions and locations with the GC-1 Contract.
   12. Provide dimensions and location of all Exterior Concrete Equipment Pads for installation by the GC-1 Contract.
   13. This contract is responsible to protect existing flooring and other finishes in all areas of work affected under this contract.
   14. Furnish and install all slotted grilles adjacent to convention radiation, including in walls and casework.
   15. GC-1 to furnish all dumpsters for building construction, for use by all MEP trades, except mechanical, plumbing demolition and electrical demolition and light fixtures, MEP trades to provide their own individual dumpsters for demolition.
   16. Temporary sanitary facilities. Minimum one unit per 10 workers and separate unit for women with lock as it applies to each School.

D. The following additional requirements for the **Middle/High School Electrical Contract EC-1** includes, but not limited to the following:

   1. Identify the locations of and required blocking for their installations to the General Construction GC-1 Contractor.
   2. Provide Access Panels, dimensions and locations to the General Contractor for installation.
   3. Finish patching associated with this Contract Work. Other Contracts are responsible for their own cutting and patching unless noted otherwise.
   4. Daily and Weekly Cleanup of the Site and building(s) area(s).
   5. Provide sleeves and other materials including dimensions and locations to the General Contractor for installation.
   6. Protection of work after installation.
   7. Fire and smoke stop.
   8. Interior floor, wall and ceiling expansion joints as per the contract documents for installation of Mechanical work.

9. Excavation and Backfill for all site MEP installations, this work is to be coordinated with local utility as required. Within the building footprint and to 5'-0" outside the building footprint
10. Temporary Electrical: as required to execute Exterior Masonry work, Interior work and Interior finishes, as noted in Section 01 50 00 Temporary Facilities and Controls.
11. GC-1 General Contractor to produce a draft CPM Schedule with 10 days and a coordinated CPM Schedule within 15 days of award and updated monthly for the duration of the project. MEP primes are to provide their input for the monthly updated schedule that will be provided by the GC-1 Contract. The General Construction Schedule, is to be updated on a monthly basis for the duration of the project as part of the monthly payment requisition process.
12. Provide sleeves and other material to be installed by the GC-1 General Contractor, coordinate dimensions and locations with the GC-1 Contract.
13. Provide dimensions and location of all Exterior Concrete Equipment Pads for installation by the GC-1 General Contractor.
14. This contract is responsible to protect existing flooring and other finishes in all areas of work affected under this contract.
15. Provide their own Dumpster for demolition.
16. Electrical Connections for equipment supplied by other Prime Contractors
17. Site Lighting and Main Electrical Power
18. Provie Temporary Electrical service and lighting for the project as note in Section 015000 Temporary Facilities and Controls.
19. Contract GC-1 to Furnish all dumpsters for building construction, for use by all MEP trades, except mechanical, plumbing demolition and electrical demolition and light fixtures, MEP trades to provide their own individual dumpsters for demolition.

E. The following additional requirements for the **Middle/High School Plumbing Contract PC-1** include, but are not limited to the following:

1. Identify the locations of and required blocking for their installations to the General GC-1 Contractor.
2. Provide Access Panels, dimensions, and locations to the General Contractor GC-1 for installation.
3. Finish patching associated with this Contract Work. Other Contracts are responsible for their own cutting and patching unless noted otherwise.
4. Daily and Weekly Cleanup of the Site and building(s) area(s).
5. Provide sleeves and other materials including dimensions and locations to the General Contractor GC-1 for installation.
6. Protection of work after installation.
7. Fire and smoke stop.
8. Interior floor, wall, and ceiling expansion joints as per the contract documents for installation of Mechanical work.
9. Excavation and Backfill for all site Plumbing installations, this work is to be coordinated with local utility as required. Within the building footprint and to 5'-0" outside the building footprint
10. Temporary Water: as required for the project to execute Exterior Masonry work, Interior work, Interior finishes, and other work as noted in Section 01 50 00 Temporary Facilities and Controls.
11. GC-1 General Contractor to produce a draft CPM Schedule with 10 days and a coordinated CPM Schedule within 15 days of award and updated monthly for the duration of the project. MEP primes are to provide their input for the monthly updated schedule that will be provided by Contract GC-1. The General Construction Schedule shall be updated on a monthly basis for the duration of the project as part of the monthly payment requisition process.
12. Provide sleeves and other material to be installed by the General Construction Contractor Contract GC-1, coordinate dimensions and locations with Contract GC-1.
13. Provide dimensions and location of all Exterior Concrete Equipment Pads for installation by GC-1 General Contractor.
14. This contract shall protect existing flooring and other finishes in all areas of work affected under this contract.

15. GC-1 to Furnish all dumpsters for building construction, for use by all MEP trades, except mechanical, plumbing demolition and electrical demolition and light fixtures, MEP trades to provide their own individual dumpsters for demolition.
16. Temporary sanitary facilities. Minimum one unit per 10 workers and separate unit for women with lock as it applies to each School

C. The following additional requirements for the **Todd Elementary School Single Prime General Construction Contract GC-2** include, but are not limited to the following:

1. Furnish all dumpsters for all demolition work and all building construction, including all mechanical, electrical and Plumbing work.
2. All demolition work
3. All General Construction, Mechanical, Electrical, and Plumbing work.
4. Daily and weekly cleanup of the site and building(s) area(s).
5. Temporary site protection, bridging and fencing. Furnish, install and maintain sidewalk bridges as required for the safe travel of school occupants from emergency exits in the existing school building. The scope includes preparation and submittal of an engineered shop drawing of the sidewalk bridge.
6. All required and necessary blocking
7. All Access Panels
8. All finish patching work.
9. All sleeves
10. Protection of work after installation.
11. Fire and smoke stop.
12. Interior floor, wall, and ceiling expansion joints as per the contract documents.
13. Framing for soffits, interior and exterior.
14. All Interior Architectural Woodwork
15. All louvers, Casework, Interior Millwork and Architectural Woodwork.
16. General Contract GC-2 shall produce a draft CPM Schedule with 10 days and coordinated CPM Schedule within 15 days of award and updated monthly for the duration of the project and provide an update to the construction schedule on a monthly basis for the duration of the project as part of the monthly payment requisition process.
17. Fire Protection specialties including fire extinguishers and cases.
18. All Exterior Concrete Equipment Pads required
19. Establishing and Maintaining Project Monuments for benchmarks / elevations.
20. This Contract includes the purchasing and installation of doors and door hardware. Refer to Specification 087100 Door Hardware and Drawings for information on the doors and door hardware. General Construction Contractors GC-1 and GC-2 to coordinate installation with Owner's Locksmith and Owner's security vendors.
21. This contract is responsible to protect existing flooring and other finishes in all areas of work affected under this contract.
22. Temporary sanitary facilities. Minimum one unit per 10 workers and separate unit for women with lock as it applies to each School.

1.8 Temporary service shall be provided as follows:

A. DAILY CLEANING

1. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.
2. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.

3. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks.
4. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by others to complete this task.
5. Contractor working solely in an area shall be responsible for clean/sweep of that area.
6. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
7. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. Each Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
8. Prime Contractors shall provide sweeping compound for daily cleaning in their respective interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools and equipment, for use by their personnel to adequately fulfill their obligations.
9. Prime Contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and Prime Contractors shall be responsible for disposing of these materials to a dumpster.
10. **General Construction Contractors (GC-1 and GC-2) shall provide all dumpsters for use by other trades for new construction work. Each Prime Contractors to provide own dumpsters for demolition work. Single Prime General Construction Contractor GC-2 shall provide dumpsters for demolition and new work at Todd Elementary School.** Prime Contractors shall provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts.
11. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.
12. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; Prime Contractors shall mop clean all finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

1.9 WORK SCHEDULES

A. All work: done in accordance with a predetermined detailed Work Schedule agreed upon by Owner and Contractors. Each Prime Contractor shall submit a detailed Work Schedule to the Contractor for General Construction, within 10 days after Award of Contract. Schedule shall include all milestone and other significant dates. Contractor for General Construction shall combine all into a CPM schedule within 15 days of award and update weekly for the duration of the project, all primes to sign off on final CPM Schedule.

1. Work Schedule shall be computer generated, in CPM format and in an additional format as approved by the Architect and Owner. Work Schedule shall be revised weekly during the Course of the Work. The latest revised Work Schedule shall be submitted each month with the Application for Payment.

B. General Contractor shall coordinate work with the Owner, other Contractors at the site, and all of its subcontractors.

C. Locations of office trailers, dumpsters, containers, storage areas, parking areas, and staging areas shall be coordinated with the Owner, Construction Manager and Architect.

D. It will be the responsibility of the Contractor to carefully interface all construction operations until they reach their final completion, and so the Owner's programs and services can be carried on without interruptions so that a smooth flow of all operations by all involved trades will be achieved within the allotted time.

1.10 ACCESS TO THE SITE

A. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.11 CODES APPLICABLE

A. Construction will be governed by: New York State Uniform Fire Prevention and Building Code, current applicable edition, and its referenced codes and standards.
State Education Department Manual for Planning Standards.

1.12 PREPARATION OF SITE

A. Contractor agrees to accept site as indicated and to remove Encumbrances, which interfere with proper fulfillment of his work without change in Contract Sum.

B. All Work as noted inside or outside of Contract Limit Lines shall be performed by Contractor as part of Contract Work.

1.13 CONTRACTOR'S USE OF PREMISES

A. Confirm Operations at the Site to Areas and Methods Permitted by:
1. Laws.
2. Ordinances.
3. Permits.
4. Contract Documents.
5. Owner's regulations.

B. General: During the Summer months, the Contractors shall have full use of the premises for construction operations. The Contractor's use of the premises is limited when School is in session and by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.

C. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

D. Do not unreasonable encumber site with materials or equipment.

E. Do not load structure(s) with weights that will endanger structure.

F. Each Subcontractor is responsible for protection and safekeeping of his materials, products and equipment stored on the premises that is incorporated into the construction, until his contract is complete and accepted by the Owner.

G. Site Access: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

H. Move at the Contractor's/Subcontractor's cost any stored materials, products or equipment which interfere with operations of Owner or others.

I. Special Owner Requirements:

1. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building, prior to Substantial Completion provided that

such occupancy does not interfere with completion of Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

2. All activities required on the site for completion of the work shall be accomplished within the Contract limit lines as indicated on the Drawings.

1.13 LINE AND LEVELS

A. Drawings indicate location of the Work.

B. Contractor shall layout all Work prior to construction and will be held responsible for its accuracy. Layout approval by Owner and Architect is required prior to construction.

C. Owner shall establish a “Datum” or “Benchmark” at convenient locations, which will remain undisturbed throughout construction, for convenience and constant reference for use by all Contractors.

D. Each Contractor is responsible for their own survey(s) and layout.

1.14 TIME FOR COMPLETION

A. It shall be understood and mutually agreed that the time for Substantial Completion is an essential condition of this Contract.

B. Contractor agrees that Work shall be performed diligently and uninterruptedly at such rate as to ensure Substantial Completion of all Work and Certificates of Occupancy on or before the date stated in the Contract documents and intermediate milestones.

C. It is expressly understood and agreed by Contractor and Owner that the time for Substantial Completion and Certificates of Occupancy are reasonable, taking into consideration average climatic range, restrictions concerning use of the site, and other prevailing conditions.

D. Contractor shall schedule the Work and provide 2-week and 4-week lookaheads accordingly to the Construction Manager.

1.15 EXAMINATION OF SURFACES TO BE COVERED

A. Prior to application of materials included in the various Sections, the installer, the manufacturer’s representative, and the Contractor shall together examine the building and surfaces upon which materials are to be supplied.

B. The installer and the manufacturer’s representative shall accept all surfaces and conditions affecting proper installation of their materials. The installer shall not proceed with the work until all conditions and surfaces not satisfactory to him.

C. The Contractor shall do all work necessary to correct unsatisfactory conditions and surfaces not specifically included as work of the subcontractor.

D. The subcontractor shall furnish to the Contractor for submission to the Architect 2 copies of his/her statement, countersigned by the manufacturer or his/her appointed representative that the entire installation has been made by correct techniques over properly prepared surfaces and under proper job conditions.

1.16 FIRE SAFETY REQUIREMENTS

A. The Contractor shall conform to the following mandatory Requirements during the course of the work:

1. Construction related debris shall be cleaned out of the building at the end of each working day.
2. No combustible materials shall be stored neither within the building, nor on the school grounds unless as directed.

1.17 SCHEDULE OF VALUES REQUIREMENTS

A. The Contractor shall conform to the following mandatory requirements for percentages of the total contract value, including accepted add alternates, for the Schedule of Values (SOV) submission:

1. General Conditions – 2%
2. Meeting Attendance – 2%
3. Shop Drawings / Samples Submissions – 1%
4. Temporary Utilities & Services – 1%
5. Coordination Drawings – 1%
6. Punch-List – 2%
7. Close-Out Documents (Warranties/Guarantees, As-Builts & O&M Manuals) – 3%

1.18 COORDINATION DRAWINGS

A. The Contractor shall coordinate the work of all Sub-Contractors, arrange space conditions to accommodate the work of all trades and prepare composite drawings as required to clearly scale the work of each trade Contractor in relation to each other.

B. The Contractor will be held responsible to correct unsatisfactory conditions resulting from improper coordination.

C. Contractors to communicate and supply shop drawings to each other to insure proper coordination.

D. Coordination drawings shall be submitted to the Architect for review and approval.

E. Daily field reports are to be provided by all Contractors to the Construction Manager.

F. Coordination Meetings:

1. General: Contractors are to prepare a written memorandum on required coordination activities. Include such items as required notices, reports, minutes of meetings, and attendance at meetings. Distribute this memorandum to each entity performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.

2. Weekly coordination meetings: Contractors shall schedule and hold weekly general project coordination meetings at regularly scheduled times that are convenient for the attendance of other parties involved in the project (i.e., Owner, Architect, CM, Sub-Contractors etc.). The Contractors shall record meeting results and shall make them available to the Project Team. These meetings are in addition to the specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Required attendance includes each prime contractor and every other entity identified by any prime contractor as being currently involved in the coordination or planning for the work of the entire project. Conduct meetings in a manner that resolves coordination problems. The Construction Manager shall have a representative at the meetings. The Contractors shall distribute copies of the meeting minutes to everyone in attendance, the Architect, and to others affected by the decisions and actions resulting from each meeting.

G. Scaled and figured dimensions with respect to the items are approximate only; sizes of equipment have been taken from typical equipment items of the classes indicated. Before proceeding with the work, the contractor shall carefully check all dimensions and sizes and shall assume full responsibility for the “fitting in” of equipment and materials to the building and to meet architectural and structural conditions.

H. Separate plans shall also be prepared for sleeve locations and concrete pads for mechanical equipment required by all contractors for the performance of their work. These drawings shall be coordinated with the coordination drawings. When final information is received, such data shall be promptly inserted on the coordination drawings.

I. The Mechanical/HVAC Contractor shall provide Electronic Coordination Drawing(s) files, at a scale of 3/8" – 1'-0" showing all HVAC equipment, ductwork, and major piping, including elevations and dimensions to all fixed building elements, such as beams; columns, slabs; ceilings; including ceiling suspensions; framing; floor; walls; doors, including door swings; and windows affected by the equipment, ductwork, and piping. Show all registers, grilles, diffusers, radiators and convectors, and other terminal elements. This drawing is to be used to coordinate installations by other prime contractors. Show location of all valves, dampers (fire, smoke, volume, and automatic), coils, humidifiers, smoke detectors, etc. requiring access for service and maintenance. Locate all access doors. Include large-scale details and sections as required to fully delineate the conditions in congested areas, leaving space for the work of the other contractors. Show plan layout of all equipment bases, pads, and inertia blocks. Clearly label all work by Mechanical/Plumbing Contractor. This Prime Contractor to also show existing Mech/HVAC., Ductwork, Equipment and other existing Mech/HVAC. appurtenances on the Electronic Coordination Drawing(s).

J. The Plumbing Contractor shall overlay on the Electronic Coordination Drawings prepared by the Mechanical/HVAC Contractor which shall indicate all Plumbing water supply, drain, waste, vent, sprinkler main and branch piping, risers and sprinkler heads and other major lines. Indicate piping elevations and locations of the fire hose cabinets, drinking fountains, etc., which encroach on duct shafts. Locate valves and other items requiring access for service and maintenance. Locate all access doors. Avoid interference with HVAC work and with building construction. Use same scale as drawing being overlaid. Clearly label all work by Plumbing Contractor. This Prime Contractor to also show existing Plumbing, Piping, Vents, Drains and other existing Plumbing appurtenances and equipment on the Electronic Coordination Drawing(s).

K. The Electrical Contractor shall overlay on the Electronic Coordination Drawings (after the Mech/HVAC and Plumbing Prime contracts) The Electronic Drawings are to be overlayed and prepared by the Electrical Prime contract. Coordinating locations of existing Plumbing and Fire Protection Contractors all main conduit and bus runs, cable trays, light fixtures, major equipment, and switch gear and panel boards and clearances. Show all items requiring access for service and maintenance. Locate all access doors. Avoid interference with exist HVAC, Plumbing, and Fire Protection work and with building construction. Use same scale as drawings being overlaid. Clearly label all existing work and new work by the Electrical Prime. This Prime Contractor to also show existing Electrical Conduits, piping, Equipment and other existing Electrical appurtenances on the Electronic Coordination Drawing(s).

L. Each Contractor shall use the signed completed coordination drawings as a working reference. Compare all shop drawings, prior to their submittal to the Architect, with the coordination drawings and revise the shop drawings to fit the coordination drawing condition. If revisions to the coordination drawings are required because of shop drawings, make revisions as directed by AOR/EOR and notify all affected contractors with copy of notification to Construction Manager. Maintain up-to-date record of all revisions on own coordination drawing copies; keep one copy at project site.

M. No extra compensation will be paid to any contractor for relocating any duct, pipe, conduit, or other material installed without coordination among trades involved or among other affected contractors. Each Contractor who causes any additional work to other contractors by improperly coordinated work or work not installed in accordance with the signed coordination drawings shall reimburse the affected other contractors for the cost of the additional work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 12 00

SECTION 01 13 00

MILESTONE SCHEDULE

PART 1 – GENERAL

1.01 MASTER SCHEDULE

The following milestone schedule serves as a basis for bidding. A Master Schedule will be developed at a general meeting with the awarded contractor(s) within 10 days of the Notice of Award. This Master Schedule will incorporate the milestone dates listed below.

1.02 MILESTONES & COMPLETION DATES

In order to meet the Substantial Completion dates, all overtime costs for extended work hours, Saturdays (and Sundays when required) must be included in the contractor's bid. No special consideration will be given to any contractor who fails to include said costs in his/her bid. Extended workdays and/or hours will be required to make up lost time due to weather and other unforeseen occurrences. Failure to act in accordance with coordination requirements of the Contract shall subject the responsible Contractor to liquidated damages as specified in the General Conditions; and sustained failure to perform as required may be grounds for termination of the Contract with the Owner taking over the work at the Contractor's cost.

A. The following schedule reflects anticipated milestones (subject to change) for the Bid Period:

a. Advertisement for Bid: 11/17/2022

b. Pre-Bid Conference & Walkthrough: 11/21/2022

c. Contractors Pre-Bid RFIs: 11/14/2022 – 12/6/2022 by 5:00 pm EST

d. Bids Due & Opening: 12/14/2022 at 2:00 pm

e. Lowest Bid De-Scope Meetings: 12/15/2022 – 12/21/2022

f. Board of Education Bid Award: 01/19/2023

B. The following schedule reflects anticipated milestones before Mobilization:

1. Submit Bonds and Insurances: 2 weeks after award

2. Provide List of Subcontractors: 3 weeks after award

3. Provide Submittal Schedule: 3 weeks after award

4. Submit Mobilization/Staging Plan: 3 weeks after award

5. Submit Construction Schedule: 15 days after award

6. Submit Abatement Work Plan: 30 days after award

C. The following schedule reflects anticipated milestones dates (date task to be completed by) for the construction period. All primes should anticipate that double shift, premium, and second shift work will be required for coordination with the other trades to meet the project milestone dates. All Primes must understand, before mobilization, this is a fast-track project and "Time is of the Essence" for any and all aspects of this project:

D. Overall Contract Start: – Date of Board of Education Award of Contracts

1. Mobilization & Temporary Facilities: 6/26/2023
2. Overall Project Substantial Completion: 8/16/2024
3. Complete All Punchlist Items: 8/30/2024
4. Final Completion (Entire Project): 8/30/2024
5. Project Closeout (Entire Project): 9/30/2024

E. Milestone Dates – Refer to CIP drawings for areas of work defined by each phase.

- **Briarcliff Manor Middle/High School (Multiple Primes Contracts): GC-1, MC-1, EC-1, PC-1**

MS/HS Interior Reconstruction	
Commence Construction	Upon Contract Award
Temporary Relocation of HS Library	6/26/2023 – 6/30/2023
Move Maresca Center to Swing Space	6/26/2023 – 6/30/2023
Complete Maresca Center Reno	8/31/2023
Complete Library Renovations	8/31/2024
Install Light Well	8/31/2024
Complete Performing Arts Area	8/31/2024
Complete Tech Areas	8/31/2024

- **Todd Elementary School (Single Prime Contract): GC-2**

Todd ES Interior Reconstruction	
Commence Construction	6/23/2023
Substantial Completion	8/15/2023
Complete Punchlist	8/31/2023
Final Closeout	9/29/2023

Asbestos Abatement at all schools and building is critical to the construction schedule and shall be scheduled so that the abatement work is completed, and areas are cleared, for other Trades and other Prime contractors to commence their work. The Briarcliff Manor UFSD will make arrangements to have the building available for second shift work, to complete the asbestos abatement work in the first two weeks of the project.

D. Final Close-out of all Contract(s)

a. Final Close-out of Contract

i. Final close out of all contracts shall be within 30 days of the substantial completion dates established above. All work including, but not limited to punch lists, project closeout, testing, balancing, Owner training, O&M manuals, as-builts, warranties, etc. shall be complete.

ii. All work required by the Construction Manager to execute final closeout of contracts after dates noted established above, if determined to be caused by contractor, shall result in payment to the Construction Manager in the form of a change order deduct to the base contract.

F. Coordination of Move-In

It is the intent of the School District to begin move-in of furnishings, fixtures and equipment prior to the dates of substantial completion as outlined above. The Contractor shall work in harmony with the School District to facilitate such move-ins for the purpose of beneficial use and occupancy.

G. School District/School Operation and Custodial Hours

During Summer 2023, work will be permitted between 7:00 a.m. and 4:00 p.m. all days including Saturdays and Sundays. Any special work arrangements (weekends, 2nd shift) must be made through the Owner. Work during School Year 2023/2024 must be scheduled to occur after School Hours only (exceptions may be made for quiet and non-disruptive work that can occur during school hours). During the school year, the schools will be open until 11:00p.m. Any work during the school year must be performed after school hours and the work areas are to be cleaned by the contractor before 10:00 p.m.

If the project is behind schedule or if it is necessary to perform work outside of the regular time periods established in the Milestone Schedule (1st and 2nd shift during summer, 2nd shift and weekends only during the school year), the Prime Contractor performing the work (or responsible for such work being performed by subcontractors) will be responsible for the additional cost to the Owner for having the Architect and/or Construction Manager on site during weekend or 2nd shift hours. This cost will be passed back to the Prime Contractor by deduct change order.

No work may occur in the school during occupied times unless there is a separation and separate access to the work area and noise is restricted to max 60 db. Any requests to work during school hours must be submitted in writing to the School District for approval. The submission must include a diagram showing how the construction area will be separated from occupied areas. Additionally, it must show temporary measures to be installed such as ventilation, screening, dust protection, fire separation, etc. The School District reserves its right to accept or reject the request at their discretion.

END OF SECTION 01 13 00

SECTION 01 21 00 – SCHEDULE OF ALLOWANCES

PART 1 – SCHEDULE OF ALLOWANCES

A. Include in the base bid a contingency allowance in the amounts listed below for unforeseen conditions.

B. Allowances are as listed below.

1.	Contract **GC-1** – HS/MS	$75,000
2.	Contract **MC-1-** MS/HS	$50,000
3.	Contract **EC-1**– HS/MS	$35,000
4.	Contract **EC-1**– HS/MS (Unused Data Cabling Removals)	$30,000
5.	Contract **PC-1** – HS/MS	$10,000
6.	Contract **GC-2** (Single Prime) - Todd ES	$30,000

Circle the Allowance(s) for the Contract submitted

Submitted by:

Contractor:_____ Date:_____

Name:_____ Position:_____

END OF SECTION – 01 21 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction and other Division 01 Specification Sections, apply to this Section. AIA Document A232-2009, "The General Conditions of the Contract for Construction, Construction Manager as the Advisor Edition", The American Institute of Architects, Articles 01 thru 15, and Supplementary Conditions are bound herein and are hereby made a part of the Specifications and shall apply to Prime Contractors and their Subcontractors unless otherwise specified.

B. Section 01 10 00, "Summary of Work".

C. Section 01 12 00, "Multiple Contract Summary."

1.2 SUMMARY

A. This Section applies to Prime Contractors and their subcontractors for providing all temporary facilities required to complete the Contract Work. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities for each of the projects; grouped facility or single facility. Temporary utilities required include but are not limited to:
1. Owner-Architect-CM Temporary Office & Supplies
2. Temporary construction support and facilities.
3. Temporary water service and distribution where required.
4. Temporary electric power and light.
5. Temporary staging setup, maintenance, relocation, and demobilization
6. Temporary heat
7. Internet service

B. All items below shall also be provided by the **General Construction Contractor (Contract #GC-1)** unless specifically noted otherwise.

1. Owner's field office (To be located at location designated by the Construction Manager))
2. Sanitary facilities, including drinking water.
3. Internet service
4. Dewatering facilities and drains.
5. Temporary heating and ventilation.
6. Weather protection.
7. Temporary Project identification signs and bulletin boards.
8. Cleanup and waste disposal services.
9. Construction aids and miscellaneous services and facilities.
10. Owners Representative Office Supplies
11. Storm water control.
12. Tree and plant protection.
13. Pest control.
14. Security enclosure and lockup.
15. Temporary partitions.
16. Barricades, warning signs, lights.
17. Environmental protection.
18. Temporary fence.
19. Ice and snow removal around construction and staging areas

C. Related Sections include the following:

1. Division 01 Section "Multiple Contract Summary and Contract Summary" for division of responsibilities for temporary facilities and controls.
2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Divisions 02 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES FOR TEMPORARY UTILITIES

A. Use Owner's existing utilities at no additional or change in contract sum.

B. Temporary filters: **Mechanical Contract (Contract #MC-1 & GC-2) for each Contract** shall provide and maintain filters on all supply air intake louvers during construction.

C. Water Service: **Plumbing Contract (Contract #PC-1 & GC-2) for each Contract** shall provide connection to Owner's existing water system as available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations using backflow preventer. Removal by same.

D. Electric Power Service: **Electrical Contract (Contract #EC-1 & GC-2) for each Contract** shall provide power from Owner's existing system as available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. The Electrical Contractor (Contract #EC-1) shall provide and maintain a temporary electrical service as necessary for power at the Middle/High School construction site and staging area. Removal by same.

E. Each Contractor and their Subcontractors shall take measures to conserve water, electric consumption and use of utilities.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain- link fabric fencing; minimum 8 feet (2.4 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails. Provide dust screen along all fencing.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gauge, galvanized steel, chain-link fabric fencing; minimum 8 feet (2.4 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized steel bases for supporting posts. Provide dust screen along all fencing.

C. Lumber and Plywood: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."

D. Gypsum Board: Minimum 5/8 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; fire rated-type panels with tapered edges. Comply with ASTM C 36/C 36M.

E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

F. Paint: Comply with requirements in Division 09 painting Sections.

2.2 TEMPORARY FACILITIES

A. Field Offices: Prefabricated units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Prime Contractors are responsible for their own temporary facilities, data, fax and telephone lines to their respective temporary office locations.

B. Owner/CM/Architect Field Office: **GENERAL CONSTRUCTION CONTRACT #GC-1 at the MS/HS** shall furnish and equip offices at the Briarcliff Manor Middle/High School as follows:

2.3 FIELD OFFICES / TRAILERS

A. Field Offices: Prefabricated units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Refer to CIP Drawings for the approximate location of Field Offices and staging areas.

B. Owner-Architect-Construction Manager (OACM) Field Office: Contracts shall furnish and equip offices at the Project site.

1. Provide 12'x 40' Office by Williams Scottsman for use by OACM personnel engaged in construction activities. Office trailer must have toilet facilities and sink, contractor shall maintain/service the toilet for the duration of the project at OACM trailer. The Trailer is to be fully skirted. The trailer location will be as directed by the Owner and CM.

2. Trailer to have exterior lighting

   a. Provide (1) High speed internet service with wireless router and Ethernet Switch

3. Provide the following new equipment which shall become the property of the Owner at the end of the project.

   (1) **Plan Table** (6'Lx4'W)
   (2) **May-line Pivot Wall Rack** with 24 Racks (Installation by GC) or
   (3) standing type.

Note That All Computer Products referenced below are to be as Manufactured by Dell.

(2) **Monitors** Dell 24 Monitor – P2419H SKU 210-AQDX – NOTE:
2 Monitors for each of the Laptop Computers. For each Laptop computers provide a docking station, keyboard and mouse.
(1) Hardware Support Services 4 years Advanced Exchange Service
SKU 814-5380, 814-5382

(1) **Laptop Computer** – Dell Latitude 5400 series or better with:
Processor – 11th Generation Intel Core i5-1145G7 (4 Core, 8M cache, base Dell Latitude 5400 series or equivalent
Intel i5 processor
Microsoft Windows 10 with option to upgrade to Windows 11
16GB Memory
500GB Solid State Hard Drive
Webcam

Primary Battery 4 Cell 63Whr ExpressChargeTM capable Battery SKU 451- BCSW
Power Supply 65W Type-C Adapter SKU 492-BCXP
Hardware Support Services 3 Years hardware Warranty with Onsite/In-Home Service
SKU 975-3461, 997-8317, 997-8328, 997-8332

(1) Laser Color Multifunction printer/copier/fax/scanner with 11x17 paper tray with Network capability by Ricoh standalone unit or equal, (provide ink and paper supplies for the project duration) to include 24 hour on call servicing
(2) 4 Drawer File Cabinet heavy duty
Paper as required for the duration of the project: 8.5x11, 8.5x14 and 11x17.
File Folder and Hanging File Folders as required for the duration of the project for the paper sizes as noted above.
(3) Wall Mounted Shelves (6'x14") Installation by GC.
(2) Tack boards 36" x 48" Installation by GC
(1) White boards 36" x 48" with erasers and markers, installation by GC
(2) Built in Desk (66"W x 30"D x 29-1/2"H) w/ (3) Padded Swivel Manager Desk Chair (Staples® Greeley™ Manager's Chair, Black Luxura)
(1) Large trash container and (2) small trash container (provide bags for project duration and weekly cleanup of trailer)
(2) Conference Table (30"W x 72"L x 29"H)
(10) Vinyl Padded Folding Chairs
(1) Cold/Hot water dispenser (provide delivery service for project duration)
(1) 3.6 Cu. Ft. Refrigerator
(**1) 0.7 Cu. Ft. Microwave Oven**
(1) First aid kit - Global Industrial First Aid Kit - 3 Shelf Steel Cabinet, ANSI Compliant, 75-100 Person

C. **(2) Fire Extinguisher-** shall be UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1. Drinking water and private toilet.
2. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg. F (20 to 22 deg. C).
3. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
4. Owner/CM Field office shall be secured and be provided with completing skirting around perimeter.

5. Owner/CM Field office to be swept, mopped and toilet facilities sanitized weekly
6. Provide security bars at doors and security screens at all windows.
7. Provide stairs at each door.
8. Provide Three-inch (3) gravel base, for 2500 Sq Ft area at Owner trailer area as per CM direction.
9. Provide (2) Two heavy duty master locks with (4) four keys

D. The **Electrical Contract (Contract #EC-1) at the MS/HS** shall provide power to the Owner/CM/Architect Field Office at the Briarcliff MS/HS.

E. The Owner/CM/Architect Field office shall be located at the site as directed by the CM and Owner.

F. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.4 EQUIPMENT

A. Fire Extinguishers: Each Contractor shall provide portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, **General Construction Contractor (Contract #GC-1 & GC-2) for each Contract** shall provide temporary heat as may be required. The **General Construction Contractor (Contract #GC-1),** shall submit to the owner the equipment to be used for approval prior to the commencement of work. The **Electrical Contract (Contract EC-1 & GC-2) for each Contract** shall provide sufficient power for The **General Construction Contractor (GC-1 & GC-2) for each Contract's** Electric Heaters for Temporary Heat, as needed and required. Coordinate work with GC.

C. For the **Single Prime General Construction Contract (Contract #GC-2) at Todd Elementary School**, the General Contractor is to provide all temporary utilities, including power for Temporary Heat.

D. Each Contractor shall provide dust control as well as maintain clean roadways and parking areas at the Site. Provide water truck and street sweeper as necessary as it pertains to their work. Provide all traffic control devices, signage and flag-person wearing Hi-Viz as required for deliveries occurring on site. Each Prime Contractor must notify the General Construction Contractor 48 hours in advance of deliveries. If adequate notice is not given, rescheduling of deliveries at a time designated by General Contractor (within 48 hours) can be mandated by the General Contractor.

E. Each Prime Contractor shall be responsible for the control of chemical fumes, gases and other contaminates produced by their construction activities such as welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure these contaminants do not enter occupied portions of the building or air intakes. All diesel engines shall be equipped with catalytic converters to minimize smoke and fumes
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 13 rating at each return air grille in system and remove at end of construction.
4. UL listed Electric Heaters for the intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. GENERAL: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. SEWERS AND DRAINAGE: **General Construction Contractor (Contract #GC-1 & GC-2) for each Contract** shall provide temporary utilities to remove effluent lawfully. For the **Single Prime Contract (Contract #2) at Todd ES**, the General Contractor is to provide all temporary utilities including power for Temporary Heat.

C. WATER SERVICE: **Plumbing Contractor (Contract #PC-1 & GC-2) for each Contract** shall use Owner's existing water service facilities, if facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use. For the **Single Prime Contracts at Todd ES, the General Contractor GC-2** is to provide power for Temporary Heat when required.

1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

D. SANITARY FACILITIES: **General Construction Contractor (Contract #GC-1 & GC-2) for each Contract** shall provide temporary toilets, wash facilities, and drinking water for use of construction personnel. A minimum of Two Temporary Toilets shall be provided at each work site. Additional temporary toilets shall be provided as the number of workers increases per OSHA Standards. A regular maintenance schedule for inspection, cleaning and pumping of the temporary toilets is the responsibility of the **General Construction Contractor (Contract GC-1 at High School Middle School & Contract GC-2 at Todd Elementary School)** and costs included within the base bid. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. The location of the temporary toilets must be submitted to the owner for approval prior to the commencement of work. Under no circumstances shall a Contractor or their sub be permitted to use any existing building toilet facilities.

E. HEATING: **General Construction Contracts (Contract #GC-1 & GC-2) for each Contract** shall provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. VENTILATION AND HUMIDITY CONTROL: **Each Contractor** shall provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. ELECTRIC POWER SERVICE: **Electrical Contract (Contract EC-1 & GC-2) for each Contract** shall use of Owner's existing electric power service, as long as equipment is maintained in a condition acceptable to Owner. For the **Single Prime Contract (Contract GC-2) at Todd ES**, the General Contractor is to provide electrical power service.

H. ELECTRIC POWER SERVICE: **Electrical Contract (Contract EC-1 & GC-2) for each Contract** shall provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. For the **Single Prime Contract (Contract GC-2) at Todd ES**, the General Contractor is to provide electrical power service

1. Connect temporary service to Owner's existing power source, as directed by Owner.

a) **Electrical Contract (Contract #EC-1 & GC-#2) for each Contract** is responsible for all labor and miscellaneous material (exclusive of breakers and starters) required for temporary connection and disconnection of temporary electrical power panels and/or equipment which requires a hard-wired connection to an electrical panel and which is supplied and utilized by other prime contractors (or their subcontractors) to perform their work. For the **Single Prime Contract at Todd ES the General Contractor (Contract GC-2)** shall provide electrical power service and temporary connections when needed.

I. LIGHTING: **Electrical Contract (Contract #EC-1 & #GC-2) for each Contract** shall provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions. For the **Single Prime Contract (Contract #GC-2) at Todd ES**, the General Contractor is to provide Temporary Lighting when needed.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Paved Areas: **General Construction Contract (Contract #GC-1 & #GC-2) for each Contract** shall construct and maintain temporary paved areas adequate for construction operations. Locate temporary paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's on-site parking for some construction personnel.

1. Owner will designate a minimum of 2 spaces and may designate more when facility is not being used.

2. On-street parking arrangements for other spaces are the responsibility of each Contract.

E. Project Identification and Temporary Signs: **General Construction Contract (Contract #GC-1 & #GC-2) for each Contract** to Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted. Installation and removal by Contractor at no additional cost to Owner.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible always.

F. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Existing Elevator Use: Use of Owner's existing elevators will not be permitted.

J. Existing Stair Usage: Use of at least one of Owner's existing stairs will be permitted if stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary of Work."

B. Site Enclosure Fence: Before construction operations begin, **General Construction Contract (Contracts #GC-1 & #GC-2) for each Contract** is to furnish and install site enclosure fence and gates in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner, Architect, and Construction Manager each with one set of keys.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

E. Temporary Enclosures: **General Construction Contract (Contract GC-1 & GC-2) for each Contract** to Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating is needed and permanent enclosure is not complete, insulate temporary enclosures.

F. Temporary Partitions: **General Construction Contracts (Contract GC-1 & GC-2) for each Contract** to Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof and fire rated partitions with 5/8" type 'x' gypsum wallboard with joints taped on both sides. Paint occupied side of partition.
2. Construct dustproof partitions with 1 layer of 4-mil (0.09-mm) polyethylene sheet on each side. Cover floor with 1 layer of 4-mil (0.09-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
3. Sound Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dustproof HM doors and frames with security locks.
5. Protect air-handling equipment, heating equipment, casework and carpeting.
6. Weather strip openings.
7. Provide walk-off mats at each entrance through temporary partition.

G. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 PROJECT CONDITIONS

A. Temporary Utilities: when acceptable to the Owner, change over from use of temporary service to use of the permanent service.
   1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner and repair any damages without delay. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site. Relocate temporary services and facilities as required by progress of the Work.

C. The General Contractor (Contract #GC-1 & GC-2) each Contract shall provide Temporary construction fences as outlined on the site logistics drawings along with all accessories, heavy duty pad locks keyed alike, heavy duty chains as required securing entire construction work areas. The General Contractor (Contract #GC-1 & GC-2) each contract shall relocate fencing as required to facilitate Districts use of surrounding areas as well as for construction operations.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Replace damaged street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

D. Use of Site: Prime Contractor shall limit use of the site for access, parking and storage of materials to those areas approved by the Owner and shall be coordinated through the Construction Manager. Materials shall be brought into the building only by routes approved by Owner. Bring materials to the site as needed for immediate installation as storage/staging areas have limited space.

E. Availability of Materials: Execution of work by individual trades shall be coordinated with the milestone schedule. Contractors shall coordinate the release of materials and equipment and schedule labor to meet all milestone dates. Each Contractor shall be required to provide temporary materials and equipment as well as the labor associated with installation at no cost, to allow District occupancy and use of spaces as scheduled if permanent materials/equipment are not available. Temporary materials and equipment are subject to District approvals.

F. Site Restoration: **General Construction Contracts (Contract GC-1 & GC-2) for each Contract** shall restore all areas disturbed on the site to original condition.
1. Restore grass areas.
2. Replace damaged asphalt paving
3. Replace damaged walkways
4. Replace landscaping that has been damaged.

END OF SECTION 015000

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01030 - SPECIAL PROCEDURES AND PROVISIONS

PART 1 - GENERAL

1.01 CONTRACTOR'S SUPERINTENDENT

A. The Contractor must devote his time and personal attention to the work and shall employ and retain at the building from the commencement until the entire completion of the work a Contractor's Superintendent competent and capable of maintaining proper supervision and care of the work and acceptable to the Architect, who, in the absence of the Contractor and irrespective of any superintendent or foreman employed by any Subcontractor, shall see that the instructions of the Owner are carried out.

B. The Contractor shall employ a competent senior superintendent. Such superintendent may not be replaced during the duration of the Project, including the completion of Punch List, unless approved by the Architect.

C. The Contractor is to provide a resume of the Contractor’s Superintendent to the Owner’s Representative.

D. The Contractor shall, at all times during the work, have a representative on site who communicates in English.

1.02 REPAIRING

A. The Contractor shall do all repairing of work that becomes damaged by his workmen or the workmen of any of his subcontractors during the progress of his work or prior to its acceptance.

B. All existing work that is damaged or disturbed during the alteration and finish work to the building shall be left in the condition as originally found.

C. Any exterior areas damaged or disturbed by work of this Contract shall be properly repaired and left in sound condition and the premises shall be left clean and orderly.

1.03 CONTRACTOR'S RESPONSIBILITY

A. The Contractor will be held responsible for all work and materials provided for by the plans and specifications until the work is completed and accepted. The Contractor will be held responsible also for any and all damages which may arise or occur to any party whomsoever by reason of work of this project, delivery and storing of materials, the opening or blocking of streets and walks or by neglecting to provide proper lights, guards, barriers, any other safeguards to prevent damage to property or injury to persons.

B. Where openings cause exposure to outside elements, the Contractor shall provide necessary protection and coverings to prevent damage from frost or water.

C. Provide and maintain temporary dustproof partitions to enclose spaces used by the Owner and relocate as required. Remove when no longer needed.

D. The Contractor assumes responsibility for all injury to or destruction of or loss by theft or pilferage of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form of work and personal property of his employees regardless of the cause.

E. Each Contractor shall be responsible for their own material and equipment until completely installed, inspected for completeness and correctness, and signed off by the Architect or his duly appointed representative.

F. The Contractor shall provide written guarantee of the complete installation to be free from defects in materials and workmanship in accordance with Section 01700. Any portion of the work judged inferior shall be replaced by the Contractor at no additional cost to the Owner.

G. The cost/value of required repair/replacement of any non-conforming items as documented by the Architect’s subject to inclusion in the Architects “Record of Unacceptable or Non-Conforming Work” and will be the subject of a fixed dollar amount of credit due to the Owner, prior to project closeout in enforcement of AIA Document A201, Item 12.3, “Acceptance of Non-Conforming Work”. If the contractor delays resolution of non-conforming work, the fixed dollar amount of credit is subject to a proportional cost increase at the discretion of the Architect.

H. The Contractor shall maintain operational exits, exit lights, danger signs, open trench markings, fire emergency equipment, night lights, and proper storage facilities for equipment and materials as directed through the length of the contract.

I. The Contractor shall take over and maintain the site immediately after receiving the order to start work. Provide protection of property and utilities until work of the Contract is complete and accepted. The Contractor shall be responsible for the safety of any adjoining property, including paving, utility mains, pipes, conduit, etc., and shall, at his own expense, protect and maintain same in at least as good a condition as that in which they were found.

J. All seeded areas, pavements, walks, curbs, and approaches shall be kept clear at all times and, if disturbed by this construction work, shall be repaired and restored with materials to match existing.

K. Before commencing any work, the Contractor shall verify all dimensions, coverage, and conditions prevalent at the job sites. If

no corrections are brought to the attention of the School District and the Engineer before starting installation, the Contractor will be totally responsible for the installation providing complete coverage of the area designated.

L. For Additions to Existing Buildings: The General Contractor is responsible for correct finish floor alignment between existing building and proposed addition. At each finish floor, General Contractor shall utilize a licensed New York State surveyor to check all finish floor elevations shown for accuracy and shall be responsible for establishing said elevations prior to shop drawing submittal. The General Contractor's submission of steel and or concrete shop drawings shall contain said information and be the final basis for all other established elevations. The architect will accept said elevations as final, as the submission will include a licensed surveyor's certification of same.

M. Upon completion of the work, the Contractor shall furnish as-built drawings showing the exact locations of every new item.

N. It is assumed that Contractor's prices are based on scope of work complete and as confirmed by site(s) inspections prior to bidding.

O. The Contractor shall be responsible for all incidental electric and plumbing work required to complete work under this Contract.

P. The Contractor shall be required to conform to all OSHA requirements regarding Lock-out/Tag-out procedures. This shall include, but not be limited to, disconnecting the power to any equipment to be serviced via a disconnect switch or breaker, locking out this power source, and tagging this lockout with appropriate wording as per OSHA requirements. This shall apply to any power source associated with this project.

Q. Safety and Security during Construction Statements: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 – Items 3a through 3e.

R. Additional Requirements of the Contractor:

1. No drinking of alcoholic beverages or use of controlled substances allowed on the grounds. No reporting to work impaired by alcohol or controlled substances is allowed. The Contractor bears the responsibility of determining if its, or its subcontractors, employees are in any way impaired which would jeopardize the safety of the public, the employees of other Contractors and their Subcontractors, the Owner, Architect, and Construction Manager.

2. All Contractors are to refrain from conversing with school personnel and students. Any construction employees found doing so will be removed from the site.

3. All Contractors are to refrain from using indecent language. All doing so will be removed from the site. Art work or decoration found on vehicles belonging to the Contractor's or Subcontractor's employees parked on or near the school property which contain indecent language or pictures shall either be covered or removed from the location.

S. Separation of Construction Statement: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 – Item D.

1. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs, or elevators designated for students or school staff.

2. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.

3. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety, and educational capabilities at all times that classes are in session.

T. Fire Prevention: There is no smoking allowed anywhere on school property per New York State law. Violators are subject to a $1,000 fine and/or banishment from the property.

1. Any holes in floors or walls should be sealed with a fire-resistant material.

U. Construction Noise: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 – Item H.

V. Construction Fume Control: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 – Item I.

W. Off-Gassing Control: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 – Item J.

X. Asbestos Code Rule 56: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner’s Regulation, Section 155.5 – Item K.

Y. Asbestos TEM: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner’s Regulation, Section 155.5 – Item L.

Z. Lead Abatement Projects: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner’s Regulation, Section 155.5 – Item M.

1.04 CLEANING

A. Upon completion of all work, the Contractor shall be totally responsible for general site clean up and shall provide all labor and material required to thoroughly "broom clean" the premises throughout. This cleaning shall include, but not be limited to, the removal of all surplus material from all radiators, pipes, ducts, gypsum boards, metal work, woodwork, stairs, floors, ceilings, glass and other material and surfaces, and all surfaces which are finished shall be left in a clean and suitable condition.

1.05 REMOVAL OF TEMPORARY WORKS

A. All temporary work such as guards, shoring, staging, etc., provided or erected by the Contractor shall be removed and shall become the property of the Contractor when such temporary work is no longer required, or when directed, or at completion of the contract.

1.06 MATERIALS, LABOR, TOOLS, WORKMANSHIP

A. The Contractor will provide and furnish at his own expense any and all material, labor, scaffolding, tools, implements, molds, models, and cartage of every description necessary or proper to or for the duty and performance of said work and the faithful execution of his contract.

1.07 ORDERING OF SPECIFIED MATERIALS

A. All specified materials are available from the manufacturers and some items require more time for delivery to the job than others. Therefore, to avoid the necessity of last minute substitutions because of late ordering, it will be the responsibility of the General Contractor to see that items that will require a substantial waiting period before delivery are ordered soon after the Contract is awarded.

1.08 SHUT-DOWNS

A. The Contractor shall perform the work in a manner which will minimize shut-downs of existing operating items or systems. When the performance of the work requires the shut-down of an existing operation item or system, such shut-down shall take place only after the Contractor has given at least five working days notice and has obtained written authorization for the shut-down from the Owner. All shut-downs shall take place only on overtime, at no additional cost. This provision shall apply to all work, including testing of newly installed or altered systems.

1.09 DELIVERIES AND STORAGE

A. All deliveries of materials or equipment must be done in conjunction with the Owner's representatives, to insure the least disruption of the facility. Storage of all materials must be approved by the Owner prior to delivery. The Owner will not accept any deliveries on

behalf of the Contractor. A Contractor's representative must be on site to accept such deliveries.

B. Before attempting to deliver materials to the site, the Contractor shall inform the designated Owner's Representative so that arrangements can be made for places of entrance and inspection of materials being delivered.

C. Storage of materials in the occupied building shall not be allowed unless otherwise agreed upon by the Owner's Representative. The Contractor shall be responsible for providing all storage trailers and security of same.

1.10 SPECIAL PROVISIONS

A. Contractor Representation at Construction Project Meetings:

1. Each Contractor shall provide qualified representation at all construction project meetings which will be held on a bi-weekly basis for the review of construction progress and coordination of all building trades. Failure of the Contractor to abide by these provisions may cause delays and incur additional expenses due to coordination difficulties.

B. Any existing items (whether or not specified or shown on the drawings) requiring removal in order to properly complete the new work shall be removed by the Contractor performing the work and disposed of off-site at no additional charge to the Owner.

C. Unless a specified item of removal, relocation, or installation (which appears to be in conflict with the actual site conditions) is brought to the attention of the Architect during the bidding period, the Contractor shall be responsible for the execution of said work and any related expenses incurred.

D. Should any work or material be required which is not denoted in the Plans and Specifications, either directly or indirectly, but which is necessary for the proper execution of the intent thereof, it shall be understood and agreed that the same is implied and required and that the Contractor shall furnish all labor and material as if they were completely delineated and prescribed.

E. Should a conflict occur between the drawings and specification and/or existing conditions, the Contractor shall be deemed to have estimated the more expensive way of accomplishing the work unless during the bidding period a clarification was requested by the Contractor and obtained in writing from the Architect, as to which method and material is to be used.

F. Where, in these specifications, one certain kind, type, brand, or manufacture of material is named, it shall be regarded as the required minimum standard of quality and performance. Where two or more are named, these are presumed to be equal and the Contractor may select one of these items. If the Contractor desires to use any other kind, type, brand, or manufacture of material that those named in the specification, he shall submit information describing in

detail where it differs from base specifications and other information as required by the Owner.

The burden of proof of equivalence rests with the bidder. Adequate supporting information must accompany proposed substitution. The Owner or Architect reserves the right to accept or reject proposed substitutes.

G. Any item shown on the plans but not specified or conversely specified but not shown on the plans, shall be treated as if shown or mentioned respectively in both.

H. Alignment and adjustment of all erected steel shall be accomplished by a registered professional or land surveyor at the Contractor's expense and to the satisfaction of the Inspector.

I. Inspection of all welded and high strength bolted field connections shall be accomplished by one of the following approved independent testing laboratories or an alternate testing company acceptable by the Owner. The Contractor shall arrange for and the Owner shall pay for all testing other than testing revealing failed results:

1. All Island Testing.

2. Soil Mechanics Environmental Services.

3. Long Island Materials Testing Laboratories, Inc.

J. Unless otherwise noted, each Contractor shall be responsible for their own cutting and rough patching. The General Construction Contractor shall be responsible for all finish patching and painting. All repair and patching work shall be done in a professional manner. The Contractor shall take care to match new and existing surfaces and materials as closely as possible for a continuous finish where duplication is impossible.

K. Each Contractor shall be responsible for their own material and equipment until completely installed, inspected for completeness and correctness, and signed off by the Architect or his duly appointed representative.

L. The General Construction Contractor shall be the lead contractor, responsible for all coordination between the General Construction, Mechanical, and Electrical trades.

M. The General Construction Contractor shall be responsible for cutting and patching all masonry work, insulated panels, etc. to accommodate any required thru-wall piping, conduit, equipment, or ductwork penetrations by other trades.

N. The General Contractor shall be responsible for provision of any required temporary roof drainage, protective fencing, plywood enclosure of all window and door masonry openings, etc., until new construction or material is permanently and completely in place.

O. The General Contractor shall provide and install all flashing, counterflashing, and pitch pockets for all roof equipment and roof penetrations and install all required roof curbs provided by others in accordance with the manufacturer's approved methods.

P. Changes to the Contract:

1. Should any changes be requested or required over and above the original contract scope, the Contractor shall be compensated as follows:

   a. For the actual and reasonable net costs for all materials and wages of applied labor required for such extra work.

   b. Rental costs for all machinery and equipment (other than small tools) required and approved for such extra work.

   c. 10% overhead and 5% profit as compensation for all other items of profit and cost or expense, including administration, overhead, supervision, etc. (Contractor is limited to 5% overhead for work performed by his subcontractor on changes.)

   d. A maximum of 2% for any increase in bonds and insurance's due to the adjusted contract sum.

Q. As is usual with capital project payments, the District will retain 5 percent of each payment issued on verified requisitions for payment submitted by the Contractor. This retainage total will be paid upon satisfactory completion of all work.

R. Contractor's proposals for any additional work (whether a field condition or program change) shall be submitted for consideration as follows:

1. Labor - Number of men
   Wage per hours
   Number of hours

2. Material - Unit costs (no lump sums)
   Unit measure (l.f., s.f., cu.ft., etc.)

3. Rental costs for machine, equipment, driver, etc.

4. 2% for bonds and insurance.

5. Upon request, the Contractor shall furnish satisfactory proof of all labor performed, materials furnished, and equipment used in performance of the extra work.

S. Whenever inclement weather (rain, hail, sleet, snow, etc.) causes an interruption in the day to day execution of the Contract work, each Contractor must fully mobilize their forces (with the necessary manpower and equipment) to immediately continue with Contract operations the very first day that such weather has subsided.

1. Contractor shall provide all necessary excavation and dewatering equipment to remove any standing water from open holes, ditches, trenches, and other excavations.

T. The maximum gross weight of vehicles used shall not exceed 2,500 lbs. per wheel in the area of any playground or ballfields. The equipment shall be fitted with flotation type tires. On lawns, the pounds per square inch exerted on the turf-grass shall not exceed 15 lbs. per square inch and on athletic areas shall not exceed 32 pounds per square inch.

U. See attached “Record of Unacceptable or Non-Conforming Work”.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01050 – UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION AND MAINTENANCE PROJECTS; COMMISSIONER'S REGULATIONS, SECTION 155.5

PART 1 - GENERAL

1. Certificate of Occupancy Statement: The existing building will be occupied during construction. Throughout the duration of construction the contractor shall maintain the integrity of the existing structure. The occupied portion of any school building and required exits shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

2. Asbestos / Lead / Polychlorinated Biphenyls Test Letter: All existing school areas to be disturbed during renovation or demolition (existing facilities building envelope components, interior finishes and concealed utility infrastructure) have been tested for lead, asbestos and Polychlorinated Biphenyls containing materials in accordance with OSHA, EPA, DEC and DOH requirements. Material test results are provided within the Project Manual. If negative for asbestos, Item 10 below does not apply. If negative for Lead, Item 11 below does not apply. If negative for Polychlorinated Biphenyls (PCB) item 12 does not apply.

3. Safety and Security Standards for Construction Projects: Throughout the duration of this construction project, the following general safety and security standards shall be maintained by all Contractors on site:

   a. All construction materials shall be delivered during the times as stipulated by the School District. All materials shall be stored in a safe and secure manner. Locations for on-site storage shall be coordinated with the Owner's Representative.

   b. Temporary construction fencing shall be erected around construction activity areas in accordance with Specification Section 01500. When indicated in the drawings, construction fencing will be shown on the Construction Implementation Plans. All fencing around construction activity areas shall be maintained to restrict unauthorized access and prevent students from entering site. Fencing around construction supplies or debris shall be maintained.

   c. Gates securing construction activity areas shall be secured and locked at all times unless manned by contractor personnel to prevent unauthorized access. Signs stating "Caution – Construction Activity Area Construction Personnel Only, Unauthorized Access Prohibited" shall be posted at all entry points and 75' intervals along security fence.

   d. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and designated with warning signs to prevent entry.

   e. Worker Photo Identification: Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

4. Separation of Construction Areas from Occupied Spaces: Construction areas which are under the control of a Contractor and therefore not occupied by District staff or students shall be separated from occupied areas by means of temporary construction barriers.
Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building in accordance with Specification Section 01500. Periodic inspection and repairs of the containment barriers must be made to prevent dust or contaminants from entering occupied areas. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

   a. A specific stairwell and/or elevator shall be assigned for construction worker use during working hours. In general, workers may not use corridors, stairs, or elevators designated for students or staff use.

   b. Contractors shall remove large amounts of construction debris and rubbish from the building using enclosed chutes or other similar sealed system to contain dust and other particulate. No material shall be dropped or thrown outside the walls of the building. Removal of construction debris and rubbish shall be through construction areas only, there shall be no movement of debris through halls of occupied spaces of the building.

   c. Dust and debris generated by construction activities in occupied parts of the building shall be cleaned by the Contractor at the close of each workday in accordance the General Requirements of Division 1, Section 1B and Specification Section 01015. The Contractor is responsible to maintain all health, safety, public address systems and educational capabilities of occupied areas within the school building at all times that classes are in session.

5. Exiting Plan: A plan showing how exits required by NYS Building Code will be maintained. This is typically shown within CIP and/or Code Compliance Plans.

6. Ventilation During Construction: A plan showing how required ventilation will be maintained during construction. This is typically shown within CIP and/or Code Compliance Plans.

7. Construction Noise: Construction and maintenance operations shall not produce noise in excess of 60 DBA in occupied spaces, or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical treatments shall be placed so as to abate the excessive noise levels. Acoustic treatments shall be prescribed by the Architect and supplied and installed by the Contractor.

8. Construction Fume Control: The Contractor shall be responsible for the control of chemical fumes, gasses and other contaminates produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes.

9. Off-Gassing Control: The Contractor shall be responsible for ensure that activities and materials which result in “off-gassing” of volatile organic compounds such as glues, paints, furniture, carpeting, wall

covering, drapery, etc. are scheduled, cured, or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

10. Asbestos Code Rule 56 Compliance: Where so indicated by positive test results, portions of the project may entail the removal of asbestos containing material as defined by 12NYCRR56. Large and small asbestos abatement projects (as defined by 8 NYCRR 155.5(k)) shall not be performed while the building is occupied. (Definition of "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction.) The isolated portions (the occupied portion and the portion under construction) of the building must contain separate code compliant exits. The ventilation systems must be physically separated and sealed at the isolation barrier(s).

    Removal of asbestos containing material shall only be performed when the building, as defined above, is unoccupied. The Contractor shall verify that the building has been vacated prior to commencing asbestos abatement work. If the building is configured such that the affected area can be completely isolated from the unaffected areas with sealed non-combustible construction barriers, then the unaffected areas can remain occupied provided required exits are maintained independently in both areas.

    Removal of asbestos containing materials on the exterior of the building such as flashing, roofing, siding or soffit and caulking may be performed on occupied buildings provided all variances have been granted and the occupants have been notified of the intention to remove asbestos containing material. Complete isolation of ventilation systems supplying the occupied spaces and windows must be maintained throughout the removal duration.

    Asbestos TEM: Where so indicated by positive test results, the asbestos abatement area shall be completely sealed off from the rest of the building and completely cleaned and tested by TEM prior to re-entry by the public.

11. Lead Abatement Projects: At interior painted surfaces which have tested Positive for Lead: Portions of walls that will be disturbed as a requirement of this contract shall be removed in accordance with the Lead Safety Plan included within the Project Manual. This section clearly references OSHA regulations to be followed, and clean-up and testing associated with lead abatement must be done in strict conformance with HUD protocol. Locations where construction activity requires the removal of lead containing materials shall be completely isolated from occupied portions of the building using a construction barrier. The Contractor shall have all surrounding areas tested for lead levels prior to commencing work and after work has been completed to ensure that surrounding areas have not been contaminated by removals.

12. PCB Projects: Any window caulking tested and found to contain PCBs must be removed in accordance with U.S. EPA regulations under the Toxic Substances Control Act (40 CFR 761.62). Soil areas adjacent to windows containing PCBs must follow the 40 CFR 761.62 criteria. A site-specific abatement plan must be developed to address potential environmental and public health concerns. Steps for abating contamination and preventing contamination of nearby areas must be done in accordance with HUD Technical Guidelines for the Evaluating and Control of Lead Based Paint Hazards in Housing.

Removal of PCB containing materials on the exterior of the building such as caulking may be performed on occupied buildings provided all variances have been granted and the occupants have been notified of the intention to remove PCB containing material. Complete isolation of ventilation systems supplying the occupied spaces and windows must be maintained throughout the removal duration.

13. Fire Prevention: Any holes in floors or walls shall be sealed with a fire-resistant material whose rating meets or exceeds that of the construction to which it is attached.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01070 - ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section lists and defines various common abbreviations which are used throughout the Contract Documents.

B. Abbreviations of organizations and federal agencies which publish standards, codes, and regulations are defined in section 01060 - CODES AND STANDARDS.

C. Other abbreviations and symbols may be found in legends and elsewhere on the Drawings. Piping material abbreviations are contained in the piping sections.

D. Should an abbreviation or symbol not be specifically defined, it shall carry the standard definition commonly used in the industry.

E. Whenever any doubt arises as to what an abbreviation or symbol means, notify Engineer and he will issue a definition in writing.

1.02 ABBREVIATIONS

A. The following is a list of commonly used abbreviations which may be found in the Contract Documents, and the meanings ascribed to them:

A.C. or ac	Alternating Current
a or A	Amperes
AFF	Above Finished Floor
amp or Amp	Amperes
Alum.	Aluminum
Asph.	Asphalt
AWG.	American Wire Gauge
Aux.	Auxiliary
Bit. Conc.	Bituminous Concrete
CB	Circuit Breaker
Cl.	Class
cm	Centimeter
C.O.	Clean out
Conc.	Concrete
Cont.	Continuous
Cu.	Cubic
cc	Cubic Centimeters
C.F.	Cubic Feet
CFM or cfm	Cubic Feet Per Minute
CFS or cfs	Cubic Feet Per Second
C.Y.	Cubic Yards
CT	Current Transformer
D.C. or dc	Direct Current
DFT.	Dry Film Thickness

Dia.	Diameter
DWG. or Dwg.	Drawing
Dr.	Drive
Ea. or ea.	Each
EF	Each Face
EW	Each Way
Eff. or eff.	Efficiency
El. or Elev.	Elevation
Fin. Gr.	Finished Grade
fps	Feet Per Second
Ft. or ft.	Feet
ftg.	Footing
g.	Grams
Ga. or ga.	Gauge
Gal. or gal.	Gallon
Galv.	Galvanized
GPD or gpd	Gallons Per Day
GPM or gpm	Gallons Per Minute
H-O-A	Hand-off-automatic
Hz. or hz	Hertz
I.D.	Inside Diameter
Inv.	Invert
KVA or kva	Kilovolts-amperes
Kw or kw	Kilowatts
kwh or KWH	Kilowatt-hours
Lbs. or lbs.	Pounds
L.F.	Linear Feet
LPA	Lighting Panel "A"
L.S.	Lump Sum
m.	Meters
mA	Milliamperes
Max. or max.	Maximum
MCC	Motor Control Center
mg.	Milligrams
MGD or mgd	Million Gallons Per Day
mi.	Miles
Min. or min	Minimum
mm	Millimeters
No. or no.	Number
nom.	Nominal
N.T.S.	Not To Scale
O.D.	Outside Diameter
O & M	Operations and maintenance
Oz. or oz.	Ounce
pb	Pushbutton
PPD	Pounds Per Day
P/B	Pullbox
pri.	Primary
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch,
psig	Pounds Per Square Inch, Gauge Pressure
PT	Potential Transformer
Pvt. or Pvmt.	Pavement
R.	Radius
R.O.W.	Right-of-Way

Sch.	Schedule
sec.	Secondary or Seconds
S.F.	Square Feet
S/S/P/	Stop-start-pilot Station
Std. or std.	Standard
S.Y.	Square Yards
T&B	Top and Bottom
Typ.	Typical
U.O.N.	Unless Otherwise Noted
U.V.	Ultraviolet
V or v	Volts
Vac or VAC	Alternating current Voltage
Vdc or VDC	Direct Current Voltage
V.F.	Vertical Feet
Vol.	Volume
W or w	Watts
Yd. or yd.	Yards

1.03 SYMBOLS

A. The following is a list of commonly used symbols which may be found in the Contract Documents, and the meanings ascribed to them:

P	Phase, Diameter, or Round (as applicable)
D	Degrees (F. = Fahrenheit C. = Centigrade)
'	Feet or Minutes
"	Inches or Seconds
#	Number or Pound
/	Per or Divided by

PART 2 - EXECUTION

(NOT UTILIZED)

PART 3 - EXECUTION

(NOT UTILIZED)

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01085 - APPLICABLE STANDARDS

PART ONE - GENERAL

1.01 GENERAL:

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and type of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship, which meet or exceed the specifically named code or standard.

3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

1.02 QUALITY ASSURANCE:

A. Familiarity with pertinent codes and standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements.

B. Rejection of non-complying items: The Architect reserves the right to reject items incorporated into the Work, which fail to meet the specified minimum requirements. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to and adjustment in the Contract Amount as approved by the Architect and the Owner.

C. Applicable standards listed in these Specifications include, but not necessarily limited to, standards promulgated by the following agencies and organizations:

1. AASHTO: American Association of State Highway and Transportation Officials, 342 National Press Building, Washington, D.C. 20004.

2. ACI: American Concrete Institute, Box 19150, Redford Station, Detroit, MI 48129.

3. AISC: American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, NY 10020.

4. ANSI: American national Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, NY 10018.
5. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

6. AWS: American Welding Society, Inc., 2501 N. W. 7th Street, Miami, FL 33125.

7. AWWA: American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, CO 80235.

8. CRSI: Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, IL 60610.

9. CS: Commercial Standard of NBS, J.S., Department of Commerce Government Printing Office, Washington, D.C. 20402.

10. DHHS: Department of Health and Human Services, 26 Federal Plaza, New York, NY 10007 (212) 264-2560

11. EPA: Environmental Protection Agency Region II, 26 Federal Plaza, NY, NY 10007 Asbestos Coordinator – Room 802 (212) 264-7307

    Part 61, Sub-Part M
    National Air Emissions Standards for Hazardous
    Air Pollutants (NESHAP)
    40 CFR Paret 763, Subpart E
    Asbestos Hazard Emergency Response Act (AHERA)

12. FED. SPECS.: Specifications Sales (3F21) Bldg. 197, Washington Navy Yard, GS, Washington, DE 20407

13. FGMA: Flat Glass Marketing Association, 3310

14. NAAMM: National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, IL 60302.

15. NEC: National Electrical Code (see NFPA).

16. NEMA: National Electrical Manufacturers Association, 155 East 44th Street, New York, NY 10017.

17. NFPA: National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.

18. NIOSH: National Institute for Occupational Safety and Health, 26 Federal Plaza, New York, NY 10007, (212) 264-2485

19. OSHA: Occupational Safety/Health Administration, New York Regional Office, 1515 Broadway, NY, NY 10036, Room 3445 (212) 944-3426

20. SDI: Steel Deck Institute, 135 Addison Avenue, Elmhurst, IL 60125.

21. SED/SLD: State Education Department and State Labor Department

22. SSPC: Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, PA 15213.

23. TCA: Tile Council of America, Inc., P. O. Box 326, Princeton, NJ 08540.

24. UL: Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611.

25. Fed Specs and Fed Standards: Specifications Sales (3FRI), Bldg. 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.

26. MIL-SPECS: Military Specifications, Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.

27. UBC: Uniform Building Code, International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01230 – CONSTRUCTION PHASE CLARIFICATIONS – REQUESTS FOR INFORMATION FROM ARCHITECT'S OFFICE

PART 1 - GENERAL

1.01 SUBMISSION OF ARCHITECT'S RFI FORM:

A. In addition to the requirements of General Conditions, Articles 1.1.10, 1.1.11, 1.26, 3.12, 4.2, 4.3, 4.4, 7.1, 7.2, 7.3, 7.4, 7.5 and 13.4 (and all other Articles as deemed applicable by the Architect), each Prime Contractor shall comply with the following wherever it applies to the work of his contract:

1. Each Prime Contractor shall prepare and submit, on the Architect's attached form (see last page of this specification section), an original Request For Information (RFI) to Architect's Office, for all questions which may arise during post-bid award activities which are to be directed to the office of the Architect. This form shall be submitted before commencement of any work, which may be in question. (Commencement of work in question shall constitute complete acceptance of field conditions and necessary remedial repairs as directed by the Architect, and work shall be conducted at no additional charges to the Owner.) The RFI form shall indicate, at the bare minimum, the following information:

   a. Date of Request and RFI number.

   b. Project Name and Project Number: reflecting title sheet information, including SED number.

   c. Attention of: Name of Architect in Charge/Project Director/Project Manager.

   d. From: Name of submitting Prime Contractor representative, including his project title, office or field office phone number, and fax number.

   e. Trade: The Prime Contract, which is being represented.

   f. Date Information Required By: Fill in exact date information is required. "*ASAP*" or "*IMMEDIATELY*" will not be acknowledged by the Architect's office.

   g. Detailed description of requested item.

2. Note to all Prime Contractors: *Request For Information* forms shall be used for requests, clarifications, or questions on contract drawings and specifications, ***not*** contract terms, scheduling items, or general correspondence, or as a means to describe or request approval of alternate construction means and methods, concepts, substitutions, materials, or systems. *Each individual Prime Contractor is to fill out the Architect's RFI form completely (leaving no blanks) and send them DIRECTLY*

via fax to the Architect's Office, with a concurrent copy to the Construction Manager's office. Neither the Architect nor the Construction Manager will be filling out these forms on your behalf, but they will be working with each other and the Owner to answer such RFIs. Incomplete RFI forms will not be logged in, and will be discarded. *It shall not be the Architect's responsibility to contact any Prime Contractor submitting RFIs to verify their completeness or accuracy.*

B. RFI Log: Each Prime Contractor shall be responsible to generate an RFI log, to be updated and submitted weekly to the Architect and the Construction Manager. Examples of acceptable log format can be obtained from the office of the Construction Manager. Log shall include, at bare minimum, the following items:

a. Date of submittal to Architect's office, and method of transmittal.

b. Date of response from Architect's office.

c. If not yet responded to, number of days since submittal.

d. In Prime Contractor's opinion, list of affected trades impacted by the results.

1.02 LIMITATIONS:

A. Requests for information shall be made in full accordance with A.I.A. Standard Document B141-1997 (Standard Form of Agreement Between Owner and Architect), Article 2.6, Contract Administration Services, Items 2.6.1.5, 2.6.1.6, and 2.6.1.7. The Architect agrees to the following actions with regard to "Requests For Information" which are received by his office:

1. The Architect shall review properly prepared, timely requests by the Contractor for additional information about the contract documents. A properly prepared Request for Additional Information about the Contract Documents shall be in a form prepared or approved by the Architect, and shall include a detailed written statement that indicates the specific drawings or specifications in need of clarification and the nature of the clarification requested (A.I.A. B-141-2.6.1.5).

2. If deemed appropriate by the Architect, the Architect shall, on the Owner's behalf, prepare, reproduce, and distribute supplemental drawings and specifications in response to Request For Information by the Contractor (A.I.A. B-141-2.6.1.6).

3. The Architect shall interpret and decide matters concerning performance of the Owner and Contractor under, and requirements of, the contract documents on written request of either the Owner or Contractor. The Architect's response to such requests shall be made in writing within any time limits agreed upon or otherwise with reasonable promptness (A.I.A. B-141-2.6.1.7).

4. Based upon the amount of RFIs received, and their content, unless otherwise so indicated on the RFI, the Architect shall establish the level of importance of said RFIs, and shall be allowed sufficient time in the Architect's professional judgement to permit adequate review. Prior to submitting any RFIs, each Prime Contractor shall use their individual discretion in determining whether or not an RFI format or verbal format be used to resolve said situation.

5. In the event of multiple sequential RFIs received same day at the Architect's office*, unless they are specifically numbered by the Prime Contractor for their order of relative importance*, they will be reviewed either: a) in the time order in which they were received by the Architect's office, b) in their natural progressive order of construction placement, or c) in order of preference, as determined by the Architect.

6. As a result of multiple sequential RFI submission, no delays in time, or Prime Contractor hard or soft costs shall be implied or imposed onto the Architect. It is the Prime Contractor's complete responsibility to adhere to the prepared Construction Schedule at all costs, including extended delays, which may be incurred by time required for RFI responses from the Architect's office.

7. Should an answer be required 'immediately', the Prime Contractor shall simply place an asterisk by the date required to call attention to such a fact. He shall coordinate his own work forces accordingly to allow the Architect proper review and analysis time for resolution of such 'immediate' problems.

8. *It shall be the Prime Contractor's complete responsibility* to document any verbal responses, into either follow-up RFI submittals or formal letters (on company logo stationery) to the Architect's office. Upon receipt, the Architect will review and make modifications to the correspondence if it varies in content from the Architect's interpretation. This will eliminate confusion or misunderstandings made in verbal form.

9. The Architect shall be the sole interpreter of all RFI validity, as the RFI is based on products of service produced by the Architect's office. The Architect reserves the right to reject any and all RFIs deemed frivolous or trivial.

10. As work in question is directed to the Architect for his sole response, only the attached Architect's RFI form will be considered as final and binding.

1.03 LOG-IN PROCEDURE FOR ALL RFI REQUESTS

A. Log-in procedures are based on the normal business hours of the Architect's office, and ***will not be modified for any reason***. The Architect's normal business hours are 8:00 a.m. to 5:00 p.m., EST, Monday through Friday. ***All RFIs shall be reviewed by the Architect's office during normal business hours.*** The Architect's office is closed on the following legal holidays: New Year's Day, President's Day, Memorial Day, Labor Day, Thanksgiving Day and the day following, and Christmas Day. ***Under no circumstances shall the Architect's office be considered or assumed as open for business on Saturdays, Sundays, or legal holidays.***

B. Any RFIs, which are received between 8:00 a.m. and 2:59:59 p.m. on a normal business day, will be received and logged in as received on that business day. Any RFIs, which are received and logged in by the Architect's Office at 3:00 p.m. or later (Eastern Standard Time) on a normal business day shall be considered as received at 8:00 a.m. the following business day. Any RFIs received by the Architect's office at or after 3:00 p.m. on Fridays will be logged in as received at 8:00 a.m. on the next following business day (Monday), In the case of the following calendar day being a holiday, the RFI shall be considered as received on the next non-holiday business day at 8:00 a.m. ***All receipt times shall be as determined by the received time stamped and signed in by the Architect's office.***

1.04 PROPER SEQUENCING OF RFI SUBMISSIONS

A. It is the Prime Contractor's sole responsibility to fully coordinate submission of RFI forms with shop drawing and technical data submittals made or yet to be made. The Prime Contractor must coordinate each RFI with requirements of work and the contract documents.

B. The Prime Contractor's responsibility for deviations in submissions from requirements of contract documents is not relieved by Architect/Engineer's review of RFIs or associated submissions, unless the Architect gives written acceptance of specific deviations.

C. The Prime Contractor's responsibility for errors and omissions in submissions or RFIs is not relieved by the Architect's review of submissions or RFIs.

D. In conformance with Section 01300 - Submissions, notify the Architect in writing *at time of shop drawing/technical data submission* of deviations in submissions from requirements of contract documents. Do not wait until RFI is prepared to inform the Architect's office of planned deviations.

E. Similar to Section 01300 - Submissions, no portion of the work requiring RFI clarifications shall be started, fabricated, or installed until return of Architect's formal response, including any supplemental information the Architect deems relevant for clarification.

F. After response to RFI, the affected Prime Contractor shall distribute copies of the RFI responses to all parties requiring

same for coordinating all subsequent work. The Architect's only responsibility shall be to supply one copy of each RFI resolution to: the Construction Manager, the Owner, and the affected Prime Contractor who initiated the RFI.

G. The affected Prime Contractor shall make required copies of all RFI resolutions for distribution to all affected parties immediately upon receipt and review of same.

1.05 AFFECT OF RFI RESPONSES ON THE PRIME CONTRACTOR'S CONSTRUCTION SCHEDULE

A. All Prime Contractors shall note well that the Architect is not legally bound to their approved construction schedules; the Prime Contractors are the only parties legally bound therein. The Architect is not required to expedite any reviews or comments in the effort to expedite the Prime Contractors' submission and/or construction schedules. Therefore, time delays created by the Architect's required review time of each RFI shall be absorbed into the Prime Contractor's work schedule accordingly. This may necessitate such Prime Contractor measures as: multiple work crews, off-hour or weekend construction by the affected Prime Contractor(s), to be completed at no additional costs to the Owner. For this reason, it is imperative that each Prime Contractor carefully review all documents as early as possible, in order to issue RFIs by the earliest possible date.

B. Any RFIs which are relative to an alteration, to the approved contractual details, or specifications will be specifically referred to the Architect's office with relative time differences noted. Any additional time required for alterations, if RFIs are approved, shall have all additional costs (if any) absorbed directly by the Prime Contractor affected. ***Should other Prime Contractors be directly affected in either labor, material, or equipment costs, their additional costs shall be borne by the Prime Contractor who initiated the RFI.***

1.06 AFFECT OF RFI FORMS ON CONTRACTOR PREPARATION, AND PREPARATION OF SHOP DRAWINGS, SAMPLES, MANUFACTURER'S DATA, ETC.

A. It is the responsibility of the Contractor furnishing and/or installing materials and/or systems to these projects to field verify all existing and/or as-built conditions, as well as all conditions presently under construction that are interrelated in whole or in part to the furnishing and/or installing of such materials and/or systems. Submissions of RFI forms are at the sole discretion of each Prime Contractor.

B. It is the responsibility of each Prime Contractor to coordinate such field verification and be ultimately responsible for the accuracy of same prior to the submission of any RFI forms or shop drawings for design intent review by the Architect/Engineer.

C. Similar to submittal information indicated in Section 01300 - Submissions, all RFIs initiated by any subcontractor and/or supplier of the Prime Contractor and/or supplier of the Prime Contractor or by the Prime Contractor themselves shall be reviewed by and shall be deemed officially submitted by the Prime Contractor. All RFIs shall be thoroughly checked by the Prime Contractor prior to the submission of same to the Architect's office for: contract document accuracy, validity and/or equivalency (if applicable); total quantity of material provided; all dimensioning systems related; alteration to same if necessary to accommodate accepted field changes built or pending; interaction with other materials and/or systems furnished and/or installed by this Prime Contractor or their subcontractors (i.e., field measurements for space allocation,

accuracy to previous submittals of this Prime Contractor, etc.); and interaction with materials and/or systems provided by other Prime Contractors.

D. After the completion of applicable RFIs, when submitting subsequent revised technical data or revised shop drawings, the Prime Contractor shall signify same on subsequent submittal by having the following information on each and every submittal:

- Name of Prime Contractor
- Date of Review by Prime Contractor
- Note: This submittal has been reviewed by (Name of Prime Contractor) in accordance with the contract documents describing and defining the requirements of such review, with affected RFI number attached.
- Copy of approved RFI, indicating Architect's final comments.
- Signature of Prime Contractor's reviewer.
- Name of Prime Contractor's reviewer (printed).
- Title of Prime Contractor's reviewer (printed).

E. The Prime Contractor shall submit in writing to the Architect and Construction Manager, prior to their relevant revised or initial submissions, the name and title of the reviewer who shall be an employee of the Prime Contractor for review and acknowledgment of same, along with the recommended RFI from the Architect's office.

F. As this project has a Construction Manager who is acting on the Owner's behalf and who has full-time construction site representation, the scheduling of all RFIs, submissions, the coordination, and interaction of other prime contractors, field conditions that affect the submission of, fabrication of, or installation of another Prime Contractor's submission, fabrication, or installation shall be made known to the Owner's Representative. Refer to Section 01300 - Submissions for additional relevant information.

G. Any resultant construction field condition that arises that is contrary to an RFI or submission made, that is conflicting with another Prime Contractor's submission, the schedule for construction, or with another Prime Contractor's constructed work shall be immediately identified by the Prime Contractor(s) and made known to the Owner's Representative. If such condition causes any construction schedule delay, "rereview" by the Architect/Engineer, additional work of the Architect/Engineer (such as field review, "redesign" or document preparation); or "reconstruction" of any work already built and/or accomplished by another Prime Contractor, the connection to such conditions (and any associated costs to accomplish same) shall be the sole responsibility of the Prime Contractor found negligent in causing such conditions.

H. Any RFI not containing complete information outlined and required as indicated within the above subsections will not be reviewed by the Architect for design intent, but rather rejected and discarded, so all Prime Contractors must insure that no blanks are left on their submitted RFIs. All time lost as a result of this error will be the sole responsibility of the Prime Contractor who made the error.

I. Any RFI submitted by the Prime Contractor that requires subsequent coordination with another material and/or system provided by this Prime Contractor or another Prime Contractor that has been reviewed, by that Prime Contractor and previously submitted to the Architect may be rejected in whole or part by the Architect, or held in abeyance by same until the corresponding and coordinating submittals are submitted as the concurrent review of all such submittals for design intent, may be deemed important by the Architect. Any release given any entity other than the Architect to fabricate, furnish, and install any material or system not reviewed by the Architect for design intent shall become the sole responsibility of the releasing entity as well as the resolution of construction related issues or conflicts, relative to approved or disapproved RFIs.

J. In addition, the Prime Contractor shall not utilize nor refer to any schedule of work not created nor provided by the Architect. The Prime Contractor's method in establishing, defining, and/or substantiating their ability to maintain the schedule presented in these contract documents and as prepared by the Owner's representative shall be exclusive of a defined time period of submittal review, and shall not be dependent upon RFI approval or time delays incurred.

K. Similar to Item 1.03L of Section 01300 - Submissions, the rejection or abeyance noted in the above subparagraph shall not be considered a delay or a reason for an extension of time in the construction schedule to the contract, as such cause for same shall have been brought upon by the Prime Contractor not providing the "pre-coordination" necessary for such submissions.

PART TWO – PRODUCTS

Not Applicable.

PART THREE – EXECUTION

Not Applicable.

END OF SECTION

BBS Architects, Landscape Architects, & Engineer, P.C.
244 East Main Street
Patchogue, New York 11772

Phone: (631) 475-0349
Fax: (631) 475-0361

REQUEST FOR INFORMATION

RFI NO:____

DATE: / /

PROJECT: **PROJ. NO:**

LOCATION:

TO THE ATTENTION OF:

FROM:

PHONE: **FAX:**

TRADE:

DATE INFORMATION REQUIRED BY:

REQUEST:

Spec Section: Description:

REPLY:

BY: **FIRM:** **DATE:**

If a "Request for Information" is deemed relevant and appropriate by the Architect, the Architect's response to such requests shall be made in writing within any time limits agreed upon or otherwise with reasonable promptness. Upon evaluation of the Prime Contractor's request and if deemed necessary, the Architect's response may include supplemental drawings and specifications.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01300 - SUBMISSIONS

PART 1 - GENERAL

1.01 SHOP DRAWINGS, PRODUCT DATA, MANUFACTURER'S WARRANTIES, AND SAMPLES:

A. In addition to the requirements of General Conditions, Article 3.12, each Prime Contractor shall comply with the following wherever it applies to the work of his contract:

1. Prepare and submit, with construction schedule, a separate schedule for shop drawings, product data, and samples submittals, which shall be herein referred to as a "Submittal Log". This log shall list all required submittals specific to your trade as detailed in the various sections of the Project Specifications. Submittal log shall be submitted within one (1) calendar week of Notice to Proceed, before submitting first payment application. Submittal log shall show the following:

   a. Section number.

   b. Item of shop drawing, product data, and samples.

   c. Date to be submitted.

2. Shop drawings: Original drawing, prepared by Prime Contractor, subcontractor, supplier, or distributor, which illustrates some portion of the work; showing fabrication, layout, setting or erection details.

   a. Identify details by reference to sheet and detail numbers shown on contract drawings.

   b. Sheet size, multiple of 8-1/2" x 11", not to exceed size of contract drawings when unfolded.

   c. Reproductions for submittals: One (1) reproducible transparency with seven (7) opaque diazo prints.

   d. Photographic reproductions of contract drawings will not be accepted as shop drawings and will be rejected.

3. Product Data:

   a. Manufacturer's standard schematic drawings:

      1. Modify drawings to delete information which is not applicable.

      2. Supplement standard to provide additional information applicable to the project.

   b. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

1. Clearly mark each copy to identify applicable materials products, or models.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

c. Latest edition of manufacturer's applicable instructions and recommendations for installation of product.

4. Manufacturer’s Warranties:

a. The Contractor shall include in his submissions samples of all manufacturer’s warranties indicating the correct time duration of the warranty as specified in the contract documents. If the documents do not specify a specific time duration, the manufacturer’s standard time duration shall apply, but in no event shall it be less than the contractor’s guarantee as specified in Section 01700.

5. Samples: Physical examples to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged.

a. Office samples to be sufficient size and quantity to clearly illustrate:

1. Functional characteristics of product or material, with related parts and method of attachment.

2. Full range of color samples.

b. Field samples and mock-ups, as specified in technical sections.

1. Erect on project site at location acceptable to Architect/Engineer.

2. Construct samples or mock-up complete, including work of all trades required in finish work.

6. The Architect refers to A.I.A. Document B141-1997*, Standard Form of Agreement Between Owner and Architect*, and has based the submittals procedure on said document.

1.02 PRIME CONTRACTOR RESPONSIBILITIES:

A. All submissions are to be made directly to the Architect’s office. Each Prime Contractor shall completely review, stamp, and sign his shop drawings, product data, and samples prior to submission to Architect. The Architect will not review any shop drawings unless first reviewed by Prime Contractor. Refer to 1.04G “Concurrent Submittals” for copies to be forwarded concurrently to the Construction Manager.

B. Verify:

1. Field measurements.
2. Field construction criteria.

3. Catalog numbers and other data.

C. Coordinate each submission with requirements of work and contract documents. Prime Contractor shall exercise professional judgement to adequately address time gaps between submissions, Architect’s/Engineer’s review time, resubmission time, fabrication, procurement and long-lead purchases, and on-site priorities which dictate installation times.

D. Each Prime Contractor will be responsible to send all shop drawings and technical submittals to the Architect’s office via Federal Express Overnight Priority Delivery, or other comparable delivery services.

E. Each Prime Contractor is responsible to supply the proper number of copies for all submissions, including samples, color boards, etc. The Architect has the right to reject and return any submissions made which do not conform to the requirements indicated herein.

F. Prime Contractor's responsibility for errors and omissions in submissions is not relieved by Architect/Engineer's review of submissions.

G. Prime Contractor's responsibility for deviations in submissions from requirements of contract documents is not relieved by Architect/Engineer's review of submissions unless Architect/Engineer gives written acceptance of specific deviations.

H. All submissions shall be accompanied by a **Letter of Transmittal**, signed by the Prime Contractor’s project manager. Notify Architect/Engineer, in writing at time of submission of deviations in submissions from requirements of contract documents. In addition, all submittals shall be accompanied by a signed and dated **“Submittal Cover Sheet”** for each item, which acknowledges the Prime Contractors review for completeness, correctness and accuracy of each submitted item.

I. No portion of the work requiring submissions shall be started, fabricated, or installed until return of approved submissions to the prime contractor.

J. After Architect review, distribute copies of submissions to parties requiring same for coordinating of work.

K. Make required copies for distribution of shop drawings, and product data, that has been stamped and signed by the Architect.

1.03 CONTRACTOR PREPARATION, REVIEW, AND SUBMISSION OF SHOP DRAWINGS, SAMPLES, MANUFACTURER'S DATA, ETC.

A. It is the responsibility of the Contractor furnishing and/or installing materials and/or systems to these projects to field verify all existing and/or as-built conditions, as well as all conditions presently under construction that are interrelated in whole or in part to the furnishing and/or installing of such materials and/or systems.

B. It is the responsibility of the Prime Contractor, to coordinate such field verification and be ultimately responsible for the accuracy of same prior to the submission of shop drawings for design intent review by the Architect/Engineer.

C. All submittals of shop drawings, materials, samples, etc. prepared by any subcontractor and/or supplier of the Prime Contractor or by the Prime Contractor themselves shall be reviewed by the Prime Contractor, prior to the submission of same to the Architect/Engineer, for: contract document accuracy and equivalency (if applicable); total quantity of material provided; all dimensioning systems related; alteration to same if necessary to accommodate accepted field changes built or pending; interaction with other materials and/or systems furnished and/or installed by this Prime Contractor or their subcontractors (i.e., field measurements for space allocation, accuracy to previous submittals of this Prime Contractor, etc.); and interaction with materials and/or systems provided by other Prime Contractors.

D. After the completion of such review as stated in 1.03C above, the Prime Contractor shall signify same by having the following information on each and every submittal:

- Name of Prime Contractor
- Date of Review by Prime Contractor
- Note: This submittal has been reviewed by (Name of Prime Contractor) in accordance with the contract documents describing and defining the requirements of such review.
- Signature of reviewer.
- Name of reviewer (printed).
- Title of reviewer (printed).

E. In compliance with 1.03D above, the Prime Contractor shall submit in writing to the Architect/Engineer and Owner’s representative (if any), prior to their first submission, the name and title of the reviewer who shall be an employee of the Prime Contractor for review and acknowledgment of same.

F. As this project has a Construction Manager who is acting on the Owner’s behalf and who has full-time construction site representation, the scheduling of submissions, the coordination, and interaction of other prime contractors, field conditions that affect the submission of, fabrication of, or installation of another Prime Contractor’s submission, fabrication, or installation shall be made known to the Owner’s Representative.

G. Any resultant construction field condition that arises that is contrary to a submission made, that is conflicting with another Prime Contractor’s submission, the schedule for construction, or

with another Prime Contractor's constructed work shall be immediately identified by the Prime Contractor(s) and make known to the Owner's Representative, and, if such condition causes any construction schedule delay, "rereview" by the Architect/Engineer, additional work of the Architect/Engineer (such as field review, "redesign" or document preparation); or "reconstruction" of any work already built and/or accomplished by another Prime Contractor, the connection to such conditions and associated costs to accomplish same shall be the sole responsibility of the Prime Contractor found negligent in causing such conditions.

H. No submission to the Architect/Engineer shall contain or utilize directly portions whole or in part of the contract documents, such as the reproduction of drawings, portions of the Project Manual, etc.

I. The Architect's office reserves the right to retain any submitted technical data and shop drawings in abeyance if: submissions are incomplete, improper number of samples are submitted, if submissions are not accompanied by a properly-executed submittal cover sheet/letter of transmittal, or until all associated/interrelated shop drawings or interrelated technical data are submitted. See "K" below.

J. Any submission not containing the information outlined and required in 1.03D above will not be reviewed by the Architect/Engineer for design intent, but rather rejected and sent back to the Prime Contractor for review by same.

K. Any submission by the Prime Contractor that requires coordination with another material and/or system provided by this Prime Contractor or another Prime Contractor that has been reviewed, by that Prime Contractor and previously submitted to the Architect/Engineer may be rejected in whole or part by the Architect/Engineer, or held in abeyance by same until the corresponding and coordinating submittals are submitted as the concurrent review of all such submittals for design intent, may be deemed important by the Architect/Engineer. Any release given any entity other than the Architect/Engineer to fabricate, furnish, and install any material or system not reviewed by the Architect/Engineer for design intent shall become the sole responsibility of the releasing entity as well as the resolution of construction related issues or conflicts.

L. In addition, the Prime Contractor shall not utilize nor refer to any schedule of work not created nor provided by the Architect/Engineer. The Prime Contractor's method in establishing, defining, and/or substantiating their ability to maintain the schedule presented in these contract documents and as prepared by the Owner's representative shall be exclusive of a defined time period of submittal review.

M. The rejection or abeyance noted in the above subparagraph shall not be considered a delay or a reason for an extension of time in the construction schedule to the contract, as such cause for same shall have been brought upon by the Prime Contractor not providing the "pre-coordination" necessary for such submissions.

N. The Architect is not legally bound to the approved construction schedule; only the Prime Contractors are bound to the approved construction schedule. The Architect is not required to expedite reviews or comments in the effort to expedite any Prime Contractors' submissions and/or construction schedule.

1.04 SUBMISSION REQUIREMENTS:

A. Submit eight (8) copies of product data.

B. Submit one (1) reproducible transparency (sepia) and seven (7) prints.

C. Submit three (3) samples specified in each technical section.

D. All specification/product data catalogue cuts submitted by the Prime Contractor(s) to the Architect's office for approval and processing shall be accompanied by a signed and dated "Submittal Cover Sheet", which shall acknowledge the Prime Contractor's receipt, completeness and correctness of the submitted material. A Letter of Transmittal shall accompany all submissions, and it shall contain:

1. Date of submission.

2. Architect/Engineer's project title and project number (include all extensions).

3. Attention of: name of Architect's designated project representative.

4. Prime Contractor's name and address.

5. Notification of deviations from contract documents.

6. Any additional pertinent data.

E. Submissions shall include:

1. Date and revision dates.

2. Architect/Engineer's project title and number.

3. The Names of:

a. Architect/Engineer.

b. Prime Contractor.

c. Subcontractor.

d. Supplier.

e. Manufacturer.

4. Identification of product.

5. Relation to adjacent structure or materials.

6. Field dimensions, clearly identified as such/

7. Technical specification section number.

8. Applicable standards.

9. A blank space 4" x 4", for the Architect/Engineer’s stamp.

10. Identification of deviations from contract documents.

11. Prime Contractor's stamp, initialed or signed, certifying to review of submission, verification of field measurements and compliance with contract documents.

F. Catalog Data:

1. Submit catalog data with a "Catalog Data" cover sheet with information as listed in paragraph 1.03, F., above.

G. Concurrent Submittals: In addition to submitting the above to the Architect’s office, the Prime Contractor will also send, concurrently, one (1) copy of drawing/cuts simultaneously to the Construction Manager.

1.05 RESUBMISSION REQUIREMENTS:

A. Shop Drawings:

1. Revise initial drawings as required and resubmit as specified for initial submission.

2. Indicate on drawings any changes which have been made other than those requested by the Architect/Engineer.

B. Product Data and Samples:

1. Submit new data and samples as required for initial submission.

1.06 DISTRIBUTION OF SUBMISSIONS:

A. Prime Contractor shall distribute copies of shop drawings, product data, and/or samples which carry the Architect/Engineer approval stamp to:

1. Prime Contractor's file (as required).

2. Job site file (as required).

3. Record document file (as required).

4. Other prime contractors, as required for coordination (as required).

5. Subcontractor (as required).

6. Suppliers and Fabricators (as required)

7. The Construction Manager (2 copies).

B. Distribute samples as directed, by Architect/Engineer.

C. The Prime Contractor will be responsible for the distribution of their approved drawings/cuts in a timely manner to other Prime Contractors (and subcontractors) for coordination with their work. Any additional costs generated due to the lack of transfer information will be borne by the Prime Contractor responsible for distribution. In the event the Prime Contractor fails to distribute shop drawings/product information to other Prime Contractors (and their subcontractors), the Owner reserves the right to have the Architect make the necessary copies and Federal Express to the parties involved. All costs incurred by the Architect will be back-charged to the Prime Contractor responsible for not distributing the shop drawings/product information. The Prime Contractors are responsible for coordinating their own work with the work of other Prime Contractors and/or their subcontractors.

D. Shop drawings/submittals returned to the Prime Contractors for second resubmission will require a two (2) day turnaround on resubmission. Submittals requiring a second resubmission will result in charges for additional Architect/Engineer review time. All returned shop drawings must be sent Federal Express Overnight Priority Delivery.

1.07 ARCHITECT/ENGINEER:

A. Review for:

1. Design concept of project.

2. Compliance with contract documents.

B. Review of separate items does not constitute review of an assembly in which item functions.

C. Stamp and initial or sign to review of submission.

D. Return submissions to Prime Contractor for distribution.

E. Note: Based upon the amount of multiple submittals received in one day, and their content*, unless they are specifically numbered by the Prime Contractor for their order of relative importance* on his Letter of Transmittal, the Architect shall establish the level of importance of each submittal, and shall be allowed sufficient time (in the Architect's professional judgement) to permit adequate review. Such submissions will be reviewed either: a) in the time order in which they were received by the Architect's office, b) in their natural progressive order of construction placement, or c) in order of preference, as determined by the Architect. As a result of multiple/sequential submissions, no delays in time, or Prime Contractor hard or soft costs shall be implied or imposed onto the Architect. It is the Prime

Contractor's complete responsibility to adhere to the prepared Construction Schedule at all costs, including extended delays which may be incurred by time required for adequate review from the Architect's office.

F. Architect's Stamp: The Architect's stamp (indicating initials and date), affixed to any shop drawing, manufacturer's specification cut or sample is only for design concept conformance, and general compliance with the content of the contract documents. This does not relieve the Prime Contractor of his/her responsibility to comply with the requirements of the Contract Documents.

1.08 TIME FOR SUBMISSION:

A. The Prime Contractor unless otherwise directed by the Architect, shall submit to the latter for approval all shop drawings, product data, and samples as specified above.

Within 2 weeks of Notice to Proceed, the following submittals shall be sent:

Section	Description	Item
1A	Schedules & Reports	Plan of Operations & Progress Schedules
1C	Insurance Requirements	Certificates of Insurances
1D	Product Approval Standard	Notification Letter to EPA – Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates
01015	Project Schedule	Contractor's Project Schedule, reflecting critical milestones & completion dates
01020	Allowances	N/A
01030	Special Procedures and Provisions	Written Guarantee of complete installation(s), As-Built drawings, equivalency requirements.
01050	Uniform Safety Standards for School Construction and Maintenance Projects – Commissioner's Regulations	N/A
01070	Abbreviations and Symbols	N/A
01085	Applicable Standards	N/A
01230	Construction Phase Clarifications	Weekly RFI Logs during construction
01300	Submissions	this Section
01500	Construction Facilities & Temporary Controls	Staging Plans, Temporary Partitions Layout
01550	Selective Demolition	Methods & Operations Sequence Schedule, Demolition & Removals sequencing
01610	Asbestos Abatement	Contractor Quality Assurance Items 1-4, Valid Asbestos Handling License, Proof of EPA-Accreditation for Response Actions (submitted w/ Bid) Notification Letter to EPA – Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates, Log Book, Waste Manifests, Dump Receipts, Employee Protection Plan, OSHA Medical Monitoring, Respiratory Training and Protection Plan, copies of all inspection & permit certifications.
01611	Test Laboratory Services	Laboratory Approval & Qualifications per 1.05A; Analysis of Contaminated Fillers via NIOSH Method, using Phase Contract Microscopy; Test Results
01612	Methods of Removal & Temporary Enclosures	Room Inspection Reports; Submission of Asbestos Caution Signs & Text, Written Emergency Procedures, Detail on Temporary Walls
01613	Asbestos Removal	N/A
01614	Air Monitoring	Air Monitoring Test Results; Daily Logs from Safety Monitor
01615	Project Decontamination	Air Maintain Test Results
01616	Clean-Up Procedures	N/A
01617	Monitoring & Supervision	Air Sampling & Analysis Data Results (per 1.04); Post Removal Test Results
01618	Removal of Asbestos	Refer to 1.11 - Submittals of Section 02080

	Contaminated Substrate Material - Manual Scrape Method	
01700	Contract Closeout	Contractor’s Notice of Substantial Completion, Contractor’s Punchlist, Final Inspection Notice, O&M manuals, Contract Closeout Documents, As-Builts, Guarantees
01710	Final Cleaning	N/A
01720	Project Record Documents	Project Record Documents at project completion
02000	Site Work Overview	Alternate / Additional Design Criteria
04100	Mortars	Technical Data (materials), Design Mix, pigment samples
04200	Unit Masonry	Technical Data, Fire Performance Data, Field Mock-ups, Unit Samples, Accessories Samples
04202	Glazed Masonry Units	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04206	Flagstone Restoration and Mortar Joint Tuckpointing	Technical Data, Certifications, Samples
04252	Masonry Thin Brick Veneer	Technical Data, Certifications, Samples, Mock-Ups
04270	Glass Unit Masonry	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04400	Belgian Block	Technical Data, Shop Drawings, Samples
04430	Simulated Masonry	Technical Data, Shop Drawings, Samples
04435	Cast Stone	Technical Data, Shop Drawings, Samples
04500	Masonry Restoration & Cleaning	Technical Data, Samples
04502	Masonry Surface Cleaning	Technical Data on application, equipment & materials
04720	Cast Stone	Technical Data, Shop Drawings, Samples, Applicable Experience

Section	Description	Item
1A	Schedules & Reports	Plan of Operations & Progress Schedules
1C	Insurance Requirements	Certificates of Insurances
1D	Product Approval Standard	Notification Letter to EPA – Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates
01010	Work Under This Contract (Asbestos)	NYSLD & EPA-AHERA certificates, Log Book, Waste Manifests, Dump Receipts, Employee Protection Plan, OSHA Medical Monitoring, Respiratory Training and Protection Plan, copies of all inspection & permit certifications.
01015	Project Schedule	Contractor's Project Schedule, reflecting critical milestones & completion dates
01020	Allowances	N/A
01030	Special Procedures and Provisions	Written Guarantee of complete installation(s), As-Built drawings, equivalency requirements.
01050	Uniform Safety Standards for School Construction and Maintenance Projects – Commissioner's Regulations	N/A
01070	Abbreviations and Symbols	N/A
01085	Applicable Standards	N/A
01230	Construction Phase Clarifications	Weekly RFI Logs during construction
01300	Submissions	this Section
01500	Construction Facilities & Temporary Controls	Staging Plans, Temporary Partitions Layout
01550	Selective Demolition	Methods & Operations Sequence Schedule, Demolition & Removals sequencing
01610	Asbestos Abatement	Contractor Quality Assurance Items 1-4, Valid Asbestos Handling License, Proof of EPA-Accreditation for Response Actions (submitted w/ Bid) Notification Letter to EPA – Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates, Log Book, Waste Manifests, Dump Receipts, Employee Protection Plan, OSHA Medical Monitoring, Respiratory Training and Protection Plan, copies of all inspection & permit certifications.
01611	Test Laboratory Services	Laboratory Approval & Qualifications per 1.05A; Analysis of Contaminated Fillers via NIOSH Method, using Phase Contract Microscopy; Test Results
01612	Methods of Removal & Temporary Enclosures	Room Inspection Reports; Submission of Asbestos Caution Signs & Text, Written Emergency Procedures, Detail on Temporary Walls
01613	Asbestos Removal	N/A
01614	Air Monitoring	Air Monitoring Test Results; Daily Logs from Safety Monitor
01615	Project Decontamination	Air Maintain Test Results
01616	Clean-Up Procedures	N/A

01617	Monitoring & Supervision	Air Sampling & Analysis Data Results (per 1.04); Post Removal Test Results
01618	Removal of Asbestos Contaminated Substrate Material - Manual Scrape Method	Refer to 1.11 - Submittals of Section 02080
01700	Contract Closeout	Contractor’s Notice of Substantial Completion, Contractor’s Punchlist, Final Inspection Notice, O&M manuals, Contract Closeout Documents, As-Builts, Guarantees
01710	Final Cleaning	N/A
01720	Project Record Documents	Project Record Documents at project completion
02000	Site Work Overview	Alternate / Additional Design Criteria
04100	Mortars	Technical Data (materials), Design Mix, pigment samples
04200	Unit Masonry	Technical Data, Fire Performance Data, Field Mock-ups, Unit Samples, Accessories Samples
04202	Glazed Masonry Units	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04206	Flagstone Restoration and Mortar Joint Tuckpointing	Technical Data, Certifications, Samples
04252	Masonry Thin Brick Veneer	Technical Data, Certifications, Samples, Mock-Ups
04270	Glass Unit Masonry	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04400	Belgian Block	Technical Data, Shop Drawings, Samples
04430	Simulated Masonry	Technical Data, Shop Drawings, Samples
04435	Cast Stone	Technical Data, Shop Drawings, Samples
04500	Masonry Restoration & Cleaning	Technical Data, Samples
04502	Masonry Surface Cleaning	Technical Data on application, equipment & materials
04720	Cast Stone	Technical Data, Shop Drawings, Samples, Applicable Experience

Within 4 weeks of Notice to Proceed, the following submittals shall be sent:

Section	Description	Item
02200	Earth Work	Sheetpiling, bracing and shoring details, certified by a NYS Professional Engineer. Shop Drawings, Details, Technical Data, Written Confirmation of all Easements
02270	Sediment and Erosion Control Procedures and Requirements	Temporary and Permanent Sediment and Erosion Control Schedule; Waste Material Disposal Plan
02350	Timber Piles	NYSPE-certified Pile Driving Log, NYSLS-certified As-Driven Pile Location Plan
02400	Storm Water Drainage, Structure and Castings	Technical Data, Materials Certification, Shop Drawings
02410 & 02411	Sand Slit Drainage Systems	5-Year Experience & References
02452	Grounds, Traffic & Parking Signs	Fabrication and Installation Drawings
02486	Synthetic Turf	Shop Drawings, Product Data, Sample Warranty, Credentials
02542	Playground Surfacing System (Wood Fiber)	Technical Data, Warranty
02543	Playground Surfacing System (Poured Rubber)	Technical Data, Warranty
02544	Playground Surfacing System (Rubber Tiles)	Technical Data, Warranty
02501	Reinforced Concrete Piping	SCDPW Class IV Certification
02504	Cleaning Existing Storm Water Drainage Systems	N/A
02506	Abandonment of Existing Sanitary and Storm Water Systems	Copies of Submittals to SC Dept. of Health Services
02519	Segmented Retaining Wall Units	Technical Data, Shop Drawings, Warranty
02531	Tennis Court Surfacing	Material Certificates, MSDS Data, Manufacturer Approval of Installer, Technical Data, Samples
02536	Track & Field Event Surfacing (Urethane)	Material Certificates, MSDS Data, Manufacturer Approval of Installer, Technical Data, Samples
02537	Cinder Running Track Reconstruction	Technical Data
02577	Pavement Marking	Technical Data, Compliance Letter from Manufac.
02578	Thermoplastic Pavement Markings	Technical Data, Letter of Compliance with SCDPW Item 685
02579	Pre-Formed Reflectorized Pavement Markings	Technical Data, Letter of Compliance with SCDPW Item 685
02600	Hot Mix Asphalt Pavement System	Technical Data, Plant Certification
02601	Asphalt Overlay	Technical Data, Plant Certification

Section	Description	Item
02604	Pavement Crack Sealing	Technical Data
02602	Asphalt Repair	Technical Data
02603	Asphalt Sealing	Technical Data
02660	Water & Sanitary Systems	Technical Data, Trade Designations
02702	Ballfield Renovation	Technical Data, Shop Drawings, Samples
02711	Subsurface Drainage System	Technical Data, Samples
02734	Irrigation Well Pump	Technical Data, Copies of permits & test results
02800	Site Amenities	Technical Data, Shop Drawings, Samples
02801	Topsoil, Lawns & Grasses	Technical Data, Seed Mixture
02810	Irrigation System	Technical Data, Installation Instructions
02820	Exterior Athletic Equipment & Backstops	Technical Data, Shop Drawings, Samples
02831	Galvanized Chain Link Fencing	Technical Data, Shop Drawings, Samples
02832	Vinyl Coated Chain Link Fencing	Technical Data, Shop Drawings, Samples
03300	Cast In Place Concrete	Technical Data, Shop Drawings, Design Mix, Test Reports, Material Certificates, Concrete Testing Lab
03310	Concrete Work	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Testing Lab
03311	Concrete Curb	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Concrete Testing Lab
03312	Concrete Sidewalk	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Concrete Testing Lab
03318	Driveway Aprons	Technical Data, Shop Drawings, Design Mix, Test Reports, Material Certificates, Testing Lab
03412	Precast Concrete Roof Plank	Technical Data
03450	Architectural Precast Concrete	Technical Data, Shop Drawings, Samples
03500	Tectum Roof Deck	Technical Data, Samples
03511	Self-Leveling Concrete Floor Underlayment	Technical Data
03512	Self-Leveling Concrete Floor Underlayment (over Extruded Polystyrene Foam)	Technical Data
03650	Underlayment Concrete	Technical Data, Manufacturers Certifications
03710	Concrete Cleaning	Cleaning Procedure, Dust, Dirt & Debris Containment Plan
03720-1	Concrete Resurfacing (Rebar Primer)	Manufacturer’s Guarantees, Technical Data, Samples

03720-2	Concrete Resurfacing (Repair Mortar)	Manufacturer’s Guarantees, Technical Data, Samples
03720-3	Concrete Resurfacing (Finish Coating)	Manufacturer’s Guarantees, Technical Data, Samples
03720-4	Concrete Resurfacing (Repair Mortar)	Manufacturer’s Guarantees, Technical Data, Samples

Section	Description	Item
05030	Metal Finishes	Technical Data, Material Certifications
05120	Structural Steel	Technical Data, Shop Drawings, Test Reports, Surveys, templates
05210	Steel Joists and Girders	Technical Data, Shop Drawings, Welders Certificates
05300	Metal Decking	Technical Data, Shop Drawings, Insurance Certification, templates
05400	Cold Formed Metal Framing	Technical Data, Shop Drawings, templates
05500	Metal Fabrication	Technical Data, Shop Drawings, templates
05510	Miscellaneous Metal	Technical Data, Shop Drawings, Samples
05512	Wrought Iron Malleable Railings	Technical Data, Shop Drawings, Samples
05514	Metal Railings	Technical Data, Shop Drawings, Samples
05515	Ornamental Metal Work (Aluminum)	Technical Data, Shop Drawings
05530	Prefabricated Expansion Joint Covers	Technical Data, Shop Drawings
05580	Arch Metal Column Covers	Technical Data, Shop Drawings
05800	Expansion Joint Covers	Technical Data, Shop Drawings
06100	Rough Carpentry	Material Certificates, Treatment Data
06170	Prefabricated Structural Wood	NYSPE-prepared Design Calculations, Shop Drawings, Technical Data
06200	Finish Carpentry	Technical Data, Shop Drawings
06204	Wood Veneer Cabinetry	Technical Data, Shop Drawings, Samples
06208	Wood Raised Panel	Technical Data, Shop Drawings
06600	Fiber-Reinforced Polymer	Technical Data, Shop Drawings, Samples
07012	Work Included (Urethane Roofing)	Technical Data, Applicator’s Licenses & Proof of Applicable Experience, warranties
07013	Codes, Standards and Permits (Urethane Roofing)	Required Operations and Permits, Tests and Inspections
07140	Metal Oxide Waterproofing	Technical Data, Shop Drawings
07160	Bituminous Dampproofing	Technical Data, Shop Drawings
07161	Subsurface Drainage System	Technical Data, Shop Drawings, Samples
07180	Water Repellents	Technical Data, Shop Drawings, Samples
07190	Underslab Vapor Barrier	Technical Data

07191	Polyethylene Vapor Barrier (Relocatable Classrooms)	Technical Data
07200	Building Insulation	Technical Data, Certified Test Reports
07210	Fireproofing Insulation	Technical Data, Certified Test Reports
07219	Preformed Masonry Insulation	Technical Data, Full Sized Samples
07240	Exterior Insulation and Finish Systems	Technical Data, Shop Drawings, Certificate of Applicator Approval, Samples (Color & Texture)

Section	Description	Item
07241	Direct Applied Exterior Finish Systems	Technical Data, Shop Drawings, Certificate of Applicator Approval, Samples (Color & Texture)
07255	Cementitious Fireproofing	Technical Data, Testing Data, Thickness Schedule
07310	Asphalt Shingles (New Installation–Grand Manor)	Technical Data, Samples, Warranty
07312	Asphalt Shingles	Technical Data, Samples, Warranty
07315	Asphalt Shingles (over existing)	Technical Data, Samples, Warranty
07323	Shingle and Roofing Tiles	Technical Data, Samples, Warranty
07324	Slate Roofing Shingles	Technical Data, Samples, Warranty
07325	Slate Shingles	Technical Data, Samples, Warranty
07326	Slate Shingle Replacement	Technical Data, Samples, Warranty
07410	Concealed Fastener Metal Wall and Soffit Panels	Technical Data, Shop Drawings
07415	Adjust-a-Web Framing System	Technical Data, Shop Drawings, NYSPE-Certified Structural Calculations
07420	Cement Board Wall and Soffit Panels	Technical Data, Shop Drawings
07460	Vinyl Siding	Technical Data, Samples
07520	2001 Kelly Roofing Membrane	Technical Data, Shop Drawings, UL & FM Compliance Data, Tapered Insulation Drawings, Installer’s Certifications
07531	Elastic Sheet Roofing (wood deck)	Technical Data, Shop Drawings, Tapered Insulation Drawings, Labor & Material Guarantee
07532	Elastic Sheet Roofing (Vented) (Non-combustible Deck)	Technical Data, Shop Drawings, Tapered Insulation Drawings, Labor & Material Guarantee
07534	SBS Modified Bitumen Roofing (Mop – Torch)	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07535	SBS Modified Bitumen Roofing (Mop – Mop)	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07536	Heat-Welded Modified Bitumen Roofing	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications

Section	Description	Item
07537	4-Ply Built-Up Roofing/ Modified Bitumen System	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07540	Urethane / Silicone Elastomeric Roofing	Technical Data, Shop Drawings, Samples
07541	Urethane / Silicone Elastomeric Roofing Recoat	Technical Data, Shop Drawings, Samples
07545	Metal Roofing System	Technical Data, Shop Drawings, Samples
07550	Fully Adhered Roofing System	Technical Data, Shop Drawings, Samples
07600	Flashing & Sheet Metal	Technical Data, Shop Drawings, Samples
07601	Flashing and Sheet Metal (Met Fab Manuf.)	Technical Data, Shop Drawings, Samples
07602	Flashing	Technical Data, Shop Drawings, Samples
07604	Lead Coated Copper Flashing and Sheet Metal	Technical Data, Shop Drawings, Samples
07605	Terne Coated Stainless Steel Flashing and Sheet Metal	Technical Data, Shop Drawings, Samples
07606	Copper Louvers	Technical Data, Shop Drawings, Samples
07632	PVC Roof Drain and Drain Pipe Removal	Technical Data, Shop Drawings
07634	Lead Coated Copper Gutters and Downspouts	Technical Data, Shop Drawings, Samples
07635	Aluminum Gutters & Downspouts	Technical Data, Shop Drawings, Samples
07710	Retrofit Insert Drains	Technical Data, Shop Drawings, Samples
07715	Prefabricated Metal Fascia & Soffit Panels	Technical Data, Shop Drawings, Samples
07800	Roof Accessories	Technical Data, Shop Drawings, Samples
07830	Roof Scuttle	Technical Data, Shop Drawings, Finish Samples
07900	Caulking	Technical Data, Certifications, Test Reports
07910	Joint Sealers	Technical Data, Certifications, Test Reports
07920	Preformed Joint Sealers	Technical Data, Samples
08110	Steel Doors and Frames	Technical Data, Shop Drawings, Samples, Certifications
08120	Aluminum Doors and Frames	Technical Data, Shop Drawings, Finish Samples, Associated Hardware Schedule
08121	FRP Doors and Framing	Technical Data, Shop Drawings, Finish Samples, Associated Hardware Schedule
08211	Flush Wood Doors	Technical Data, Shop Drawings, Finish Samples
08261	Wood French Door Assembly	Technical Data, Samples, Certificates, Finish Samples
08306	Fire Rated Access Doors	Technical Data, Shop Drawings, Finish Samples
08330	Roll Up Coiling Fire Doors	Technical Data, Shop Drawings, Finish Samples

08331	Roll-up Overhead Doors	Technical Data, Shop Drawings, Finish Samples
08360	Upward Acting Sectional Doors	Technical Data, Shop Drawings, Finish Samples
08410	Aluminum Entrances and Storefronts	Technical Data, Shop Drawings, Finish Samples Manufacturers Certification, QC/Performance Results
08520	Aluminum Windows (Dual Glazed - EFCO)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08522	Aluminum Windows (Dual Glazed - Litex)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08523	Window Repair	Technical Data, Shop Drawings
08524	Aluminum Windows (Dual Glazed – Graham)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08526	Aluminum Windows (Dual Prime Horizontal Slider – Litex)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results

Section	Description	Item
08528	Aluminum Windows (Dual Double Hung)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08630	Vinyl Sheath Double Hung Wood Windows (Andersen)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08631	Aluminum Clad Wood Windows (Marvin)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08632	New Aluminum Clad Wood Windows (Marvin)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08640	Self-Flashing Polycarbonate Unit Skylights	Technical Data, Shop Drawings, Samples
08710	Finish Hardware	Technical Data, Hardware Schedule, Final Hardware Schedule Content, Keying Schedule, Samples, Templates
08711	Aluminum Storm Doors	Technical Data, Shop Drawings
08712	Aluminum Insect Screens	Technical Data, Shop Drawings
08722	Door Operator	Technical Data, Shop Drawings, Samples
08760	Window Hardware and Specialties	Technical Data, Shop Drawings
08800	Glass and Glazing	Technical Data, Shop Drawings, Samples
08806	Fire Rated Glazing (FireLite)	Technical Data, Shop Drawings, Samples
08807	Oversized Fire Rated Glazed Assemblies (VL3000)	Technical Data, Shop Drawings, Samples
08808	Fire Rated Wire Glazing	Technical Data, Shop Drawings, Samples
08920	Glazed Aluminum Curtain Walls (EFCO)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals
08922	Glazed Aluminum Curtain Wall System (US Aluminum Corp. Series 3200)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals

08924	Glazed Aluminum Curtain Walls (Litex)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals
08930	Metal Glazing Panels (1/4" Porcelain Enamel Panels)	Technical Data, Shop Drawings, Samples
08950	Insulated Translucent Panel System	Manufacturer's & Erectors Qualifications, Shop Drawings, Color Samples, Test Reports per 1.03B, Quality Control per 1.03, Energy Calculations per 1.03
08951	Insulated Translucent Panel Skylight System	Technical Data, Shop Drawings, Color Samples, Test Reports per 1.03B, Quality Control per 1.03, Energy Calculations per 1.03
09102	Plaster (over CMU–Interior)	Technical Data, Sample Panels
09210	Stucco Plaster (on CMU at Exterior)	Technical Data, Sample Panels
09220	Surewall Fiber Reinforced Plaster System (FRP)	Technical Data, Sample Panels
09221	Lath and Cement Plaster (Stucco)	Technical Data, Sample Panels
09250	Gypsum Wallboard	Technical Data, Samples
Section	Description	Item
09255	Vinyl Coated Gypsum Wallboard Panels	Technical Data with Specified Compliances, Samples, Shop Drawings, Engineering Calculations
09290	Gypsum Fabrication	Technical Data, Samples
09300	Ceramic Tile	Technical Data, Samples
09400	Terrazzo Flooring	Technical Data, Samples
09410	Thin-Set Epoxy Terrazzo Flooring	Technical Data, Samples, System Data, Installer's Experience
09425	Terrazzo Tile	Technical Data, Samples
09500	Acoustical Wall Panels	Technical Data, Samples
09510	Acoustic Ceiling System	Technical Data, Samples
09511	Sprayed Acoustical Applications	Technical Data, Samples, Test Reports, Applicator Certifications
09512	Acoustical Ceiling Tile / Grid Restoration	Technical Data, Samples
09513	Metal Ceiling Systems	Technical Data, Samples, Maintenance Instructions
09514	Fiberglass Ceiling Grid System	Technical Data, Samples, Maintenance Instructions
09515	Acoustical Tile Coating	Technical Data, Samples, Maintenance Instructions
09550	Wood Flooring	Technical Data, Samples
09563	Wood Athletic Flooring (Conner "Duracushion III")	Technical Data, Samples
09565	Wood Athletic Flooring (Robbins "Locktite")	Technical Data, Samples
09567	Wood Athletic Flooring (Conner "Perma-Lock")	Technical Data, Samples

09569	Wood Athletic Flooring (Conner “Neo-Shok”)	Technical Data, Samples
09570	Wood Flooring (Refinishing)	Technical Data
09650	Resilient Flooring	Technical Data, Samples
09651	Rubber Stair Treads	Technical Data, Samples
09666	Ribbed Rubber Matting	Technical Data, Shop Drawings, Samples
09680	Carpeting	Technical Data, Shop Drawings, Samples
09770	Indoor Athletic Surfacing	Technical Data, Samples
09772	Vinyl (Fiberglass Reinforced) Indoor Athletic Surfacing	Technical Data, Shop Drawings, Samples
09774	Poured Urethane Indoor Athletic Floor Surfacing	Manufacturer/Installers Certification – 10 years Experience, Ship Drawings for Game Lines & Track Markings, Technical Data, Samples, Maintenance Instruction, Product Warranty
09800	Special Coatings	Technical Data, Test Data, Samples
09810	Epoxy/Quartz Flooring	Technical Data, Shop Drawings, Sample Panels, Test Results
09815	Elastomeric Quartz Flooring (EnviroChem)	Technical Data, Shop Drawings, Sample Panels, Test Results

Section	Description	Item
09820	Marble Dusting	Technical Data, Shop Drawings, Samples, Water Analysis and Calculations
09831	Silicone Elastomeric Coating	Technical Data, Applicator Certifications
09845	Intumescent Coating	Technical Data, Samples, Sample Panels
09900	Painting	Technical Data, Samples, Field Samples
09902	Polomyx Waterbase Paint	Technical Data, Samples, Field Samples
09950	Wall Coverings	Technical Data, Samples, Certificate of Compliance
09986	Fiberglass Reinforced Plastic Panels	Technical Data, Shop Drawings, Samples
10100	Visual Display Products	Technical Data, Certified Lab Test Reports, Samples
10102	Dry Markerboards	Technical Data, Shop Drawings, Samples
10240	Skylight Safety Screens	Technical Data, Shop Drawings, Samples
10440	Specialty Signs (Roof I.D. Sign)	Technical Data, Full-Sized Samples
10441	Signage	Technical Data, Shop Drawings, Samples
10500	Lockers	Technical Data, Shop Drawings, Finish Samples
10520	Fire Extinguishers and Cabinets	Technical Data, Shop Drawings, Finish Samples
10600	Toilet Partitions (Steel)	Technical Data, Shop Drawings, Finish Samples
10601	Toilet Partitions (Polymer)	Technical Data, Shop Drawings, Finish Samples

10650	Operable Partitions	Technical Data, Shop Drawings, Finish Samples
10651	Electrically-Operated Continuously Hinged Operable Partitions	Technical Data, Shop Drawings, Finish Samples
10800	Toilet Accessories	Technical Data, Shop Drawings, Finish Samples
11060	Stage Equipment	Technical Data, Shop Drawings, Finish Samples, O&M Manuals, Affidavits, Guarantees
11061	Stage Rigging and Drapery	Technical Data, Shop Drawings, Rigging Schedule, Finish Samples, Affidavits, Guarantees
11063	Fire Safety Curtain and Rigging	Technical Data, Shop Drawings, Rigging Schedule, Finish Samples, Affidavits, Guarantees
11400	Food Service Equipment	Technical Data, Shop Drawings
11480	Athletic Equipment	Technical Data, Samples
11482	Resilient Protective Padding	Technical Data, Shop Drawings, Samples, Guarantees
11484	Resilient Safety Tile System	Technical Data, Shop Drawings, Samples, Guarantees
11600	Laboratory Casework and Equipment	Technical Data, Shop Drawings, Test Reports, Certifications, Warrantees
11601	Laboratory Casework and Equipment (Collegedale Casework, Inc.)	Technical Data, Shop Drawings, Test Reports, Certifications, Warrantees
11602	Laboratory Casework and Equipment (Sheldon)	Technical Data, Shop Drawings, O&M Manuals Color and Finish Samples, Warranties

Section	Description	Item
11603	Laboratory Casework and Equipment (Fisher Hamilton Wood Casework)	Technical Data, Shop Drawings, O&M Manuals, Color and Finish Samples, Warrantees
11605	Laboratory Casework and Equipment (Modern School Supplies)	Technical Data, Shop Drawings, Color and Finish Samples, O&M Manuals, Warrantees
11700	Playground Equipment (Playground Environments)	Safety Specifications, Shop Drawings, Warranty
11701	Playground Equipment (Playworld)	Safety Specifications, Shop Drawings, Warranty
11702	Playground Equipment (Park Systems)	Safety Specifications, Shop Drawings, Warranty
12342	Panel Systems	Technical Data, Shop Drawings, Warranty
12345	Laboratory Casework	Technical Data, Shop Drawings, Color and Finish Samples, O&M Manuals, Guarantee
12346	Laminate-Clad Casework (Trimline Series)	Technical Data, Shop Drawings, Color and Finish Samples
12347	Laminate-Clad Computer Casework	Technical Data, Shop Drawings, Color and Finish Samples
12348	Laminate-Clad Casework	Technical Data, Shop Drawings, Samples

12350	Wood Casework and Classroom Wardrobe Units	Technical Data, Shop Drawings, Samples
12492	Spring-Operated Roller Shades	Technical Data, Shop Drawings, Samples
12505	Curtains / Draperies	Technical Data, Shop Drawings, Samples, O&M Manuals, Flame Resistance Affidavits, Guarantee
12510	Horizontal Window Blinds	Technical Data, Shop Drawings, Samples
12520	Vertical Window Blinds	Technical Data, Shop Drawings, Samples
12530	Roller Shades	Technical Data, Shop Drawings, Samples
12642	Classroom Wardrobe Units	Technical Data, Shop Drawings, Samples
12690	Recessed Entrance Mats	Technical Data, Shop Drawings
12710	Auditorium, Arena and Theater Seating	Technical Data, Shop Drawings, Samples
12715	Seating Refurbishment/ Reupholstery	Technical Data, Shop Drawings, Samples
12760	Telescoping Bleachers	Technical Data, Shop Drawings, Samples, Closeout Submittals
12761	Telescoping Gym Seats (Electrically Operated)	Technical Data, Shop Drawings, Project List, Samples, O&M Manuals, Manufacturer Qualifications, Installer Qualifications, Warranty
13050	Access Flooring	Technical Data, Shop Drawings, Installer Qualifications
13122	Metal Building Systems	Technical Data, NYSPE-certified Shop Drawings, Certified Design Analysis, Letter of Certification
13125	Permanent Grandstands	Technical Data, Shop Drawings, Certificates, Product Samples, Color Samples

Section	Description	Item
13650	Prefabricated Structures	Technical Data, Foundation & Pier Location Plans, Complete Set of NYSPE-certified Shop Drawings of Prefab Building
13750	Pre-manufactured Chimneys	Technical Data, Shop Drawings
14200	Elevator (Dover)	Technical Data, Shop Drawings
14220	Vertical Wheelchair Lift	Technical Data, Shop Drawings
14240	Elevator (Otis)	Technical Data, Shop Drawings
15010	General	N/A
15011	Special Conditions	Shop Drawings, List of Equivalents
15012	Work Included	Shop Drawings, As-Builts
15014	Codes, Standards and Permits	N/A
15015	Maintenance Instructions	Maintenance Schedule(s)
15016	Test and Instructions	Written Report to Architect
15017	Vibration and Noise Control	N/A

15018	Motors and Electrical Work	Technical Data
15019	Guarantee	N/A
15020	Cutting and Patching	N/A
15050	Piping and Accessories	Technical Data
15051	Basic Materials and Methods	Technical Data
15052	Pipe Fittings	Technical Data
15053	Joints	Technical Data
15055	Valves	Technical Data
15057	Valve Tags, Nameplates and Identification	Technical Data
15058	Pipe Hangers, Bases and Supports	Technical Data
15139	Steam to Water Heat Exchangers	Technical Data
15141	Centrifugal Pumps	Technical Data
15175	Preliminary Work	N/A
15180	Insulation	Technical Data
15181	Insulation (Second Spec)	Technical Data
15300	Fire Sprinkler System	Technical Data, Shop Drawings
15550	Burners & Controls	Technical Data, Installation certification
15551	Fuel Oil Sump Pump Unit	Technical Data, Shop Drawings
15600	Fuel Oil Storage Tank, Work Included	Technical Data, copies of Permits & Inspections, As-Built Drawings
15601	Hot Water Boilers	Technical Data
15602	Pressure Atomizing Burners	Technical Data

Section	Description	Item
15603	Rooftop HVAC Unit Rehabilitation	Technical Data
15604	Boiler Reconstruction	Technical Data
15605	Cast Iron Boilers	Technical Data
15607	New Duplex Sump Pump Unit	Technical Data
15608	Water Heater	Technical Data
15610	Fiberglass Fuel Oil Storage Tank	Technical Data
15611	Above Ground Diesel Fuel Storage Tank	Technical Data
15612	New Fuel Oil Pump Set/ Burner Modification	Technical Data

15650	Heating, Ventilating & Air Conditioning	Technical Data, Installation Drawings
15651	Thru-wall Heat Pumps	Technical Data
15652	Electric Cabinet Heater	Technical Data
15653	New Cooling Tower and Related Equipment	Technical Data
15656	Temperature Control Systems	Technical Data
15657	Electrical Work	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15658	Hot Water Boiler (Steel)	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15659	Vacuum and Boiler Feed Unit	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15675	Commercial Air-Cooled Condensing Units	Technical Data, Installation Drawings
15700	Heat Transfer	Technical Data, Installation Drawings
15701	Hot Water Convector Units	Technical Data, Installation Drawings
15702	Classroom Unit Ventilators	Technical Data, Installation Drawings
15703	Make-up Air Unit and Exhaust Fan	Technical Data, Installation Drawings
15705	Rooftop Unit (RTU-3)	Technical Data, Installation Drawings
15706	Rooftop Unit (RTU-2)	Technical Data, Installation Drawings
15710	Hot Water Coils	Technical Data, Installation Drawings
15761	Fan Coil Units	Technical Data, Installation Drawings
15800	Air Distribution	Technical Data, Installation Drawings
15802	Inspection, Testing & Balancing	Final Reports to the Architect
15803	Gravity Louvers/Penthouses	Technical Data, Shop Drawings
15804	Exhaust Fans	Technical Data, Installation Drawings
15805	Ductwork	Technical Data, Shop Drawings
Section	Description	Item
15806	Fire Dampers	Technical Data, Shop Drawings
15807	New Dust Collection Unit	
15808	Registers, Grilles & Diffusers	Technical Data, Shop Drawings
15810	Retractable Kiln Exhaust Hood	Technical Data, Shop Drawings
15860	Light Duty Air Handling Units	Technical Data, Shop Drawings
15861	Light Duty Air Handling Units (Second Spec)	Technical Data, Shop Drawings
15903	Automatic Temperature	Technical Data, Shop Drawings

	Controls	
15904	Electronic Automatic Temperature Control	Technical Data, Shop Drawings
15011A	Special Conditions	Technical Data, Shop Drawings
15012A	Work Included	Technical Data, Shop Drawings
15013A	Codes, Standards and Permits	N/A
15014A	Schedule of Frequency	N/A
15015A	Maintenance Instructions	Technical Manuals, Maintenance Schedules, Parts List, List of Local Suppliers
15016A	Test & Instructions	Written Report to the Architect
15019A	Guarantee	Printed Guarantees
15050A	Basic Materials and Methods	Technical Data
15052A	Electric Wiring for Plumbing Work	Wiring Diagrams, Shop Drawings
15053A	Joints	Technical Data
15054A	Pipe Specialties	Technical Data
15055A	Valves	Technical Data
15057A	Valve Tags, Nameplates, & Identification	Technical Data
15058A	Pipe Hangers, Bases & Supports	Technical Data
15060A	Cutting and Patching	N/A
15180A	Piping Insulation	Technical Data
15302A	Sewer Installation	Technical Data
15400A	Plumbing System	Technical Data, Installation Drawings
15403A	Drainage & Vent Systems	Technical Data, Installation Drawings
15404A	Domestic Water System	Technical Data, Installation Drawings, Test Results
15409A	Plumbing Fixtures	Technical Data, Roughing Drawings
15410A	RPZ Device in Hot Box	Technical Data, Installation Drawings
15410A	New Duplex Sump Pump Unit	Technical Data
15411A	Water Heater	Technical Data, Installation Drawings
Section	Description	Item
15420A	Domestic Hot Water Heaters	Technical Data, Installation Drawings
15430A	Exhaust Fan	Technical Data, Installation Drawings
16010	Electrical Work	Technical Data, Shop Drawings
16013	Work Included	N/A
16100	Basic Materials & Methods	Technical Data, Shop Drawings

16140	Wiring Devices	Technical Data
16200	Power Generation	Technical Data
16202	Emergency Generator	Technical Data, Connection Diagrams
16203	Automatic Transfer Switch	Technical Data, Test Data
16429	120/208 and 120/240 Voltage Distribution	Technical Data, Shop Drawings (see 16429), Closeout Submittals
16462	Dry-Type Distribution Transformers K-Rated	Technical Data, Shop Drawings (see 16462), Closeout Submittals
16470	Panelboards	Technical Data, Shop Drawings (see 16470)
16475	Circuit Breakers	Technical Data, Installation Drawings
16500	Lighting	Technical Data, Installation Drawings
16502	Auditorium Lighting Control System	Technical Data, Installation Drawings
16510	Theatrical Lighting	Technical Data, Installation Drawings
16530	Site Lighting	Technical Data, Installation Drawings
16601	Lightning Protection	Technical Data, Installation Drawings
16671	Transient Voltage Surge Protection (TVSS)	Technical Data, Installation Drawings
16700	Telecommunications System	Technical Data, Shop Drawings, Reports
16704	Security System	Technical Data, Shop Drawings, Reports
16705	Fire Alarm and Smoke Detection System	Technical Data, Shop Drawings, Calculations
16706	Modified Public Address System	Technical Data, Shop Drawings
16707	Public Address Sound System	Technical Data, Shop Drawings, Warranties
16708	Auditorium Sound System	Technical Data, Shop Drawings, O&M Manuals
16720	Fire Alarm System	Technical Data, Installation Drawings
16730	Master Time-Program Clock System	Technical Data, Installation Drawings
16755	Electrical Security System	Technical Data, Shop Drawings, Qualifications
16760	Communications Systems	Technical Data, Shop Drawings, Samples
16810	Computer Network	Technical Data, Shop Drawings
17010	Technology Implementation	Technical Data, Installation Drawings

PART TWO – PRODUCTS

NOT APPLICABLE

PART THREE – EXECUTION

NOT APPLICABLE

END OF SECTION

ENGINEERS
244 East Main Street ▪ Patchogue, New York 11772
Tel (631) 475-0349 ▪ Fax (631) 475-0361 ▪
Const. Admin., MEP & T Depts. Fax (631) 654-9398

Submittal Cover Sheet

Name of Contractor: _____

Project: _____

Date: _____ Architect's Project No: _____

Items Submitted: _____

Manufacturers: _____

Model No's: _____

Submission Number: _____

Acknowledgement by Contractor: This submittal has been reviewed by the above named contractor in accordance with the contract documents describing and defining the requirements of such review

Signature:_____ Title of reviewer (print)_____

Name (print): _____ Date of review: _____

Notes:

SECTION 01410 - SPECIAL INSPECTIONS AND STRUCTURAL TESTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the *Building Code of New York State* (BCNYS).

B. Hold a Special Inspections preconstruction meeting at least 7 days prior to initial planned date for start of construction.

1. Discussions shall include the following:
   a. Review of specifications and Schedule of Special Inspections for work requiring Special Inspections.
   b. Responsibilities of Contractor, Owner, Testing Agency, Special Inspector, and Registered Design Professional.
   c. Notification and reporting procedures.
2. Attendees shall include Contractor, Owner's Representative, Testing Agency, Special Inspector, and Registered Design Professionals for Structural Engineering and for Architecture.

1.2 DEFINITIONS

A. Registered Design Professional: Licensed Professional Engineer or Registered Architect whose seal appears in the Construction Drawings. Unless noted otherwise, references to the Registered Design Professional in this section refer to the Structural Engineer for building design.

B. RDP for Geotechnical Engineering: Licensed Professional Engineer whose seal appears on the Geotechnical Investigation. The RDP for Geotechnical Engineering shall perform and oversee Agent 2 services as indicated in the Schedule of Special Inspections. If a Geotechnical Investigation was not performed or if the RDP for Geotechnical Engineering is not retained to perform Agent 2 services, a licensed Geotechnical Engineer shall be retained to perform these duties.

B. Code Enforcement Official: Officer or other designated authority charged with administration and enforcement of the BCNYS. For projects under jurisdiction of New York State agencies such as the Department of Education (SED), State University Construction Fund (SUCF), Office of General Services (OGS), and Dormitory Authority (DASNY), the Code Enforcement Official is an official from agency having jurisdiction.

C. Special Inspector: A Professional Engineer registered in the state of New York that has a minimum of four years of structural design experience with buildings.

D. Testing/Inspecting Agency: Agent retained by Special Inspector or Owner and coordinated by Special Inspector to perform some inspection services on behalf of Special Inspector. A Geotechnical Engineer is an example of an Inspecting Agent.

E. Statement of Special Inspections: Documents prepared by the Registered Design Professional and filed with and approved by the

Code Enforcement Official, listing materials and work requiring Special Inspections. These documents include this specification and the Schedule of Special Inspections.

F. Schedule of Special Inspections: An itemized list of inspections, verifications, and tests (including frequency) required for the project and individuals, agencies, or firms who will be retained to perform these services. The Schedule of Special Inspections is located in Drawing **[insert dwg #]**.

G. Seismic/Wind-Force-Resisting System: Components of the structural system that provide resistance to seismic/wind forces. These components are identified in the Schedule of Special Inspections.

H. Continuous Special Inspection: Full-time observation of work by the Special Inspector or Testing Agency while the work is being performed.

I. Periodic Special Inspections: Part-time or intermittent observation of work by the Special Inspector or Testing Agency for work that has been or is being performed and at completion of work.

1.3 QUALIFICATIONS

A. Special Inspector and Testing/Inspecting Agency shall be accepted by the Registered Design Professional (RDP) and the Code Enforcement Official.

B. Special Inspections shall be performed by agents who have relevant experience for each category of inspections indicated in the drawings.

C. Minimum qualifications of inspection agents are indicated in the drawings.

1.4 SUBMITTALS

A. Special Inspector and Testing/Inspecting Agency shall submit to the Registered Design Professional and Code Enforcement Official for review, a copy of their qualifications including names and qualifications of each inspector and technician who will be performing inspections or tests.

B. Special Inspector and Testing/Inspecting Agency shall disclose past or current business relationship or potential conflict of interest with Contractor or Subcontractors whose work will be inspected or tested.

1.5 PAYMENT

A. Owner will engage and pay for services of Special Inspector and Testing/Inspecting Agency.

B. If materials requiring Special Inspections are fabricated in a plant not within 200 miles of project site, Contractor shall be responsible for travel expenses of Special Inspector or Testing/Inspecting Agency.

C. Contractor shall be responsible for cost of retesting or reinspection of work failing to comply with requirements of Contract Documents.

1.6 OWNER RESPONSIBILITIES

A. Owner will provide Special Inspector with complete set of Contract Documents sealed by the Registered Design Professional and approved by the Code Enforcement Official.

1.7 CONTRACTOR RESPONSIBILITIES

A. Each Contractor responsible for construction of a seismic/wind-force-resisting system listed in the Schedule of Special Inspections and indicated in drawings shall submit a written Contractor's Statement of Responsibility to the Code Enforcement Official, Special Inspector, and Registered Design Professional prior to commencement of work on system or component. Use form provided at end of this section or other similar form.

B. Contractor shall cooperate with Special Inspector and his agents so Special Inspections and testing may be performed without hindrance.

C. As indicated in the Schedule of Special Inspections, Contractor shall notify Special Inspector or Testing/Inspecting Agency at least 48 hours in advance of a required inspection or test.

D. Contractor shall provide incidental labor and facilities to provide access to work to be inspected or tested, to obtain and handle samples at site or at source of products to be tested, to facilitate tests and inspections, and for storing and curing of test samples.

E. If Special Inspections or testing require the use of Contractor's scaffolding to access work areas, Contractor shall provide competent person to perform daily evaluation of scaffolding to verify it is safe to use. Contractor shall notify Special Inspector and Testing Agent of this review before each use. Contractor is responsible for safe assembly and stability of scaffolding.

F. Contractor shall keep latest set of Construction Drawings, field sketches, accepted shop drawings, and specifications at project site for field use by Inspectors and Testing Technicians.

G. Contractor shall perform remedial work if required and sign nonconformance reports stating remedial work has been completed. Contractor shall submit signed reports to Special Inspector as work proceeds.

H. The Special Inspection program shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents or from implementing an effective Quality Control program.

I. Contractor shall be solely responsible for construction site safety.

1.8 LIMITS ON AUTHORITY

A. Special Inspector or Testing/Inspecting Agency shall not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Special Inspector or Testing/Inspecting Agency shall not have control over Contractor's means and methods of construction.

C. Special Inspector or Testing/Inspecting Agency shall not be responsible for construction site safety.

D. Special Inspector or Testing/Inspecting Agency shall not have authority to stop work.

PART 1.20 - INSPECTIONS AND TESTING

1.21 EXCAVATION, BACKFILL, COMPACTION, AND DEEP FOUNDATIONS (BUILDING AREA)

A. Special Inspector shall perform inspections and verifications or coordinate the RDP for Geotechnical Engineering to perform inspections and verifications including the following:

1. Identify soils requiring undercutting and replacing while observing proof rolling and when subgrade is exposed.
2. Verify footing bearing strata.
3. Review and accept materials proposed by Contractor for use as compacted fill based on test data and information submitted by Testing Agency. Material approval shall be based on requirements and recommendations stated in Project Geotechnical and Subsurface Investigation.
4. Observe and accept filling and compaction procedures.
5. Observe and accept preparation of slab-on-grade subgrade and subbase.

B. Testing Agency shall perform field density tests for building subgrades and for fill materials including slab subbase within building area in accordance with ASTM D 1557 or ASTM D 2922 as follows:

1. Footing subgrade and each stratum of soil on which footings will be placed.
2. Building subgrade including slab subbase and each lift of compacted material.
3. Inspect each subgrade and fill layer before further backfill or construction work is performed. Approval shall be based on satisfactory achievement of compaction criteria.
4. Verify use of fill material and lift thicknesses in field.

C. Testing Agency shall perform moisture content testing of slab subbase in accordance with ASTM D 3017.

D. Pile Foundations:

1. Visual inspection of pile splice welds according to AWS.
2. Visual inspection of steel piles before driving for damage.
3. Special Inspector shall perform inspections and verifications or coordinate the RDP for Geotechnical Engineering to perform inspections and verifications including the following:
   a. Be present during pile installation.
   b. Review pile location plan provided by Contractor.

c. Verify acceptable bearing strata and depths have been reached during installation.
d. Observe load tests.
e. Review records of load test results provided by Contractor.
f. Provide installation records of each pile, including bearing and top evaluations.

4. Testing Agency shall sample fresh concrete and perform compressive strength testing in accordance with Cast-In-Place Concrete section of this specification.

1.22 CAST-IN-PLACE CONCRETE

A. Special Inspector shall perform the following:

1. Inspect reinforcing steel and placement.
2. Inspect embedded bolts and anchor rods prior to concrete placement.
3. Inspect placement of prestressing tendons.
4. Inspect post-tensioning tendons and anchorages.
5. Inspect erected precast members.
   a. Inspect grouting of precast concrete plank.

B. Testing Agency shall perform the following:

1. Verify use of required design mix.

2. Sample and test concrete during placement as follows. Test shall be taken at point of discharge into structure:
   a. Record specific locations where concrete was placed. Refer to column lines where possible.
   b. For each truck, record time concrete is batched as shown in truck ticket, time placement begins/sample time, and time truck is emptied.
   c. For each truck, sample fresh concrete in accordance with ASTM C 172, except modified for slump to comply with ASTM C 94.
   d. For each truck, perform slump test in accordance with ASTM C 143. Perform two slump tests for pumped concrete; one at truck and one at point of discharge.
   e. For normal-weight concrete, measure air content in accordance with ASTM C 231, pressure method. For lightweight concrete, measure air content in accordance with ASTM C 173, volumetric method. Perform one test for each truck for air-entrained and non-air-entrained concrete.
   f. Record temperature of concrete for each truck. Test in-place concrete temperature hourly when ambient temperature is 40 degrees F and below and when 80 degrees F and above.
   g. Record air temperature and general weather conditions (cloudy, windy, sunny, etc.).
   h. Record unit weight of fresh normal-weight concrete in accordance with ASTM C 138. Record unit weight of lightweight concrete in accordance with ASTM C 567. Perform one test for each 50 cubic yard of concrete.
   i. Perform concrete compressive tests as follows:
      I. Prepare compressive test specimens in accordance with ASTM C 31. Take six standard cylinders for each 50 cubic yard of concrete or each 5,000 square feet of slab area for each type of concrete. Store undisturbed in insulated box during cold weather. Deliver to laboratory between 16 and 32

hours after making. Perform compressive tests in accordance with ASTM C 39: two specimens tested at 7 days, two specimens tested at 28 days, and two specimens retained for later testing if required.

II. In cold weather or whenever steel erection is scheduled to commence less than 14 days after placement of supporting foundation concrete, cast additional set of four cylinders for each 50 cubic yard or fraction thereof of supporting foundation concrete. Field-cure cylinders, and test two specimens at 7 days, retaining two specimens for later testing if required. Steel erection may not begin until supporting concrete obtains 75 percent of its design strength.

III. If concrete will be placed in separate buildings on a given project, make individual compressive strength test cylinders for each building.

j. Perform additional testing as follows if required:

I. Take additional set of cylinders for compressive strength testing for each truck in which total time period between batching and completing placement has exceeded ACI-recommended, 90-minute-maximum time limit and is likely to exceed 120 minutes. Take additional cylinders within 10 minutes of placement completion.

II. Make additional tests of in-place concrete when test results indicate specified concrete strengths or other characteristics have not been attained in structure.

III. Perform tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods acceptable to Architect.

IV. Contractor shall reimburse Owner for cost of additional tests.

3. Inspect concrete and shotcrete placement for proper application techniques.
4. Inspect for maintenance of specified curing temperature and techniques.
5. Perform floor flatness (F_F) and levelness (F_L) testing of slabs receiving a trowel finish no later than 48 hours after slab placement in accordance with ASTM E 1155.
   a. Each floor/level shall be divided into test section areas. F_F and F_L numbers for each test section area are local values.
   b. Test section areas shall be minimum of 320 square feet with minimum boundary length of 8 feet for any side. Testing is not to be performed for smaller slab areas.
   c. Test section areas shall be maximum of 2,000 square feet.
   d. Test section areas shall not cross slab construction joints.
   e. Locate test lines orthogonally or at 45 degrees to slab edges in accordance with ASTM E 1155 and no closer than 2 feet to any edge or opening.
   f. Overall F_F and F_L numbers are for entire floor/level and shall be determined by considering measurements from all of test section areas on that floor/level.
   g. (F_L) testing is not required for slabs on metal deck.
6. Perform moisture vapor emission and alkalinity testing in accordance with ASTM F 1869 and ASTM F 710, respectively, as follows:

a. Perform testing after building is enclosed, prior to installation of adhered floor finishes, and once HVAC systems are operational.
b. Test results must be reviewed and accepted by floor finish installer.

7. Verify in-situ concrete strength prior to stressing tendons in post-tensioned concrete or removing of shores/forms from beams or structural slabs.
8. Inspect application of prestressing forces and grouting of bonded prestressing tendons in prestressed concrete.
9. Inspect welding of reinforcing bars.

1.24 STRUCTURAL STEEL (INCLUDING METAL DECK)

A. Special Inspector shall perform the following:

1. Verify Fabricator maintains detailed fabrication and Quality Control procedures:
   a. Review procedures for completeness and adequacy relative to code requirements.
   b. If Fabricator is designated as AISC-Certified Fabricator, Special Inspection for shop-fabricated members and assemblies is not required.
   c. If Fabricator is not designated as AISC-Certified Fabricator, Contractor shall reimburse Owner via execution of credit change order for cost of Special Inspections and testing in Fabricator's shop.
2. Review manufacturer's Certificates of Compliance for high-strength bolts and weld filler material.
3. Review certified mill test reports.
4. Inspect steel frame joint details for compliance with approved Construction Documents.

B. Testing Agency shall perform the following:

1. Material verification of high-strength bolts, nuts, and washers, including review of identification markings and manufacturer's Certificate of Compliance.
   a. Test high-strength bolt assemblies in a tension measuring device to verify material conformance prior to installation. Assemble bolt, nut, and washer on a loose plate and tension by tightening nut to develop required tension in Table 4 of "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Verification that copies of accepted field welding procedure specifications are available on-site for reference by erector's welders.
3. Verification that erector's welder's qualifications are current and appropriate for joint type, welding position, and welding process to be used.
4. Verification that joint fitup for partial and complete penetration groove welds are in compliance with AWS tolerances as follows:
   a. Visually inspect 50 percent of joints scheduled for partial and complete penetration groove welds.
   b. Visually inspect 50 percent of column splices scheduled for partial and complete penetration groove welds.

c. Visually inspect 100 percent of tension member splices, column splices, and moment connections that are part of the lateral force resisting system.

5. Inspect high-strength bolting.
   a. Joints designated as snug tight require only visual inspection.
   b. Joints designated as slip critical require visual inspection during installation.
   c. Checking after installation using calibrated wrenches will not be permitted.
6. Material verification of structural steel and metal deck, including review of identification markings.
7. Perform pull-out tests on adhesive, expansion, and sleeve anchors.
8. Material verification of weld filler materials, including review of identification markings.
9. Inspect welding of structural steel and metal deck.
   a. Visually inspect welds according to AWS.
   b. Schedule inspection of field welding in timely manner utilizing vertical access means and methods utilized by Contractor to perform the welding.
   c. Ultrasonic inspection (UT) according to ASTM E 587 is required for partial and complete penetration field groove welds as follows:
      I. UT inspect 50 percent of joints scheduled for partial and complete penetration groove welds.
      II. UT inspect 50 percent of column splices scheduled for partial and complete penetration groove welds.
      III. UT inspect 100 percent of tension member splices, column splices, and moment connections that are part of lateral force resisting system.
      IV. UT inspect 50 percent or minimum of six of the joints scheduled for partial or complete penetration groove welds completed by each welder. Increase inspection percentage to 100 percent for each welder with more than one rejected weld.
   d. Magnetic particle inspection according to ASTM E 709 is required for Fabricators not certified by AISC Quality Certification Program for 10 percent of shop fillet welds.
   e. Magnetic particle inspection according to ASTM E 709 is required for 10 percent of field fillet welds.
   f. UT inspect according to ASTM E 587 is required for 10 percent of shop partial or complete penetration welds and 100 percent of shop partial or complete penetration groove welds in tension members.
   g. Inspect shear connectors in accordance with AWS D1.1, Section 7. Observe bend tests performed by Contractor. Refer to Section (**05300**) (**05 30 00**), Part 3 for bend test requirements.
   h. Inspect every shear connector by striking once with 10-pound hammer. Direction of hammer swing shall be parallel with member containing connector. Inspection by striking with hammer does not replace bend tests in accordance with AWS.
10. Inspect welding of reinforcing steel.
11. Inspect condition of erected materials.
    a. Visually inspect erected steel for damage.
    b. Visually inspect connections and framing to verify compliance with Contract Documents and accepted shop drawings.
12. Inspect column plumbness and splices:

a. Inspect erected columns for plumbness within tolerances specified in Section (**05100) (051200),** Part 3: Execution.
b. Inspect columns for fit up within tolerances specified in AISC *Manual of Steel Construction*, Specification Section M4.

13. Inspect mechanical fasteners for metal deck, including connections to supporting structure and side-lap fastening.
14. Additional testing shall be performed as follows if required.
    a. Testing Agency shall perform additional tests of connections and framing members field modified by Contractor to correct errors in shop drawings, fabrication, or erection.
    b. Anchor rods and embedded structural supports incorrectly located or damaged after installation shall be field modified by Contractor as indicated in Section 03300, Paragraph 3.4 and tested by Testing Agency.
    c. Testing and reporting of field modifications shall be in accordance with this section, Special Inspections, and have the following additional requirements:
       I. Magnetic particle inspection according to ASTM E 709 is required for 100 percent of fillet welds.
       II. Ultrasonic inspection according to ASTM E 587 is required for 100 percent of full-penetration welds.
       III. Perform pull-out tests on 100 percent of each type of adhesive, expansion, or sleeve anchor used by applying a load equal to 125 percent of allowable pull-out strength listed in manufacturer's literature.
    d. Contractor shall reimburse Owner for cost of additional tests performed.

1.25 COLD-FORMED METAL FRAMING

A. Special Inspector shall perform the following:

1. Verify Fabricator maintains detailed fabrication and Quality Control procedures:
   a. For Fabricators not previously registered and approved to perform such work without Special Inspection, review Quality Control procedures for completeness and adequacy relative to code requirements for Fabricator's scope of work.
2. Visually inspect installation of clips, hangers, hurricane ties, and miscellaneous connectors.
3. Visually inspect framing and details.
4. Visually inspect installation of truss bracing.

B. Testing Agent shall perform the following:

1. Verify member size and thickness.
2. Verify weight of galvanized coating according to ASTM A 90.
3. Visually inspect framing for damage, including trusses and bracing.
4. Visually inspect welds according to AWS.
5. Perform pull-out tests on adhesive, expansion, and sleeve anchors.

PART 1.30 - DOCUMENTATION

1.31 RECORDS AND REPORTS

A. Prepare detailed reports of each test or inspection. Include the following general information:

1. Project name and number.
2. Date of test or inspection.
3. Name of Testing Agency or Inspecting Agency.
4. Name of technician or inspector.
5. Weather conditions.
6. Locations and elevations of specific areas tested or inspected referenced to grid lines.
7. Description of test or inspection.
8. Reference to applicable ASTM standard.
9. Summary of observations, results, and recommendations.
10. Description of areas or materials requiring retesting or reinspection.

B. Reports for each drilled pile or pier shall contain the following information:

1. Elevation of bottom and top.
2. Centerline location at top.
3. Variation of shaft from plumb.
4. Elevation of top and bottom of casings left in place.
5. Volume of grout or concrete in each pile or pier.
6. Condition of bearing strata and verification of review by RDP for Geotechnical Engineering.
7. Water seepage.
8. Unusual conditions.
9. Delays in placement of grout or concrete, and location of construction joints in shafts.
10. Dates of starting excavation or drilling, completion of excavation or drilling, inspections, and placement of concrete.
11. Number of blows for every foot penetration and rate of penetration under last five blows of hammer.
12. Kind and size of hammer used in driving.

C. Concrete compressive strength test reports shall contain the following information:

1. Name of Contractor and concrete supplier.
2. Name of concrete testing service.
3. Name of technician making and testing specimens.
4. Truck number and delivery ticket number.
5. Date and location within structure of concrete placement.
6. Concrete type, class, mix proportions of materials, and design compressive strength at 28 days.
7. Slump, air content, unit weight, and concrete temperature.
8. Total time period between batching and completing placement for each truck.
9. Compressive strength and type of break for tests.

D. Field reports for concrete inspection shall contain general information noted above plus ambient temperature and cylinder numbers.

E. Test reports for masonry materials shall include proportions, composition, and compressive strength.

1.32 COMMUNICATION

A. Testing/Inspecting Agency shall immediately notify Contractor, Special Inspector, and Registered Design Professional by telephone, fax, or e-mail of test results failing to comply with requirements of Contract Documents.

B. Special Inspector shall immediately notify Contractor of work found to be in nonconformance with Contract Documents during inspections. If nonconforming work is not corrected while Special Inspector is on-site, Special Inspector shall notify Registered Design Professional within 24 hours (one business day) and issue an inspection report noting the non-conformance.

C. Special Inspector and each Testing/Inspecting Agent shall use a log to record and track non-conforming work during construction. Non-Conformance log shall include the following information:

1. Description of non-conformance.
2. Date of non-conformance.
3. Description of RDP response if received.
4. Status of nonconformance: 'Open' or 'Closed.'

Updated log shall be attached to each inspection report. Special Inspector or Testing/Inspecting Agent may use Non-Conformance Log form provided at end of this section or other similar form.

D. If non-conforming work is not corrected at time of substantial completion of structure or other appropriate time, Special Inspector shall notify Code Enforcement Official.

1.33 DISTRIBUTION OF REPORTS

A. Testing/Inspecting Agency shall submit reports to Special Inspector and Registered Design Professional within 7 days of inspection or test. Legible handwritten reports may be submitted if final typed copies are not available.

B. Special Inspector shall submit reports to Registered Design Professional within 7 days of inspections. Legible handwritten reports may be submitted if final typed copies are not available.

C. If requested by the Code Enforcement Official, Special Inspector shall submit interim reports that include inspections and tests performed since beginning of construction or since previous interim report. Interim reports shall be addressed to the Code Enforcement Official with copies sent to the Registered Design Professionals (Structural Engineer and Architect) and Contractor. Interim reports shall be signed by Agent performing inspections.

1.34 FINAL REPORT OF SPECIAL INSPECTIONS

A. At completion of work, each Testing/Inspecting Agency shall submit Agent's Final Report of Special Inspections to Special Inspector stating work was completed in substantial conformance with Contract Documents and appropriate inspections and tests were performed. Testing/Inspecting Agency may use Agent's Final Report of Special

Inspections form provided at end of this section or other similar form.

B. At completion of work, Special Inspector shall compile a Final Report of Special Inspections including each Agent's Final Report of Special Inspections. The Final Report of Special Inspections shall state required inspections have been performed and itemize nonconforming work not corrected or resolved.

C. Special Inspector may use Final Report of Special Inspections form provided at end of this section or other similar form based on CASE Form 102-2001.

D. Special Inspector shall submit Final Report of Special Inspections to Registered Design Professional and Code Enforcement Official prior to issuance of a Certificate of Use and Occupancy.

END OF SECTION 01410

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01550 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. The work must comply with the requirements of the following related specifications sections when applicable:

1. Division 1 Section 01050 - *"Uniform Safety Standards for School Construction and Maintenance Projects – Commissioner's Regulations*
2. Division 1 Section 01352 - *"LEED Requirements"* for additional LEED requirements. *(For LEED Certified Projects)*
3. Division 1 Section 01524 - *"Construction Waste Management"* for recycling construction waste. *(For LEED Certified Projects)*

1.02 DESCRIPTION OF WORK

A. Extent of selective demolition work is indicated on drawings and/or specified herein.

1.03 SUBMITTALS

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review and approval prior to commencement of work.

B. See Section 01524 for additional submittal requirements for LEED Projects.

1.04 JOB CONDITIONS

A. Occupancy: Owner will be occupying areas of the building immediately adjacent to areas of selective demolition. Demolition work must be conducted in a manner to minimize disruption of normal Owner's operations.

B. Exits: All exits must be kept clear and maintained.

C. Protection: Provide temporary barricades and other forms of protection as required to protect Owner's personnel, staff and General Public from injury due to selective demolition work and new construction.

1. Prevent dust and dirt from rising and entering the building.

2. Protect adjacent floor areas with suitable coverings.

D. All work in an Educational Facility must comply with the Commissioners Regulations and Uniform Safety Standards for School Construction and Maintenance Projects. Reference Section 01050 for additional information.

E. Project Waste: All project waste and rubbish to be disposed in containers provided by the Contractor for subsequent legal off site disposal in accordance with Specifications Sections 01352 and 01524. Container locations to be coordinated with the Owner. Off site disposal must be on a regular basis.

F. Damage: Promptly repair or replace areas that are to remain and are damaged by demolition or removal work.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed for any interferences, or conditions which will be detrimental to timely and proper completion of the work.

B. Report any interferences or unsatisfactory conditions to the Architect in writing. Do not proceed until interferences or unsatisfactory conditions have been removed or corrected.

3.02 PREPARATION

A. Erect and maintain dust-proof closures to prevent the spread of dust to adjacent areas.

3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. Each day, remove debris, rubbish, and other materials resulting from demolition operations from building in accordance with Specifications Sections 01352 and 01524. Material to be disposed in containers provided by the Contractor. *(For LEED Certified Projects)*

3.05 CLEAN UP

A. Upon completion of demolition work, remove tools, equipment and all remaining demolished materials from site. Leave areas broom clean.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01600 – ASBESTOS WORK UNDER THIS CONTRACT

1.01 ASBESTOS HAZARD

A. The disturbance and dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with content of the training session on asbestos control work, the Contractor shall appraise all of his workers, supervisory personnel, subcontractors, and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.

B. Where in the performance of the workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified asbestos-containing materials, appropriate, continuous measures as necessary to protect all building occupants from the hazard of exposure to airborne asbestos shall be taken.

C. If found in non-compliance with these specifications, the Contractor will be served a written notice to this effect. This written notice will serve as a warning. Further non-compliance of these specifications of safety regulations will be cause of cancellation of contract.

D. All asbestos containing materials, and asbestos contaminated materials abatement work shall be performed in accordance with the applicable provisions of NYS DOL Industrial Code Rule 56 (12 NYCRR Part 56), USEPA 40 CFR Part 763 (AHERA), 40 CFR Part 61, 29 CFR Part 1910, 29 CFR Part 1926, NYS DEC Title 6 part 364, NYS Department of Heath Title 10 part 73 and all other applicable federal, state and local laws, rules and regulations having jurisdiction over this project, and shall include all aspects of worker safety & protection.

1.02 WORK INCLUDED

A. The work under this section shall include all labor, materials, equipment, and performance of all operations in connection with the abatement of asbestos containing materials, completely in accordance with the applicable drawings, specifications, and governing code authorities.

B. The following list of items is to be used as a guide to the Contractor and shall not be considered as limiting the scope of work.

1. Contractor shall visit the site and become thoroughly acquainted with the scope of work prior to bidding.

2. Do all cutting and patching as required.

3. Obtain all inspections and permits, and pay all required fees.

4. Provide and install new non-asbestos materials to replace asbestos materials removed, unless otherwise noted.

5. All removal work shall be done under negative pressure with HEPA-filtered, powered exhausts.

6. All areas shall be damp cleaned after all removal work has been completed.

7. A copy of the Notification Letter from Contractor to the U.S. E.P.A., from the Contractor to the New York State Department of Labor, Division of Safety and Health Asbestos control Program, dump receipt and waste manifest shall be sent to the Engineer for review prior to final payment.

8. All areas containing asbestos shall have a surfactant (wetting agent), similar to amended water, applied to all surfaces.

9. All E.P.A., OSHA, N.Y.S. Department of Labor Industrial Code Rule 56 and Department of Health regulations and guidelines shall be strictly adhered to, including all provisions of these specifications. Any modifications must be authorized in writing and incorporated exactly as specified.

10. Contractor shall be permitted to use the "glove/bag" method for asbestos removal where applicable if accomplished in accordance with all regulations.

11. The Contractor shall make provisions for the possibility of the heating system remaining on during the course of the work.

12. All existing finishes contiguous to the work area and inclusive of the work area shall be restored to original condition. Any damage caused under this contract shall be repaired by the Contractor (e.g. paint peeled off by barrier tape, nail holes, water damage, broken glass, etc.), at no additional cost to the building owner.

13. Any furniture, equipment, or materials moved during the course of this contract shall be placed back to its original position. These materials shall be pre-abatement cleaned before removal from the work area as per Code Rule 56, Section 56-8.1.

14. Contractor shall provide the Engineer with copies of certificates issued by the New York State Labor Department and EPA-AHERA.

15. Notify, on forms provided by the New York State Labor Department, both the Labor Department and the EPA 10 days prior to the commencement of work.

16. Licensed waste haulers shall be used.

17. Contractor shall be responsible for all OSHA air testing. The Owner will contract an independent testing laboratory for all other air monitoring, including TEM clearance samples.

18. Contractor shall provide and post near or within the abatement project clean room a written emergency procedure program in each appropriate language signed by each worker.

19. Any electrical service contained in the abatement areas either shall be completely shut down and locked out or critically barriered to remain outside the abatement area. Temporary electrical power shall be brought in from outside the abatement area with ground fault interruption protection furnished at the source. Power source shall be secured to avoid accidental shutdown of negative air infiltration equipment. If necessary, Contractor shall provide for an exterior separately generated power source.

20. Contractor shall post all supervisor and worker accreditations, owners, monitoring firms, and designers phone numbers, company's written respiratory protection program, written emergency procedures, project log book, and written notification to the occupants of the building 10 days prior to the commencement of work as required by code.

21. A copy of the log book, waste manifests, and dump receipts shall be submitted to the Owner prior to job completion and sign off.

22. A copy of the standard operating procedure, employee protection plan, OSHA medical monitoring, and respiratory training and protection plan shall be submitted to the Owner prior to work start up.

23. Contractor shall be GPAC approved or shall furnish an engineering specification for any equal system proposed for use.

24. Contractor shall provide separate filtered sump pump systems for drainage of all areas as required to remove waste water. Filtration system shall assure a minimum of five micron effectiveness.

25. For work above hung ceiling, perimeter tiles shall be removed under full containment and all walls properly sealed and plasticized up to the deck. This shall include critical barriers on all openings in wall and deck above hung ceiling. Ceiling can then be removed and abatement completed.

26. Contractor shall comply with all U.L. Labor Department and OSHA fire safety regulations including 29 CFR 1910 and 1926.

27. Fixed objects and other items which are to remain in the work area shall be pre-cleaned and plasticized as per code.

28. The entire work area shall be precleaned as per code.

29. All plastic sheeting used shall be of the fire retardant type.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01610 – ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. Applicable provisions of the General Conditions, Supplementary Conditions and Division 1 – General Requirements form a part of this Section.

B. The extent of asbestos-bearing materials to be removed under this Project is indicated on the drawings and as indicated within test results provided by the District's Project Monitor. All work shall be performed in accordance with the latest regulations issued by the New York State Labor Department. Documentation as noted below required by all agencies having jurisdiction is included in the contractors Scope of Work including any and all fees for permits, dumping, testing or monitoring except as specified elsewhere.

1.02 QUALITY ASSURANCE

A. Acceptable Contractor

1. Must have a minimum of three (3) years continuous experience as a contractor normally engaged in asbestos Abatement.

2. Shall have completed at least five (5) or more similar projects within the last five years.

3. Must have completed projects with the E.P.A. and New York State Department of Labor Jurisdiction and Management.

4. Workers and supervisors must be accredited in accordance with the requirements of all applicable rules and regulations.

B. Licensing and Certification

1. No Contractor shall engage in an asbestos project unless such Contractor has a valid asbestos-handling license issued by the Commissioner.

2. A copy of a valid asbestos handling license or other proof of the issuance of a valid asbestos handling license deemed suitable by the Commissioner shall be submitted by the bidder.

3. A copy of a valid asbestos handling license shall be conspicuously displayed approximate to but outside the work area on an asbestos project.

4. No Contractor shall engage in or permit a person employed by the Contractor to engage in or supervise work on an asbestos project involving the removal, encapsulation, or enclosure of asbestos or asbestos material or the disturbance of asbestos unless each such person has a valid asbestos handling certificate.

5. Any person employed on an asbestos project whose duties shall involve the removal, encapsulation, or enclosure of any asbestos material or the disturbance of asbestos or the supervision of such work shall have an asbestos handling certificate or a copy thereof in his/her possession at all times during his/her work on the project.

6. The Contractor conducting the abatement work shall be accredited by the E.P.A. to conduct response actions. Proof of accreditation shall be submitted with bid.

1.03 APPLICABLE CODES

A. All work of this contract shall comply with applicable provisions of the:

1. Occupational Safety and Health Administration (OSHA), including:
Asbestos Regulation
Title 29, Part 1910, Sections 1001, 134, 1926,.2, and .1200.
Code of Federal Regulations

2. Environmental Protection Agency
Regulations for Asbestos
Title 29, Part 61, Sub-parts A and P, Sub-part F, of the Code of Federal Regulations and EPA Asbestos Hazard Emergency Response Act (AHERA), 40 CFR, Part 763.

3. New York State Department of Environmental Conservation (DEC) (Editorial Note: This is required only where asbestos-containing materials will be transported to a sanitary landfill). Regulations regarding industrial waste collector registration Title 6, Part 364, of the New York State Official Compilation of Codes, Rules, and Regulations--6NYCRR364.

4. New York State Department of Labor
Asbestos
Part 56 of Title 12 - Industrial Code Rule 56

5. New York State Department of Health
Asbestos Safety Program Requirements
Part 73 of Title 10
Environmental Laboratory Approval Program

B. Two copies of A and B above shall be obtained by the Contractor. One copy of each shall be posted at the job site. One copy of each shall be on file in the Contractor's office.

C. The most recent edition of any relevant regulation, standard, document, or codes shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized.

1.04 OCCUPANCY OF SITE

A. The normal occupants of the work areas will be relocated during the performance of the work and returned thereto at the conclusion of the work at no cost to the Contractor. However, the Contractor shall protect all furniture and equipment in the work areas in a manner as hereinafter specified for walls and floors. In addition he will perform the work of this contract in a manner that will be least disruptive to the normal use of the non-work areas in the building.

B. Attention is specifically drawn to the fact that other contractors, performing the work of other contracts, may be (or brought upon) any of the work sites of this contract.

Therefore, the Contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other contractors who may be on (or brought upon) any site of the work of this Contract.

1.05 NOTIFICATION

A. The Contractor shall notify the following agencies in writing ten (10 days prior to the start of the asbestos removal project:

1. U.S. Environmental Protection Agency
Asbestos Neshaps Contact:
USEPA Division
26 Federal Plaza
New York, NY 10007

2. New York State Department of Labor
Division of Safety and Health's Asbestos Control Program
1 Main Street
Brooklyn, NY 11201

B. Notification to the agencies in Paragraph A above shall include the following information:

1. Name and address of Owner of building.

2. Name, address and asbestos license number of Contractor.

3. Address and description of the building, including size, age and prior use of the building or area, and amount of asbestos material present in square feet and/or linear feet, as applies. Designate room numbers or other location information unless entire building is involved.

4. Scheduled starting and completing dates for removal and/or encapsulation.

5. Procedures and equipment (including ventilating systems) that will be employed to comply with 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants".

6. The name and address of the waste disposal site where asbestos waste will be deposited.

7. The name, address and ELAP registration number of the Monitoring Firm to perform air monitoring and analysis of air samples on behalf of the Contractor's employees.

8. Any and all requirements in Part 56 Title 12 NYCRR 56-1.6 (d).

1.06 PERMITS

A. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

1. Permit: An annual "Industrial Waste Hauler Permit", specifically for asbestos-containing materials, is required pursuant to 6 NYCRR 364 for transporting of waste asbestos containing materials to a legal disposal site.

2. Asbestos-containing waste materials to be transported shall be packed in accordance with Environmental Protection Agency requirements, i.e.: that the asbestos be bagged, in sealed-tight containers, and that the bags and containers shall be properly labeled.

B. ENVIRONMENTAL PROTECTION AGENCY

1. Notification: At least 10 days prior to beginning work on the asbestos-containing materials, the Contractor shall send written notification to the Environmental Protection Agency, Region II, Air and Hazardous Material Division, with a copy to the Architect/Engineer and the Owner.

2. The notification shall include the information as indicated in 1.04B above.

C. DEPARTMENT OF LABOR

1. At least 10 days prior to beginning work on the asbestos-containing materials, the Contractor shall send written notification to the New York State Department of Labor Asbestos Control Bureau of the Department's Division of Safety and Health. Notification shall be in writing and on the forms provided by the Commissioner.

1.07 REGULATORY COMPLIANCE

A. The Contractor shall furnish documentation to the building owner or his designated representatives that the firm and its employees are familiar with the following regulations of the US Department of Labor, Occupational Safety and Health Administration (OSHA) and the US Environmental Protection Agency (EPA) relating to the removal, disposal and treatment of asbestos.

1. OSHA regulations, namely: Section 1910.1001, Asbestos of 29 CFR Part 1910 and 29 CFR 1926, 29 and CFR 1910.134, "Respiratory Protection" and 29 CFR 1910.20, "Access to Employees Exposure and Medical Records".

2. EPA regulations, namely: Sub-parts A and B of 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants".

3. Labor Department, namely: Part 56 Title 12 NYCRR.

B. New York State Department of Environmental Conservation (DEC):

1. Regulations regarding industrial waste collector registration.

2. Title 6, Part 364 of the New York State Official Compilation of Codes, Rules and Regulations – 6 NYCRR 364.

C. The New York State Education Department (S.E.D.)

1. Guidance Document for control and Abatement of Asbestos Conditions in Public Schools, latest edition.

D. Two (2) copies of each of the above shall be obtained by the contractor; One (1) copy of each shall be posted at the job site. One (1) copy of each shall be on file in the Contractor's Office.

E. The Contractor shall display copies of the Documents required by governing agencies.

F. A list of emergency telephone numbers shall be maintained at the job site an shall include the Architect, Engineer, Building Representative, Monitoring Firm employed by the Contractor, Fire, Police, emergency Squad, local Health Department and Hospital.

G. The Contractor shall be responsible for controlling access at the work site and shall maintain a daily log of personnel entering the Work Area. A list of worker names shall be posted with their start and stop times for each day. Copies of daily log forms will be given to the asbestos Safety Inspector at the end of each week's work progress.

H. The Contractor shall post at the job site documentation that all employees have received medical examinations, as required by OSHA and documentation of respirator training and fit-testing, as required by OSHA 1910.134 and 29 CFR 1926.

I. The Contractor shall strictly adhere to all precautions necessary for the safety and health of the workers in accordance with provisions of OSHA Standards 29 CFR Part 1926, construction Standards and Section 1910.001, Asbestos of 29 CFR 1910, General Industry Standards and Section 1910.134 Respiratory Protection of General Industry Standards.

1.08 PROTECTIVE CLOTHING AND EQUIPMENT

A. Clothing – Protective clothing shall consist of disposable full body coveralls, with hoods and booties attached. Separate disposable head-covers and foot covering may be substituted if disposable coveralls without attached hoods and booties are used. Additional clothing shall include boots or sneakers and gloves. Eye protection and hard hats shall be available as appropriate.

B. Respirators – The Contractor shall provide the required respirators and protective clothing to all workers, and to all official representatives of the Owner, State or other governmental entity, and the Asbestos Safety Monitor who may inspect the job site.

During the preparation of the work site, contractors may choose between two types of respiratory protection as specified. In order of increasing effectiveness, they are:

1. Power air purifying respirators certified by NIOSH for use in atmospheres containing asbestos.

2. Type "C" supplied air respirators, either continuous flow or pressure demand class as certified by NIOSH.

NOTE: Respiratory protection must comply with the exposure limits described in OSHA 1910.1001 and 1926.

The Contractor shall require that each person entering the Work Area shall wear an approved respirator and protective clothing. There shall be no exceptions to the rule.

C. Air Filtration Units – The Contractor shall have available air filtering equipment capable of filtering asbestos fibers to 0.3 um at 99.97% efficiency and of sufficient quantity and capacity to cause a complete air change within the work area once every 15 minutes, exhausting the filtered air so as to maintain a negative pressure inside the work area of sufficient flow through the decontamination chamber and waste exit port so as to prevent escape of airborne fibers. The units shall have been calibrated by the DOT challenge. The number of Negative Air Filtration units needed for the application is determined by dividing the required capacity of the ventilation system as measured in $feet^3$ min. by the rated capacity of the Negative Air Filtration units to be used. The number of units needed (Total $feet^3$ /min)/(Capacity of unit (in $feet^3$)

Example of calculation for determination of required number of negative air filtration units:

1. The dimensions of room in which asbestos is to be removed are 120 feet by 60 feet by 10 feet high.

2. Room volume = 120 x 60 x 10 = 72,000 $feet^3$.

3. The required capacity of the ventilation system in cubic feet per minute (CFM) is determined by dividing the volume by the required minimum air change rate: one complete room volume exchange every 15 minutes. Required capacity of the ventilation system:
$\frac{72{,}000 \text{ cubic feet}}{15 \text{ minutes}} = 4800$ cubic feet per minute (CFM)

4. The rated capacity (in CFM) of the negative air filtration unit (with a clean HEPA filter in place) shall be determined as provided by the manufacturers technical data. In this example, suppose the manufacturers rating for the negative air filtration unit with a clean HEPA filter in place is 1200 CFM.

5. In order to determine how many units are needed, divide the required capacity of the ventilation system (from Item 3 above) by the rate and capacity of the negative air filtration units (from Item 4 above).

   $\frac{4800 \text{ CFM}}{1200 \text{ CFM}} = 4$ negative filtration units needed for this area.

   NOTE: As filter loading occurs during the removal process, the rated capacity of the negative air filtration system will decrease.

6. Replacement air shall enter the Work Area through the decontamination facility, in order to reduce the possible escape of contaminated air. The entire alternate ventilating system shall be installed and operating prior to commencement of asbestos removal.

D. Other Equipment:

1. Vacuums shall be equipped with HEPA filters capable of filtering asbestos to 0.3 um at 99.97% efficiency.

2. Polyethylene bags shall be 6 mil thick, labeled as per OSHA 1910.10041 and EPA 40 CFR 61, Sub Part M, and used for the disposal of asbestos contaminated waste.

3. All tape shall be a high quality duct tape. All spray-on adhesives, glue and other barrier securing material shall also be high quality products. If site conditions negate the performance of one type of system for securing barriers, a suitable alternative shall be required and provided by the Contractor at no additional cost.

4. Power: The Contractor shall have available power cables and sources such as generators to maintain negative air pressure in the work area in the event of power outage.

5. Portable Showers: The Contractor shall have available stalls and sufficient hose length and drain systems or an acceptable alternate such as a portable decontamination trailer with showers. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower. Waste shower water shall be filtered through a minimum of 5 um filters and recycled to be used as a wetting agent or added to asbestos contaminated waste before disposal in an approved landfill.

   a. Portable showers shall be provided and shall be located at the work area exit so that workman go through the shower directly before entering the changing area. One shower shall be provided for every six (6) workers.

   b. Provide a continuously adequate supply of soap and towels and maintain all areas in a sanitary condition.

   c. If the portable shower is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., the shower area shall be provided with a minimum 1/4-inch hardboard "ceiling" with a polyethylene sheeting, at least 6 mil. in thickness, covering the top of the "ceiling."

   d. Shower shall be in accordance with Code Rule 56, Section 56-9.1.

6. Ladders and Scaffolds: The Contractor shall have available ladders and/or scaffolds of sufficient quantity and adequate length and maintain them on site to allow inspection of elevated removal surfaces. Scaffolding may be of suspension type, of standing type such as metal tube and coupler, tabular welded frame, pole, or outrigger type or cantilever type. The type, erection, and use shall comply with all applicable OSHA provisions. During the erection and/or moving of scaffolding, care must be exercised so that any polyethylene covering is not damaged.

E. The Contractor shall have available sufficient inventory of protective clothing, respirators, filter cartridges, glue, spray on adhesives and air filters. Personal protective equipment inventory shall exceed by a minimum of 100% the expected daily person-day usage.

F. Each worker shall be instructed and trained in proper respirator use and shall always wear a respirator, properly fitted on the face, in the work area until the work area is completely decontaminated. Respirators shall be approved by the National Institute for Occupational Safety and Health (NIOSH) for use in asbestos-containing environments and shall be PAPR type at minimum. Half-face and single-use paper respirators are not permitted. All persons shall enter and exit the work area through the personal decontamination enclosure system, and must sign the entry/exit log each time.

G. Packing boxes for the respirators (masks) and for disposal filters shall show the logo of NIOSH and shall also indicate that the masks and filters are for use in asbestos-containing environments.

H. Supply a sufficient quantity of respirator filters approved for asbestos so that the workers can change filters during the work day. Respirators shall be wet rinsed, and filters discarded, each time a worker leaves the work area. New filters shall be installed each time the worker re-enters the work area. Respirators and filters shall be stored at the job site in the changing room and shall be totally protected from exposure to asbestos prior to their use.

I. Workers shall wear disposable, full-body overalls and disposable head and footwear covers in the work area. Footwear may be "non-disposable," in which case it shall be left in the work area at all times and shall be disposed of at the completion of the work.

J. All workers, without exception, shall:

1. Remove street clothes in the changing area and put on new disposable coveralls, new head covers, new footwear covers, unless "non-disposable" footwear has been left in the work area, and a clean respirator each time the work area is entered.
2. Remove the disposable coveralls, disposable head covers, and disposable footwear covers or "non-disposable" footwear in the equipment room before leaving the work area. Gross contamination shall be removed prior to leaving the work area.

3. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is recommended:

    a. Thoroughly wet body from neck down.

    b. Wet hair as thoroughly as possible without wetting the respirator filter.

    c. Take a deep breath, hold it, and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator, and filter. While still holding breath, remove respirator and hold it away from face before starting to breathe.

    d. Dispose of wet filter.

    e. Shower completely with soap and water.

    f. Rinse thoroughly.

4. Shower each time before entering the changing area to change into street clothes or into new disposable work items.

    a. Workers shall NOT eat, drink, smoke, and chew gum or tobacco in the work area. To eat, drink, or smoke, workers shall follow the procedures described in 3B and 3C, then dress in street clothes before entering the non-worker area of the building.

    b. No worker sporting a beard shall be allowed inside the work area.

c. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.

1.09 GUARANTEE

A. Work performed shall be guaranteed for a period of one year from the date of Substantial Completion.

B. The Contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism.

1.10 REQUIRED INSPECTIONS

A. Pre-commencement inspections shall be conducted as follows:

1. Notification to the Asbestos Safety Control Monitor shall be made by the Contractor to request a pre-commencement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested each time another work site is started in a multi-phase project.

2. The Asbestos Safety Technician shall ensure that:

a. The job site is properly prepared and that all containment measures are in place pursuant to this subchapter;

b. Measure for the disposal of removed asbestos material are in place and shall conform to the adopted standard;

c. The contractor has a list of emergency telephone numbers at the job site which shall include the Asbestos Safety Control Monitor firm employed by the building Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer.

3. If all is in order, the Asbestos Safety Technician from the Asbestos Safety Control Monitor Firm shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any work is to commence. Conditional approvals shall not be granted.

B. Progress Inspections shall be conducted as follows:

1. If the Asbestos Safety Technician observes irregularities at any time, the Asbestos Safety Technician shall direct such corrective action as may be necessary.

2. If the contractor fails to take the corrective action required, or if the contractor, any of their employees habitually and/or excessively violate the requirements of any regulation, then the Asbestos Safety Technician shall order the work stopped in writing. If the contractor fails to comply with the order, then the Asbestos Safety Technician shall notify the administrative authority having jurisdiction and/or the building owner who shall issue a Stop Work Order to the contractor and have the work site secured until all violations are corrected.

C. Pre-sealant Inspection shall be conducted as follows:

1. Upon completion of the removal phase, a visual inspection shall be conducted to ensure that all asbestos-containing material has been removed properly before encapsulation begins.

D. Clean-up Inspection shall be conducted as follows:

1. Notice for clean-up inspection shall be requested by the contractor in advance of the desired date of inspection.

2. The clean-up inspection shall be conducted prior to the removal of the critical barriers.

3. The Asbestos Safety Technician from the Asbestos Safety Control Monitoring Firm shall ensure that:

a. The work site has been properly cleaned and is free of visible asbestos and asbestos containing material.

b. All removed asbestos has been properly removed from the site in accordance with the regulations of the EPA.

c. Final air monitoring levels as required or lower have been attained.

4. If repeated inspections are required due to failure to properly clean the work area the cost of these inspections will be back charged to the contractor.

1.11 REQUIREMENTS OF ASBESTOS DISPOSAL

A. All asbestos waste materials destined for disposal shall be wetted and packaged in permanently sealed, leak-tight containers (such as double 6-mil plastic bags) in accordance with 40 CFR 61.20-25 before it can be legally transported and disposed of. No haulage of loose asbestos is permitted. A locked, secure container shall be provided by the contractor if asbestos waste is to be stored outside unattended.

B. Asbestos-containing material and debris which is properly packaged in accordance with the provisions of 1.11A above with regard to removal may be disposed of at a sanitary landfill when certain precautions are taken.

1. Note to Environmental Protection Agency.

2. Permit: An "Industrial Waste Hauler" permit is required for transporting asbestos-containing materials to a disposal site.

C. Asbestos waste can be hauled in trucks or dumpster containers provided the load is comprised only of asbestos in bags and does not contain any other wastes or asbestos containing wastes which could compromise the integrity of the permanent containers. If other materials are present in the load, which could potentially puncture the permanent containers, then those containers shall be enclosed in temporary fiber or steel drums during loading, transport and unloading operations. In addition, asbestos wastes shall not be loaded into or hauled with vehicles containing compaction devices, as the normal compaction cycle will threaten the integrity of the permanent container.

D. All containerized waste shall be carefully loaded on trucks or other appropriate vehicles for transport. Before and during transport, care shall be exercised to ensure that no unauthorized persons have access to the materials.

E. At the burial site, the sealed plastic bags may be carefully dumped from the drums, except where bags are broken or damaged. They shall be left in the drum and the entire contents buried. Uncontaminated drums may be recycled.

F. Contractor shall ensure that no "back hauling" is engaged in by the industrial waste hauler.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01611 – TEST LABORATORY SERVICES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work includes the testing and monitoring for Contractors employees:

1. Contractor shall submit the name of the testing laboratory he intends to employ for approval by the Architect, and

2. Cooperate fully with selected testing laboratory and all others responsible for testing and inspecting the work.

3. Costs of testing during removal shall be in accordance with OSHA regulations and paid for by the Contractor.

B. Related work specified elsewhere:

1. Requirements for testing are described herein and in other Sections of these Specifications.

2. Payment for monitoring and final air testing will be made by the Owner.

1.02 AIR MONITORING

A. Through the entire asbestos-control operation and project decontamination, air monitoring shall be conducted to insure compliance with OSHA and New York Department of Labor regulations. Air monitoring shall be conducted as prescribed by Section 1910.1001 (F)3 of OSHA and Sub-part 56-17 of Department of Labor, New York State regulations.

1.03 LABORATORY TESTING

A. The services of an approved independent testing laboratory shall be employed to perform laboratory analysis of the air samples as prescribed by Section 1910.1001(E) of OSHA regulations and N.Y.S. Department of Health 502. Submit for approval of the Architect/Engineer, the name of the laboratory. Approval must be obtained prior to commencing the asbestos-control work. A complete record, certified by the testing laboratory, all air monitoring tests and results shall be furnished to the Architect/Engineer and the Board of Education.

1.04 COST OF TESTING

A. Asbestos project air sampling and analysis requirements shall be as following:

1. ***The cost of OSHA air monitoring shall be included in the Contractor's bid.***

2. ***The cost of any background, TEM clearance, or any additional monitoring shall be borne by the Owner.***

3. ***Should the clearance samples come back above permissible levels, the cost of any additional required air sampling shall be paid by the Contractor, including monitoring fees.***

4. ***Any additional cost for quick turnaround air testing due to the Contractor's failure to meet specified completion dates shall be borne by the Contractor, including monitoring fees.***

5. ***Should the Contractor notify the hygienist that the work area is ready for inspection, any work site which is either not prepared properly or fails the inspection shall be reinspected at the Contractor's expense.***

6. All air sampling technician and project monitor certificates shall be posted at all times.

7. All laboratories used shall be accredited by the AIHA or by the New York State Department of Health for the selected methodology of sampling and analysis of asbestos.

8. The contractor shall note that the Architect/Engineer (Project Designer) ***is not*** the Project Monitor on this project. The Project Monitor will be assigned or handled by the Owner.

B. Through the length of the project, the monitoring firm shall conduct inspections to perform both barrier air monitoring as well as procedural inspections.

Pre-Abatement (Area Preparation)	Abatement (Work in Progress)	Post-Abatement* (Clearance Air Monitoring)
PCM	PCM	TEM, PCM

*Aggressive Air Sampling Techniques shall be used.

Final Clearance Transmission Electron Miscroscopy (TEM) shall show the average fiber concentration as per 40 CFR Part 763, Sub-Part E, Appendix A, as below 70 structures per square millimeter (705/mm2).

1.05 QUALITY ASSURANCE

A. Qualifications of Testing Laboratory:

The Contractor shall employ an Industrial Hygienist or Laboratory to conduct air testings. They shall be selected from the latest Interim Listing of Commercial Laboratories prepared by Research Triangle Institute, Research Triangle Park, N.C. 27709.

B. Codes and Standards:

1. Air testing shall be in accordance with EPA and the requirements of Section 0910.1001 (a) and (f) and 1926 of the OSHA 2206 regulations.

2. Analysis of contaminated filters shall be in accordance with NIOSH method using phase contrast microscopy. Membrane filter shall be 37-mm diameter, open face.

3. Testing Laboratory shall be from the approved list of firms of the Environmental Laboratory Approved Program of the New York State Health Department.

1.06 SUBMITTALS

A. Test Reports:

1. Promptly process and distribute three (3) copies of the test results, to the Architect.

2. Prompt reports are necessary so that, if required, modifications to work methods and/or practices may be implemented as soon as possible.

3. The contractor shall verbally notify the Architect within 24 hours of the results of each test, followed by written notification within three days.

1.07 PAYMENT FOR FINAL AIR TESTING

A. Final Air Testing Costs:

All cost for the first final air testing following clean-up as required by this contract shall be paid for by the Owner.

B. Re-testing:

Should air tests (following final clean-up) indicate a fiber count greater than .01 fibers per cubic cm. in any of the building areas, the Contractor shall re-clean the specific area. The Owner will then have the area re-tested. ***All costs of such re-testing will be at the Contractor's expense.***

1.05 CONTRACTOR'S TESTING

A. Inspecting and testing performed exclusively for the Contractor's convenience and to assure compliance with Section 1910.1001 and of the OSHA Regulations, shall be the sole responsibility of the contractor. ***The cost thereof shall be deemed included in the bid price.***

PART 2 – EXECUTION

2.01 COOPERATION WITH TESTING LABORATORY

A. Representative of the Testing Laboratory shall have access to the work area at all times. The Contractor shall provide facilities for such access in order that the Laboratory may properly perform its function.

2.02 TAKING SPECIMENS

A. Specimens and samples for testing shall be taken by the testing personnel. Sampling equipment and personnel will be provided by the Testing Laboratory. Deliveries of specimens and samples to the Testing Laboratory will be performed by the Testing Laboratory.

B. Air samples shall be taken as follows:

Area to be Sampled	When	Each Area	Minimum Sample Volume in Liters	Collection Rate
Work Area	**During removal or encapsulation work**	**Daily (4 per 8 hr. work shift)**	**120**	**@ 2 LPM**
Area Immediately Adjacent to Work Areas	**During removal or encapsulation work**	**Daily (4 per 8 hr. work shift)**	**1200**	**@ 10 LPM**
Work Area	**During sealing containment work**	**NONE REQUIRED**	**NONE REQUIRED**	**NONE REQUIRED**

C. Air Monitoring Clearance shall be as follows:

Type	Size	NYS DOL ICR 56	AHERA	NYS SED (2007 NEWSLETTER)	Combined Requirements	Aggressive Air Sampling Required
AHERA-SSSD Includes DOL Minor	<3lf or <3sf	None, Unless Part of Larger Project, Disturbance, or Loss of Integrity	None	Not Available	None, Unless Part of Larger Project, Disturbance, or Loss of Integrity	No, per AHERA
DOL Minor	>3lf or >3sf but <10lf & <25lf	None, Unless Part of Larger Project, Disturbance, or Loss of Integrity	Allows PCM 5 in, 2 blanks	PCM 5 in, 5 out, 3 blanks	PCM 5 in, 5 out, 3 blanks	Yes, per AHERA
DOL Small	>10lf & >25lf if but <160lf & <260lf	PCM 3 in, 3 out	PCM 5 in, 2 blanks	PCM 5 in, 5 out, 3 blanks	PCM 5 in, 5 out, 3 blanks	Yes, per AHERA & DOL
DOL Large AHERA PCM Limit	>160lf & >260lf	PCM 5 in, 5 out	TEM 5 in, 3 blanks	Follow AHERA	PCM 5 in, 5 out, 2-10 blanks per NIOSH AND TEM 5 in, 3 blanks	Yes, per AHERA & DOL

D. No person involved in asbestos abatement work shall be exposed to greater than 8 hour time weighted asbestos fiber exposure levels or Instantaneous ceiling concentrations of asbestos fibers greater than the limits prescribed in OSHA 29 CFR 1910.1001 and 1926. Where such measures are discovered during testing, appropriate measures as prescribed by OSHA CFR 1910, 1910.1001 and 1926 shall be taken.

E. Sampling for sealing and containment projects is only required as outlined in Items 4 and 5 above.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01612 – METHODS OF REMOVAL & TEMPORARY ENCLOSURE

PART I – GENERAL

1.01 WORK AREA PREPARATION:

The work area(s) shall be completely isolated from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, this contractor shall be responsible for cleaning, on a daily basis, those areas in accordance with all applicable codes. All costs incurred in cleaning, or otherwise decontaminating, non-work areas and the contents thereof shall be borne by the Contractor.

Note: Prior to initiating any preparation work, the Contractor shall verify that the Owner's Air Monitoring Firm has performed any necessary pre-test(s) as required by the New York State Labor Dept.

A. The following preparations shall be conducted using approved respirators. However, the use of protective clothing during this phase is optional; the decision to use protective clothing should be based upon the degree of contamination found at the work site during visual observation and pre-testing.

1. Inspection of rooms, shall be made by representatives of the Contractor and Owner before any work is initiated, to inventory and document any existing damage to components, such as furniture, fixtures, walls, doors, and radiator covers. All removable furniture and/or equipment shall be removed from the work area by the Contractor before commencing work. Furniture and equipment shall be pre-abatement cleaned before its removal from the work area. All non-removable furniture and equipment in the work areas shall be completely covered with two layers of polyethylene sheeting, at least 6 mil in thickness, securely taped in place with tape, in addition to critical barrier. All surfaces within the work area are to be precleaned.

2. Signage: Asbestos caution signs shall be provided and displayed in accordance with Section 1910.1001 (g) of OSHA regulations and Part 56 Title 12 NYCRR. Signs shall be in language of all workers that contractor employs as well as any language known to be used and is reasonably common in the geographical area of the project. Refer to 1.05 of this Specification for additional information.

3. Before the work is begun, the contractor shall clean with wet cloths, or if necessary with vacuum cleaner equipped with High Efficiency Particulate Absolute (HEPA) filters, all asbestos material. These items and equipment shall be removed from the work area and returned after the job has been completed and the work area has been decontaminated to the satisfaction of the

owner's agent. Cloths and filters used for cleaning shall be disposed of as contaminated.

4. A "work area" that is contaminated, must be isolated from the balance of the building, and must be decontaminated at the completion of the asbestos-control work.

5. The Contractor shall isolate the work area by building an approved decontamination facility or installing an approved decontamination trailer at all entrances and exits thereto. Work shall be divided into convenient work areas, each physically adjacent, there shall be a separate decontamination unit for each work area. Decontamination units shall have air lock design as required.

6. The Contractor shall establish emergency procedures for each area and shall post written plans in areas readily available by employees. These plans shall include plans for medical emergencies, fire evacuation, temporary loss of electrical power and temporary breach of containment.

B. The following preparations shall be performed in the stated order utilizing protective clothing and respirators. These respirators shall be at least PAPR type respirators approved by NIOSH for use in atmospheres containing asbestos.

1. The work areas shall be completely sealed off by erecting double barriers of fireproof polyethylene sheeting, at least 6 mil in thickness at all entrances and exits to the work area. The sheeting shall be secured to temporary framing with duct tape. The distance between the entrance and exit sheeting shall measure at least 3 feet, and the sheets, when closed, shall overlap the temporary framing so as to seal the opening. The sheets shall be weighted so that they quickly close after being released so that the work area shall always be sealed off by either the entrance or exit sheet. The integrity of all barriers shall be maintained until the project monitor/Owner grants permission for their removal.

2. Detach and clean removable electrical, heating and ventilating equipment and other items connected to asbestos surfaces. These items shall be removed from the work area using decontamination procedures and returned to their proper place when the work area has been decontaminated.

3. Wet clean all non-removable items; including built-in equipment, in the work area and cover with two thickness of 6-mil plastic sheeting taped securely in place.

4. All walls and floors in the work area shall be covered with two layers of fireproof polyethylene sheeting, at least 6 mil in thickness each, taped securely in place to protect such surfaces from water damage, to prevent contamination of those surfaces, and maintained in place with duct tape. Tape all joints including the adjoining with the floor covering.

5. Floor and wall polyethylene plastic shall be overlapped one to the other. The first layer of floor sheeting shall extend up the wall a minimum of 12 inches. The second layer shall be extended up the side walls at least 24". No seams shall be located at the joints between walls and floors. Wall covering shall be securely fastened to the plastic floor covering. Walls and floors to be overlapping layers only; poly shall not be continuous from wall to floor or wall to ceiling. This method of overlap will help to protect floor surfaces from water damage and contamination. Wall cover shall overlap floor by at least 12".

   NOTE: Plastic sheeting shall be a minimum of 6-mil fireproof polyethylene film for walls and 6-mil for sealing off corridors. A <u>double</u> thickness of 6-mil polyethylene film shall be used for all floors and critical barriers. All tape shall be high quality duct tape.

6. Temporary walls comprising critical barrier openings greater than 32 square feet in area are to be constructed with solid materials using 3/8" thick plywood sheathing in accordance with Part 56-8 (15). All joints to be airtight; install double layer of polyethylene sheeting as per note above.

7. All ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, convectors, and speakers, etc. shall be individually sealed with polyethylene sheeting at least 6 mil in thickness taped securely in place with duct tape until the entire operation including cleanup is completed. Care must be taken in sealing off lighting fixtures to avoid melting or burning of the sheeting. All appurtenances shall also be pre-abatement cleaned.

8. In order to avoid the potential tripping hazards created by wet plastic on stairs, the floors in stairway areas may remain unprotected by plastic.

9. However, other methods shall be used to protect and/or decontaminate these surfaces. These alternative methods shall be specified in writing and approved by the Owner before the work project begins.

10. Floor drains shall be sealed individually with two layers of 6-mil polyethylene and duct tape then the entire floor shall have a minimum of two thickness of 6-mil polyethylene sheeting.

    NOTE: In the event that the adhesive material used to secure the plastic sheeting is found to be of insufficient strength to support the weight of the plastic barriers, then the Contractor shall so inform the A/E and receive direction as to a suitable stronger method of securing the plastic sheeting (e.g., spray-on adhesive, glue beads, horizontal wood battens). All securing procedures shall be of first class workmanship. The Contractor, at his expense, shall restore any and all damaged areas prior to completion of projects which occur as a result of barrier securing. All air handling systems serving the work area must be shut down and locked out.

11. Tools, scaffolding, staging, etc. necessary for the work shall be placed in the area to be isolated prior to erection of the plastic sheeting temporary enclosure.

12. Prior to commencing work, the contractor shall submit to the Architect/Engineer for approval contingency plans for safe evacuation of the work area in case of fire.

13. All electrical and mechanical items such as lighting fixtures, diffusers, registers, escutcheon plates, etc which cover the surface to be abated must be removed so as not to interfere with the work.

14. All abatement area surface penetrations shall be completely sealed off including two layers of polyethylene sheeting, if applicable.

15. Crawl space and basement corridor walls and ceilings shall be pre-cleaned and covered with two layers of polyethylene sheeting, if applicable.

16. All sump pump and drainage systems shall be shut off and sealed prior to start up of abatement. If required, the Contractor shall provide a separate filtered pump system to remove wastewater from the abatement area.

17. Temporary lighting of adequate illumination levels shall be provided by the Contractor for abatement and inspections.

18. Remove filters from all heating, ventilation and air conditioning systems and pack them in sealable 6-mil minimum single thickness plastic bags, labeled for disposal as asbestos containing material waste. These bags should be handled in the same manner as removed asbestos. The filters should be replaced with new filters as a final step in the decontamination process (after the final washdown).

C. As all existing ventilating systems in the work area are to be shut down and isolated (and positively pressurized to avoid ductwork contamination) and sealed throughout the removal operation, an alternate system must be utilized. (Existing system shall be critically barriered at all outlets or intakes plus two layers of plastic. If ductwork becomes contaminated as a result of incorrect abatement procedures, then all ductwork and systems shall be either decontaminated or removed and replaced by the Contractor.)

D. Install approved negative air filtration units utilizing appropriate HEPA filters to exhaust air from the work area. These units shall be sized to achieve a rate of one air change every 15 minutes. The volume (in ft^3) of the work area is determined by multiplying the floor area by the ceiling height. The required capacity of the ventilation system (in ft^3/min) for the work area is determined by dividing this volume by the minimum air change rate, which shall be one air change every 15 minutes.

Thus: Required capacity of ventilation system in ft^3 per min = volume of Work Area (in ft^3) /15 min.

1. The number of Negative Air Filtration units needed for the application is determined by dividing the required capacity of the ventilation system as measured in ft^3 min by the rated capacity of the Negative Air filtration units to be used.

2. The power for negative air filtration units must be a temporary source connected through a ground fault circuit outside the work area.

E. Shut down and lock our electric power to all work areas. All power to work areas shall be brought in from outside the area through a ground-fault interrupter at the source.

F. All elevators in the work area shall be shut down and isolated.

1.02 CHANGING AREA (CLEAN ROOM)

A. An isolated changing area shall be provided for the purpose of changing into protective clothing. It shall be constructed using polyethylene sheeting, at least 6 mil in thickness and located so that access to the work area shall be from the changing areas through the shower.

B. Within the changing area, provide a suitable locker or acceptable substitute for storage of each worker's street clothing.

Note: It is recommended that a toilet facility, sink, and running hot and (at least) cold water be available in the changing area.

1.03 VISUAL BARRIER

A. Where the work area is immediately adjacent and within view of occupied areas, a visual barrier of opaque polyethylene sheeting at least 6 mil in thickness shall be provided so that the work procedures are not visible to building occupants. Where the area adjacent to the work area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. The barrier shall be constructed with wood or metal studs covered with minimum 1/2-inch thick hardboard. Where the solid barrier is provided, sheeting need not be opaque.

1.04 ALTERNATE METHODS OF ENCLOSURE

A. Alternate methods of containing the work may be submitted by the Contractor to the Architect/Engineer for approval. Do not proceed with any such method(s) without written authorization of the Architect/Engineer.

1.05 SIGNS

A. Post an approximately 20- by 14-inch manufactured caution sign at each entrance to the work area. The sign shall display the following legend with letter sizes and styles of a visibility at least equal to the following:

LEGEND	NOTATION
Asbestos	1 inch Block
Dust Hazard	3/4 inch Block
Avoid Breathing Dust	1/4 inch Gothic
Wear Assigned Protective Equipment	1/4 inch Gothic
Do Not Remain in Area Unless Your Work Requires It	1/4 Gothic
Breathing Asbestos Dust May Be Hazardous To Your Health	1/4 Point Gothic

Spacing between respective lines shall be at least equal to the height of the respective upper line.

B. Post an approximately 10- by 14-inch manufactured sign at each entrance to each work area. The sign shall display the following legend with letter sizes and styles of a visibility at least equal to the following:

LEGEND	NOTATION
No Food, Beverages, or Tobacco Permitted	3/4 inch Block
All Persons Shall Don Protective Clothing (Coverings) Before Entering the Work Area	3/4 inch Block
All Persons Shall Shower Immediately After Leaving Work Area And Before Entering The Changing Area	3/4 inch Block

C. Insure compliance with all requirements noted on the signs by all individuals entering the work area.

1.06 DECONTAMINATION UNIT

A. For any project requiring either a remote decon unit or for full containment requiring a decon unit, the Contractor shall properly construct such a unit including opaque poly, 36 inch wide airlocks, bag holding rooms large enough to contain securable carts, full clean rooms, proper framing, double poly floors, lockable clean/waste holding rooms, shower areas, equipment rooms, etc. as required by governing codes including Industrial Code Rule 56, Subparts 56-9 and 56-10.

1.07 EMERGENCY PROCEDURES

A. The Contractor shall post written emergency procedures near or within the clean room in all appropriate languages, read and signed by all workers employed on this project. These procedures should include, but not be limited to:

1. Location and phone numbers of police, fire, and medical emergency response teams.

2. Procedures to facilitate all such responses, e.g. EMT response to cardiac, heat stroke, injury victims within the work area.

3. Procedures in the event of fire in the work area.

4. Procedures in the event of an O_2 deficient atmosphere within the work area.

5. Procedures in the event of a water system failure (leakage) within the work area.

6. Procedures to avoid electrical hazards in the work area.

7. Procedures to avoid slips, trips, and falls in the work area.

8. Procedures to decontaminate injury victims.

9. Procedures to address short-term electrical power failure which affects negative air, lighting, and decontamination activities.

10. Procedures to address long-term electrical power failures.

11. Procedures in the event of a major critical barrier failure.

12. Procedures in the event high airborne fiber concentrations are exhibited during barrier air monitoring.

13. Procedures to address unanticipated discoveries of openings behind surfaces being abated.

1.08 ENCLOSURE INTEGRITY

A. Upon completion of the construction of all plastic barriers and decontamination system enclosures, and prior to beginning actual abatement activities, twelve (12) hours settling shall be allowed to ensure the integrity of the enclosure.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01613 – ASBESTOS REMOVAL

PART 1 – GENERAL

Not Applicable

PART 2 – PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 ASBESTOS

A. Asbestos-containing materials to be removed shall be thoroughly wetted immediately prior to stripping and/or tooling to reduce fiber dispersal into the air. Wetting agent 50% polyoxyethylene ester and 50% polyoxyethylene ether, Aqua-Gro or equal, in a concentration of one (1) ounce in five (5) gallons of water (or as recommended by other approved manufacturers). The outer covering of any installation which has been painted and/or jacketed shall be perforated in order to allow penetration of the wetting agent, or, where feasible, carefully stripped away while simultaneously spraying the wetting agent on the installation to minimize dispersal of asbestos fiber into the air.

B. A fine low pressure spray of this solution shall be applied to prevent fiber disturbance preceding removal. Saturate the material sufficiently to prevent emission of airborne fibers in excess of the exposure limits prescribed in the OSHA regulations. The wetted or amended water shall be sprayed on as many times and as often as necessary to ensure that the asbestos material is adequately wetted throughout (especially that asbestos nearest the substrate) to prevent dust emission as specified in the OSHA regulations. No dry removal of asbestos is allowable.

C. Asbestos-containing material, which is stripped away or otherwise removed, shall be packed while still wet into plastic bags, 6 mil minimum thickness. Bags shall be sealed and placed into drums, covered and sealed for transport. The outside of all drums shall be cleaned before leaving the work area. Periodic cleanup and bagging of removed material while still wet and used coveralls, headcover, etc. shall be done to prevent accumulation of such material on the floor covering where traffic in the area may cause excessive air borne concentrations of the fibers. Stripped materials shall be sprayed as necessary to keep it wet until cleanup.

NOTE: For amosite-containing materials, a small test area shall first be tested with the specified wetting agent to determine material absorption. Inspection of rooms, shall be made by representatives of the Con-tractor and Owner before any work is initiated, to inventory and document an existing damage to components, such as furniture, fixtures, walls, doors, and radiator covers.

NOTE: Removal procedures may be amended per Applicable Variance AV85.

D. Removal of the asbestos material shall be done in small sections by two-person teams, on staging platform if needed. The asbestos material shall not be allowed to drop a distance greater than 12 feet. In the event that the drop is greater than 12 feet to the floor a collection platform or chute may be used.

E. A project supervisor or foreman shall remain on site whenever any type of work, including set up, is in progress. This supervisor's or foreman's name shall be provided to the Owner, Engineer, and Project and Air Monitors, and must be an English-speaking person. This person shall be ultimately responsible for maintaining the site, he shall also ensure that no one exits the work area before going through a proper decontamination process. He shall also ensure that all proper decontamination procedures are followed and that proper waste handling and storage procedures are followed.

F. Contractor shall provide 24 hour notice to the Project Monitor for pre- and post-abatement inspections. No work may proceed prior to an inspection, and no lock down may proceed prior to an inspection including final air monitoring.

G. As a method of organizing the asbestos removal work, workers, shall begin on the areas nearest to the decontamination unit and work toward the negative air filtration units. Also, to the extent possible, workers shall always face the negative air filtration units while removing asbestos materials. In this way asbestos fibers released by the process will be drawn away from the workers' breathing zones and towards the filtration units. The Contractor shall have on site an Emergency power source for the negative pressure units to ensure their continuous function in the event of a power failure. The wet material from each section shall be packed and sealed into labeled 6-mil plastic bags prior to starting the next section to prevent the material from drying. Water soaked fallen material shall not be left out of bags overnight, or for more than four hours to prevent loss of its water content due to evaporation. However, plastic bags will not be effective when wire lath and similar sharp-edged materials are involved in asbestos removal. Therefore, contaminated material containing sharp edged items shall be cut to size while adequately wet, placed in small cardboard boxes and double bagged, or singly bagged and then placed in temporary fiber drums. Bags and drums shall be marked with the label prescribed by Section 61.22 (c) of the EPA regulations. The outside of all containers shall be wet-cleaned or HEPA vacuumed before leaving work area. All vacuum cleaners shall be equipped with HEPA filters.

NOTE: 40 CFR 61.22 (j) prescribes a leak-tight container, the integrity of which is the Contractor's responsibility until after deposition at a sanitary landfill which is run in accordance with 40 CFR 61.25. Therefore, caution must be used in the choice of container types, and consideration given to the method of unloading at the landfill. Fragile containers shall be unloaded by hand to prevent rupture and possible airborne emissions.

H. Negative air shall be maintained to provide four area air changes per hour. Contractor to supply containment volume measurements to the Project Monitor for verification. Air volumes are to be determined by metering the air flows at the machine exhaust outputs and a minimum static pressure differential of .02 inches of water shall be maintained between the inside and outside of the abatement area at all times. A minimum of two negative air machines shall be present in the work area at all times. All negative air machine exhaust ducting shall be monitored continuously by the Contractor to ensure proper system operation. Equipment shall operate continuously, 24 hours a day from beginning of set-up through clearance. At least one negative air unit shall be installed as a back-up to be used during filter changing and other unit failure.

I. After completion of this removal phase (stripping), all surfaces from which asbestos has been removed shall be wire brushed and/or wet sponged or cleaned by an equivalent method to remove all visible asbestos containing material. During this work, the surfaces being cleaned shall be kept wet using amended water. All disposable equipment shall be packaged for disposal. Container shall be washed with amended water and shall have all exterior particulate matter removed prior to removal from the contaminated area.

J. All work area barriers including decontamination unit barriers and waste decontamination unit barriers shall be inspected by the supervisor at least twice daily, and shall be documented in the project log book. Repairs shall be made immediately upon discovery and prior to resumption of abatement activities.

K. All accessory equipment shall be moved to the equipment room in sealed containers (6-mil minimum) and decontaminated for removal.

L. Watertight and securable waste holding carts shall be available in the bag holding area of the waste out decontamination unit.

M. All free water (in container areas) shall be retrieved and added to asbestos contaminated waste and then placed in plastic lined drums.

N. Power tools used to disturb asbestos material shall be equipped with HEPA filtered local exhaust.

O. Final clean-up of work area may commence.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01614 – AIR MONITORING

PART 1 – GENERAL

1.01 AIR MONITORING

A. The Contractor shall cooperate fully with all aspects of the air monitoring program which is conducted by an independent air monitoring firm responsible to the District. This Section is provided only as information to the Contractor.

B. The independent air monitoring firm shall provide a qualified Asbestos Safety Monitor to observe the progress of the work to verify that the contractor's performance meets all state and federal regulations and is in compliance with this specification. The Asbestos Safety Monitor shall have the authority to direct the actions of the Contractor verbally, or in writing, to insure compliance.

C. In addition, to the independent air monitoring firm hired by the District, the Contractor shall arrange for air monitoring to be conducted in all Work Areas in accordance with 29 CFR 1910.1001, and 1926 or OSHA regulations, on behalf of the Contractor's employees (at least on the first day of major removal work and in the event of major process changes). The Testing Laboratory shall be certified as proficient in asbestos analysis by AIHA or NOISH and employed by the Contractor. These personal samples shall be obtained from employees engaged in each of the following operations: asbestos removal, (i.e. spraying, scraping, brushing), disposal (i.e. bagging) and clean-up. Representative sampling shall be repeated in the event of major changes in the removal operation. This sampling shall be done with the sampling media and flow rates specified in NIOSH Method 7400. (Samples shall be taken for the determination of the 8-hour time weighted average airborne concentration and of the ceiling concentrations of asbestos fibers.

D. The results of the Contractor's air monitoring shall be returned within two (2) working days, copies shall be provided to each employee monitored as specified by OSHA Regulations 29 CFR 1910.02 and 1926. The Contractor shall examine these results and evaluate the effectiveness of the controls in use (wet methods, exhaust units and respiratory protection). Copies of these monitoring tests shall be provided to the Owner's Asbestos Safety Monitor, as part of the documentation that the work has been completed. Copies shall also be made available, upon request to representatives of Local, State or Federal Enforcement agencies. Copies of these air monitoring results shall also be posted in a plainly visible location at the job site for the purpose of notifying the Contractor's employees. These shall be posted within one working day upon receipt of the results from the analytical laboratory.

E. Air monitoring and visual inspection in and adjacent to the Work Area will be conducted on behalf off the Owner throughout the abatement project, and in accordance with this specification.

F. The testing laboratory shall conduct all required analysis expeditiously and shall report the results of such tests to the Asbestos Safety Monitor. The Asbestos Safety Monitor upon receipt of testing results indicating concentrations above 0.01 fibers/cc have occurred outside the containment barriers or results above 0.02 f/cc within the clean room of the decontamination chamber during the abatement action, shall report these results within one working day to the Contractor, the owner and the A/E, so that prompt corrective action may be taken.

G. The Asbestos Safety Monitor shall keep a daily log of on site observations concerning contractor's compliance with activities required under these job specifications. The log shall be made available upon request at all times to the owner, the A/E and the appropriate Local, State and Federal agencies. The Asbestos Safety Monitor shall report results in a comprehensive final report, including daily logs, observations and air monitoring results.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01615 – PROJECT DECONTAMINATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Following completion of the asbestos-control work, polyethylene sheeting on walls, then the floor cover, shall be carefully removed, folded to minimize dispersal of asbestos-containing residue and debris, and packed properly in caution-marked double ply plastic bags 3 mil minimum thickness each ply. Bags shall be sealed and placed in fiber or metal drums, covered and sealed for transport. The outside of all drums shall be cleaned before leaving the work area.

1. Vertical sheeting which forms the sole barrier between the work area and occupied area shall remain in place.

2. Double barriers at entrances to the work area shall remain in place.

3. Sheeting over lighting fixtures and clocks, ventilation openings, and occupied area shall remain in place.

B. Clean all surfaces of the work area including remaining sheeting, tools, scaffolding and/or staging by use of a High Efficiency Particulate Absolute (HEPA) filter vacuum (Note: A HEPA Vacuum will fail if used with wet material). Dry dusting or dry sweeping shall not be permitted. Once vacuuming is complete, all surfaces shall be washed. Cleaning cloths and mopheads shall be rinsed periodically to avoid spreading of asbestos fibers.

C. Following the first cleaning and prior to the first sheeting removal, apply a thin coat of encapsulating agent on non-removed surfaces only. Then carefully remove sheeting over lighting fixtures and clocks and dispose of as indicated above.

D. After the area has been allowed to settle for a minimum of twelve (12) hours, perform a second cleaning. Following completion of the second damp-cleaning operation, perform a complete visual inspection of the work area (all surfaces, including beams, ledges, and folds of polyethylene sheeting) to insure that the area is dust free. If any residue is visible after the second cleaning, affected surfaces shall be damp-cleaned again.

E. Then perform a third cleaning after an additional twelve (12) hour period has elapsed.

F. Air samples shall be taken in each work area (see Section 02082) for air monitoring and testing.

G. If the work area is found to be still contaminated, i.e. if these test results exceed any reading for outside air taken pursuant to Section 02082, repeat the damp-cleaning, air monitoring, and testing.

H. After the work area is found to be decontaminated, and upon approval of the Project Monitor, remaining polyethylene sheeting shall be carefully removed, folded, and disposed of as indicated above.

1.02 DECONTAMINATION

A. The Contractor shall provide an adequate decontamination unit consisting of a serial arrangement of rooms or spaces adjoining the Work Area as indicated on plans or a decontamination trailer meeting the criteria outlined below. Each space shall be clearly identified and separated from the others by plastic sheet doors, acceptable air locks minimum 3' wide designed to minimize fiber and air transfer as people pass between areas. Air locks shall have at least three layers of 6-mil plastic sheetings.

B. The decontamination areas are described below:

1. Clean Room: In this room, persons remove and leave all street clothes and put on clean, disposable coveralls. Approved respiratory protection equipment is also picked up in this area. Sheeting for this area to be 6-mil opague for walls and double layer floor. NO ASBESTOS CONTAMINATED ITEMS ARE PERMITTED IN THIS ROOM.

2. Shower Room: This is a separate room used for transit by cleanly dressed people entering the job site from the Clean Room and for showering by them after they have undressed in the Equipment Room. Hot and cold water adjustable at the tap is required. THIS IS A CONTAMINATED AREA.

3. Equipment Room: Work equipment, footwear and all other contaminated work clothing shall be stored here. This is also a change and transit room for people. All areas between the Shower Room and Work Area shall be considered part of the Equipment Room. Double layer plastic floor and wall covering is required. A walk off water pan for cleaning footwear is required. THIS IS A CONTAMINATED AREA.

1.03 SAFETY

Workers and visitors shall observe the following Work Area entry and exit procedures:

A. WORKER ENTERS CLEAN ROOM AND REMOVES STREET CLOTHING, PUTS ON CLEAN OVERALLS AND RESPIRATOR, AND PASSES THROUGH SHOWER ROOM INTO THE EQUIPMENT ROOM.

B. ANY ADDITIONAL REQURIED CLOTHING AND EQUIPMENT PREVIOUSLY DEPOSITED IN THE EQUIPMENT ROOM IS PUT ON (WHEN WORK AREA IS TOO COLD FOR COVERALLS ONLY, THE WORKER WILL USUALLY PROVIDE HIMSELF/HERSELF WITH ADDITIONAL WARM GARMENTS TO BE WORN UNDER THE DISPOSABLE CLOTHING. THESE MUST BE TREATED AS CONTAMINATED CLOTHING AND LEFT IN THE DECONTAMINATION UNIT). UNDER NO CIRCUMSTANCES SHALL A WORKER ENTER THE WORK AREA WITHOUT HAVING PROTECTIVE CLOTHING ON.

C. WORKERS PROCEED TO WORK AREA AND PERFORM WHATEVER WORK IS TO BE DONE.

D. BEFORE LEAVING THE WORK AREA, THE WORKER SHALL REMOVE ALL GROSS CONTAMINATION AND DEBRIS FROM THE COVERALLS USING A VACUUM WITH A HIGH EFFICIENCY PARTICULATE ABSOLUTE (HEPA) FILTER. IN PRACTICE, THIS IS USUALLY CARRIED OUT BY ONE WORKER ASSISTING ANOTHER.

E. THE WORKER PROCEEDS TO EQUIPMENT ROOM AND REMOVES ALL CLOTHING EXCEPT APPROVED RESPIRATORS. EXTRA WORK CLOTHING MAY BE STORED IN CONTAMINATED END OF THE UNIT. DISPOSABLE COVERALLS ARE PLACED IN A BAG FOR DISPOSAL WITH OTHER MATERIAL.

F. THE WORKER THEN PROCEEDS DIRECTLY INTO THE SHOWER ROOM. RESPIRATORS SHALL BE TAKEN OFF LAST TO PREVENT INHALATION OF FIBERS DURING REMOVAL OF CONTAMINATED CLOTHING AND SHALL NOT BE REMOVED UNTIL THEY HAVE BEEN WASHED FREE OF DUST.

G. AFTER SHOWERING, THE WORKER MOVES TO THE CLEAN ROOM AND DRESSES IN STREET CLOTHING PRIOR TO EXITING.

H. RESPIRATORS ARE PICKED UP, WASHED THOROUGHLY AND DISINFECTED AS REQUIRED BY OSHA REGULATIONS 29 CFR 1910.134, AND 1926, AND WRAPPED AND STORED IN THE CLEAN ROOM.

I. All filters in the air handling system(s) shall be carefully removed, treating as contaminated material, bagged, and disposed of as indicated above.

J. Filters in dual cartridge type respirators used during the preparation phase of the job shall be removed, wetted and discarded as contaminated waste. A new filter shall be in place in the respirator prior to re-use. For powered air purifying respirators or supplied air respirators, the manufacturer shall be consulted about the proper decontamination sequence.

K. There shall be no smoking, eating or drinking in any contaminated areas (shower room, equipment room and work area). Respirators shall be worn in all contaminated areas. Failure to observe these requirements will result in the ejection of the offender from the premises. Failure of the offender to leave will result in a written stop work order.

L. Work footwear, i.e., non-disposable, shall remain inside the contaminated area until completion of the job and shall be thoroughly cleaned at that time.

M. It shall be the contractor’s responsibility to ensure all employees follow the appropriate procedures, including the decontamination procedures listed. Employees who repeatedly violate proper procedures shall be subject to disciplinary measures by the contractor, including dismissal if necessary.

N. Three final cleanings will be performed prior to clearance air monitoring and lock down. Each cleaning shall be at a minimum of twelve hours apart to allow for drying time.

O. Post abatement visual inspections shall be conducted by the Project Monitor prior to all cleanings and lockdown. All surfaces in the work area shall be encapsulated, not just abated surfaces. However, any cosmetic surfaces such as painted or finished surfaces shall have three layers of polyethylene applied and a fourth cleaning shall be done on the cosmetic surface to eliminate defacing of the surface due to lock down.

P. After completion of the cleaning operation the contractor shall:

1. Notify the Asbestos Safety Monitor that a POST removal clean-up inspection can be performed to ensure all visible asbestos has been removed and the area is dust free. The owner's testing firms will conduct an aggressive visual inspection of all work areas. In addition to a visual inspection conducted at the floor level, the owner's testing firm shall inspect all exposed surfaces in the work areas, including those at the ceiling level (using ladder as necessary), to ensure that no visible asbestos-containing materials have been left above ceilings, structural members or on light fixtures or other surfaces. The contractor must provide the ladders or scaffolding necessary to inspect these areas and sufficient electrical sources, location and number to conduct air sampling.

2. Request air monitoring of the work area by the Owner's testing firm within 48 hours. This testing shall be done using NIOSH Method 7400 by a credentialed laboratory. The Owner's testing firm will then conduct overall area monitoring under simulated conditions of normal building occupancy. Fans with a radius of one foot and capable of creating a minimum air velocity of 500 ft per minute shall be used in each room to be monitored to stir up any residual invisible fibers such as would be entrained in air by the pedestrian traffic under conditions of normal occupancy. Asbestos fiber concentrations shall not exceed 0.01 f/cc. Final air monitoring clearance testing will not be taken if any of the surfaces in the work area are wet.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01616 – CLEAN-UP PROCEDURES

PART 1 – GENERAL

1.01 CLEAN-UP

The following clean-up procedures shall be required for all large and small abatement projects:

A. Frequency for containerizing: Cleanup of accumulations of loose asbestos material shall be performed whenever enough loose asbestos material has been removed to fill a single leak tight container of the type commensurate with the material properties. In no case shall cleanup be performed less than once prior to the close of each working day. Asbestos material shall be kept wet until cleaned up.

B. Frequency of dust: Accumulations of dust shall be cleaned off all surfaces on a daily basis using HEPA VACUUM and/or wet cleaning methods.

C. Frequency for enclosures: Decontamination enclosures shall be HEPA vacuumed and/or wet cleaned at the end of each shift.

D. Clean-up tools and equipment: Accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dustpans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste.

1.02 POST ABATEMENT REQUIREMENTS

A. The following clean-up procedure shall be required after completion of all abatement activities:

1. Clean-up tools and equipment: All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean all surfaces after gross cleanup.

2. First Cleaning: All surfaces in the work area shall be first wet cleaned using rags, mops and sponges. To pick up excess liquid and wet debris, a wet purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.

3. First Sheeting Removal: The cleaned, exposed barrier layer of plastic sheeting shall be removed from walls and floors. Windows, doors, HVAC system vents and all other openings shall remain sealed. Decontamination enclosure systems shall remain in place and be utilized.

4. Second Cleaning and Sheeting Removal: After the first cleaning, at least twelve hours shall be allowed for asbestos to settle. Thereafter all objects and surfaces in the work area shall be HEPA vacuumed and/or wet cleaned. The remaining plastic on walls and floors only shall then be removed. All windows, doors, HVAC system vents and all other openings shall remain sealed.

5. Third Cleaning: After the second cleaning, at least twelve hours shall elapse before HEPA vacuuming and/or cleaning all surfaces in the work area. The negative pressure ventilation units shall remain in continuous operation during the settling periods and third cleaning.

6. Removal of Waste: All containerized waste shall be removed form the work area and the holding area.

7. Removal of Tools and Equipment: All tools and equipment shall be removed from the work area and decontaminated.

8. Clearance Air Monitoring: Clearance air monitoring is to be conducted by Owner's Laboratory.

9. Removal of Isolation Barriers: The isolation barriers shall be removed only after satisfactory clearance air monitoring results have been achieved.

1.03 FINAL CLEAN-UP

A. All critical barriers shall be unsealed.

B. Plastic sheeting, tape and any other debris shall be disposed of in sealed plastic bags labeled as asbestos contaminated waste.

C. The inside of windows shall be washed.

D. Any walls, floors, trim, doors, furniture or other items damaged during the work shall be repaired and refinished to match existing material.

E. Woodwork, trim, floor, furniture, plumbing and electric light fixtures shall be cleaned.

F. Cloths or sponges used in the cleaning operation shall be disposed of as contaminated waste.

G. There shall be no residue left on floors, ceilings, electric light fixtures or other surfaces.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01617 – MONITORING & SUPERVISION

PART 1 – GENERAL

1.01 DESCRIPTION

The specifications of this section are provided ***as information only*** to the Asbestos Removal Contractor.

A. All work herein described shall be performed as one single contract responsible to the Owner and shall include the services of both an Asbestos Safety Control Monitor and Asbestos Safety Technician. This work shall be in addition to, and independent of the OSHA mandated air monitoring conducted on behalf of the contractor's employees. Testing Laboratory shall be from the approved list of firms published by the New York State Health Department.

1.02 GENERAL DUTIES

A. The Asbestos Safety Technician shall perform all air sampling specified herein, and shall be thoroughly familiar with the Asbestos Removal Specifications. Acting on behalf of the Owner, he shall have access to all areas of the Asbestos Removal project at all times and shall randomly inspect and monitor the performance of the Contractor to verify that said performance meets all Federal and State Regulations and is in compliance with the Asbestos Removal Specifications. The Asbestos Safety Technician may be on site throughout the entire abatement operation.

1.03. AUTHORITY AND COMPLIANCE RESPONSIBILITIES

A. The Asbestos Safety Technician shall have the authority to direct the actions of the Contractor verbally, and in writing to assure compliance. In the event of continual non-compliance or serious violation, the Asbestos Safety Technician shall notify the Owner, the Architect/Engineer and, as necessary, appropriate governmental agencies. The Asbestos Safety Technician shall issue a written "Stop Work" order to the contractor if so directed by the Owner, the Owner's Architect/Engineer or an appropriate governmental agency. All directions to the contractor shall be legible, dated, and shall bear the signature of the Asbestos Safety Technician. Copies shall be forwarded to the Owner and Architect/Engineer.

1.04 REPORTING OF AIR SAMPLING AND ANALYSIS DATA

A. The Testing Laboratory shall conduct all required analysis within the time frame specified and in conformance with specified analytical procedures and shall report the results of such tests to the Asbestos Safety Technician. The Asbestos Safety Technician, upon receipt of testing results indicating that concentrations above 0.01 fiber/cc have occurred outside the containment barriers or within the clean room of the decontamination chamber during the abatement action shall report these results within one working day verbally or by telephone communication if necessary to the Contractor, the Owner and the A/E, so that prompt corrective action may be taken.

This telephonic or verbal communication shall be followed by a written report. A copy of which shall be sent to the administrative authority having jurisdiction.

B. The Asbestos Safety Technician shall keep a daily log of on-site observations concerning Contractor's compliance with activities required under the job specifications, listing all deficiencies encountered and the names of all persons entering the work area. This log shall be made available upon request at all times to the Owner, the Architect/Engineer and to appropriate Local, State and Federal Agencies. The Asbestos Safety Technician shall report results in a comprehensive final report, including daily logs, required inspection reports, observations and air monitoring results. The Asbestos Control Monitor shall maintain the report as a permanent record and present a copy to the Owner within twenty (20) working days.

1.05 PRE-TESTING

A. Prior to the initial preparation for asbestos removal (i.e., before construction of barriers, masking and sealing, test(s) shall be conducted under normal building occupancy conditions in order to establish base line air quality data for future reference. If pre-test(s) have not already been performed, the Asbestos Safety Technician shall conduct the pre-test(s).

1. Conditions during sampling: Whenever possible, sampling shall be conducted during conditions of normal use occupancy. If an observer cannot be present to ensure the integrity of each sample while building is occupied, then the Air Testing Technician shall return when the building is not occupied to perform monitoring under conditions of simulated normal use occupancy. The aspect of normal use activity that is important to recreate during simulation is the re-entrainment in air fibers which, may have settled out onto horizontal surfaces. To this end, when the building is not occupied, the Asbestos Safety Inspector shall supply and place propeller type fans in the space. The fan shall have blades with a radius of at least one foot and shall be capable of creating a minimum air velocity of 500 ft per minute. These may be of the oscillating type. The sampling pump and sampling media shall be placed 20-40 ft at a right angle from the line(s) of airflow created in front of the fan.

2. Sampling Procedure: Filter cassettes and sampling train shall be assembled as specified in NIOSH Method #7400. The flow rate shall be between 2.0 and 10 liters per minute. The total volume shall be of sufficient quantity to guaranty 0.005 fibers/cc level of reliable quantitation. Pumps shall be calibrated before and after sampling and a record kept of each calibration. At least five samples per homogenous sampling area shall be collected with on additional for every 5,000 sq.ft. greater than 25,000 sq.ft.

3. Analysis: NIOSH Method #7400.

4. Maximum turn-around time: 2 working days.

5. Evaluation Criterion: 0.01 f/cc.

6. The Asbestos Safety Technician shall perform all air sampling specified in this sub-chapter, and shall be thoroughly familiar with applicable regulations. He shall have access to all areas of the asbestos removal project at all times and shall inspect and monitor the performance of the Contractor to verify that said performance complies with these specifications.

7. The Asbestos Safety Technician shall have the authority to direct the actions of the contractor verbally and in writing to assure compliance. In the event of continual non-compliance or serious violation the Asbestos Safety Technician shall notify the Inspector from the Administrative Laboratory having jurisdiction who shall issue a written Stop Work Order to the Contractor and have the work site secured until all violations are resolved.

8. The Asbestos Safety Technician upon receipt of testing results indicating that concentrations above 0.01 fibers/cc have occurred outside the containment barriers or above .0.2 f/cc within the clean room of the decontamination chamber during the abatement action shall report these results within one working day verbally or by telephone communication if necessary to the Contractor, the owner and the architect/engineer so that prompt corrective action may be taken. This telephone or verbal communication shall be followed by a written report.

1.06 REMOVAL

A. Monitoring outside the work area shall be provided throughout removal to ensure that no outside contamination is occurring.

B. Filter cassettes and sampling train shall be assembled as specified in NIOSH #7400. The flow rate shall be between 2.0 and 10 liters per minute. The total volume shall be sufficient to achieve a detection limit of 0.01 f/cc. Pumps shall be calibrated before and after sampling and a record kept of this calibration.

C. Three samples per day shall be provided. One stationary sample at decontamination unit entrance/exit and two samples adjacent to work area, but remote from the decontamination unit entrance. In the selection of adjacent areas to be monitored, preference shall be given to rooms which may remain occupied by unprotected personnel.

D. If the Contractor’s barriers or other control methods are observed to malfunction and if the Contractor does not correct the problems immediately upon notifications, then the work stoppage procedures shall be followed. In such a situation, additional sampling up to three samples per day, shall be performed by the Asbestos Safety Technician.

E. Analysis: NIOSH Method #7400.

F. Maximum turn-around time: two working days.

G. The evaluation criteria: 0.01 f/cc.

H. Series of smoke tests shall be performed at the decontamination unit entrance/exit, by the Asbestos Safety Technician to ensure continuous negative air pressure. This test shall be performed before each work shift and every four hours thereafter until work stops.

1.07 POST REMOVAL TEST

A. The Asbestos Safety Technician shall provide monitoring of work area (s) within 48 hours of final cleaning and before removal of critical barriers. This test is required to establish safe conditions for removal of critical barriers and to permit reconstruction activity to begin. Sufficient time following clean-up activities shall be allowed so that all surfaces are dry during monitoring.

1. Conditions During Sampling: Normal occupancy use conditions shall be simulated using fans. The Asbestos Safety Technician shall supply and place propeller-type fans in each room to be sampled so as to cause settled fibers to rise and enter the air. The fans shall have blades with a radius of at least 20" and shall be capable of creating a minimum air velocity of 500 ft. per minute. The sampling pump and sampling media shall be placed 20-40 ft. at a right angle from the line(s) of air flow created in front of the fan. Negative air equipment must operate so as not to exceed 2 air changes per minute.

2. Sampling Procedure: Filter cassettes and sampling train shall be assembled as specified in NIOSH #7400. The flow rate shall be between 2.0 and 10 liters per minute. The total volume shall be of sufficient quantity to guaranty 0.005 fibers/cc level of reliable quantitation. Pumps shall be calibrated before and after sampling and a record kept of this calibration.

3. Sampling Frequency and Location: Take a minimum of five samples per homogenous abatement area plus one for each 5,000 sq. ft. greater than 25,000 sq.ft.

4. Analysis: NIOSH Method #7400.

5. Time for Laboratory Analysis: Maximum turn-around time upon completion of sample is thirty six (36) hours.

6. Evaluation Criteria: If any test results exceed 0.01 fiber/cc the Asbestos Safety Technician shall so inform the Contractor, the Owner and the Architect/Engineer.

7. Final Clearance: Air Testing shall be in accordance with A.H.E.R.A. interim methodology as prescribed in EPA Regulation 40 CFR Part 763 (Transmission electron Microscopy).

B. The Contractor shall be required to re-clean all surfaces using wet cleaning methods and provide negative HEPA filtered exhaust air during the re-cleaning process. This process of re-cleaning, allowing surfaces to dry, and re-testing shall be repeated until compliance is achieved.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01618 - REMOVAL OF ASBESTOS CONTAMINATED SUBSTRATE MATERIAL – MANUAL SCRAPE METHOD

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z87.1	(1989; Errata; Z87.1a) Occupational and Educational Eye and Face Protection
ANSI Z88.2	(1992) Respiratory Protection

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 732	(1982; R 1987) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM D 1331	(1989) Surface and Inter facial Tension of Solutions of Surface-Active Agents
ASTM D 2794	(1993) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 4397	(1991) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E 84	(1991a) Surface Burning Characteristics of Building Materials
ASTM E 96	(1993) Water Vapor Transmission of Materials
ASTM E 119	(1988) Fire Tests of Building Construction and Materials
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E 1368	(1990) Visual Inspection of Asbestos Abatement Projects

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 761	Polychlorinated Biphenyls (PCBs)
40 CFR 763	Asbestos Hazard Emergency Response Act (AHERA)

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(1990) Compressed Air for Human Respiration
CGA G-7.1	(1989) Commodity Specification for Air

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos-Containing Materials Guidance
EPA 340/1-90-019	(1990) Asbestos/NESHAP Adequately Wet Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(1990) Portable Fire Extinguishers
NFPA 70	(1993) National Electrical Code
NFPA 90A	(1993) Installation of Air Conditioning and Ventilating Systems
NFPA 101	(1994) Safety to Life from Fire in Buildings and Structures
NFPA 701	(1989) Methods of Fire Test for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

UNDERWRITERS LABORATORIES (UL)

UL 586 (1990) High Efficiency, Particulate, Air Filter Units

NEW YORK STATE

12 NYCRR Part 56	New York State Department of Labor (revised January 11, 2006)
6 NYCRR Part 364	New York State Department of Environmental Conservation, Waste Collector Registration
6 NYCRR Parts 370	New York State Department of Environmental Conservation through 374-3 and 376

1.2 DEFINITIONS

1.2.1 "Adequately Wet"

A term as defined in 40 CFR 61, Subpart M and EPA 340/1-90-019 that means to sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

1.2.2 "Amended Water"

Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

1.2.3 "Friable ACM"

A term as defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 that means any material containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy, that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

1.2.4 "Non friable ACM"

A term as defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 that means any material containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

1.2.5 "Category I Non friable ACM"

A term as defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 that means asbestos-containing packings, gaskets, resilient floor

covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in 40 CFR 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy.

1.2.6 "Category II Non friable ACM"

A term as defined in 40 CFR 61, Subpart M and EPA 340/1-90-018 that means any material, excluding Category I non friable ACM, containing more than 1 percent asbestos as determined using the methods specified in Appendix A, Subpart F, 40 CFR 763, Section 1, Polarized Light Microscopy, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

1.2.7 "Asbestos Regulated Work Area"

An asbestos regulated work area is an area contained and controlled either by an enclosed containment (full containment area, single or double bulkhead containment area, mini-containment area), modified containment glove bag or outdoor techniques, where asbestos containing materials (ACM) operations are performed and isolated by physical boundaries to prevent the spread of ACM and control access to authorized persons. A full containment, single or double bulkhead containment area, mini-containment area, modified containment, and glove bag work area is isolated within a containment enclosure in which ACM operations are performed. An outdoor regulated work area is not isolated within a containment enclosure, but is otherwise secured by means of physical barriers, boundary warning tape, and signs, etc., to control access by unauthorized persons.

1.2.8 "Time-Weighted Average (TWA)"

The TWA is an 8-hour time weighted average of airborne concentration of fibers (longer than 5 micrometers) per cubic centimeter of air which represents the employee's 8-hour workday as determined by Appendix A of 29 CFR 1926, Section 1926.1101.

1.3 DESCRIPTION OF WORK

1.3.1 WORK INCLUDED

A. The work covered by this section includes the handling of Category I Non friable asbestos-containing materials, and Category II non-friable asbestos-containing materials (ACM) that are encountered at this project. This section describes procedures and equipment required to protect workers and occupants of the work area from contact with airborne asbestos fibers and ACM dust and debris. The work also includes the disposal of the generated ACM wastes.

B. This abatement work is governed by 29 CFR 1926.1101 (Asbestos), 40 CFR 763

C. (AHERA), 40 CFR 61 Subpart M (NESHAPS), and 12 NYCRR Part 56 (New York State Department of Labor Industrial Code Rule 56), and other regulations as listed in Section 1.1 of this Specification.

D. The Contractor shall furnish all labor, materials, training, services, fees, equipment, and insurance necessary to carry out the removal and disposal of asbestos containing materials (ACM), and hazardous materials described below.

E. Contractor shall coordinate all work with the Owner, Construction Manager, Asbestos Project Monitor, General Contractor, Flooring Contractor, Electrical Contractor, Mechanical Contractor, Plumbing Contractor, Window/Door Contractor, Roofing Contractor, and any other entity as necessary.

F. The work is to be phased by zones. Zones are to be isolated from other building areas by hard wall barriers. Place zone partitions to allow at least two exits from each zone.

G. Protect all furnishings and equipment to remain.

H. All ACM locations are descriptive and/or diagrammatic. All measurements and quantities are approximate. Exact locations and quantities should be field verified by the Contractor.

I. The project involves removal in multiple work areas. Personnel and waste decontamination units, sized for a large project, are required. The decontamination units shall be contiguous with the work areas. Remote decontamination units may be used where allowed.

J. Non-ACM building materials may be decontaminated and disposed as construction debris.

K. The Contractor shall file applications for all necessary permits as required by all administrative authorities and enforcing agencies. The Contractor is required to fulfill any format necessary as well as to pay all required fees.

L. The Contractor is responsible to secure required variances.

M. Critical barriers, wet methods, HEPA vacuum equipment, HEPA negative air filtration, decontamination units, and personal protective equipment are required for this project; regardless of any variances that the contractor may obtain.

N. The Contractor shall be responsible for verifying the bid document drawing(s) provided and identifying any additional ACM that may exist. The proposals based upon these specifications shall be held as made with full knowledge of existing conditions and requirements.

O. The Contractor shall, in order to obtain a clear and complete knowledge of the scope of work, visit the premises and examine carefully the work involved and existing conditions before submitting his/her bid.

P. The Contractor shall field verify, prior to bid submission, all quantities of asbestos containing material to be removed, and all field conditions affecting the work. Any discrepancies between the Contract Documents and the field conditions shall be reported to the Construction Manager in writing prior to the submission of bids.

1.3.2 SPECIFIC MATERIALS TO BE REMOVED

All Interior Areas

MATERIAL
VINYL ASBESTOS FLOOR TILE AND MASTIC

A complete drawing package has been issued. All drawings should be reviewed. Some of the work is specified on the following:

Reference Ceiling Demolition Drawings
Reference Architectural Drawings
Reference Mechanical Drawings
Reference Schedule Drawings
Reference Work Location Plans
Reference Project Phasing Plans

A. Remove and dispose asbestos-containing floor tiles, mastic and leveling compound from the building as indicated. Floor tile and mastic must be bagged for disposal. All floor tile mastic is to be removed from the indicated areas. All leveling compound is to be removed. Floor tile mastics and leveling compounds are to be completely removed from the concrete substrate. Only wet methods with manual scraping shall be used. Floors shall be ready to accept new leveling compound and skim coat, and be re-tiled. Reference specification section and manufacturer's instructions for new floor installation. Abated floors must be approved and accepted by the floor installation contractor.

B. All movable objects will be removed from the work areas by others prior to the start of each phase of the project.

C. Contractor to construct isolation barriers that seal off all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grilles, diffusers, and any other penetrations of the work areas. Where applicable, hallway lockers are also to be covered prior to ceiling demolition and floor tile removal.

Barriers are to be constructed using two layers of six mil fire-retardant plastic sheeting sealed with duct tape. Also, all seams in system components that pass through the work area shall be sealed. Doorways and corridors that shall not be used for passage during work shall also be sealed.

D. Critical barriers and HEPA filtered negative air filtration must be in-place before ceilings/walls can be demolished.

E. Floors that are to remain may include terrazzo, non-ACM floor tile, and linoleum (refer to the Contract Documents). These floors are to be protected from damage prior to beginning ceiling demolition.

M. Asbestos Containing Materials (ACM) shall be maintained in an adequately wet condition prior to, during, and after removal. No ACM is to be worked dry.

N. Contractor to double bag, label, and properly dispose of asbestos containing waste, and to provide completed waste manifest within 35 days of removal from the site. Waste Generator Labels are to be affixed to each bag of asbestos waste.

1.4 MEDICAL REQUIREMENTS

A. Medical requirements shall conform to 29 CFR 1926, Section 1926.1101.

1.4.1 Medical Examinations

1. Before being exposed to airborne asbestos fibers, workers shall be provided with a comprehensive medical examination as required by 29 CFR 1926, Section 926.1101 and other pertinent state or local requirements. This requirement must have been satisfied within the past year. The same medical examination shall be given on an annual basis to employees engage in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation, X-ray films of asbestos workers shall be identified to the consulting radiologist and medical record jackets shall be marked with the word "asbestos."

1.4.2 Medical and Exposure Records

1. Complete and accurate records shall be maintained of each employee's Medical examinations, medical records and exposure data as required by 29 CFR 1910, Section 1910.20 and 29 CFR 1926, Section 1926.1101 for a period of 30 years after termination of employment.

2. Records of the required medical examinations and exposure data shall be made available for inspection and copying to:

The Assistant Secretary of Labor for Occupational Safety and Health (OSHA) or authorized representatives of the employee and an employee's physician upon request of the employee or former employee. Maintain on file at the work site for review as requested by the Industrial Hygienist, a copy of the required medical certification for each employee.

1.5 TRAINING

A. Within 1 year prior to assignment and commencement of work on this asbestos abatement project, each worker directly involved in handling ACM, ACM generated wastes to include packaging and transporting such wastes for disposal, shall take and successfully complete a course of asbestos training as specified by United States Environmental Protection Agency (EPA) requirements at 40 CFR 763, Subpart E, Appendix C and the State of New York Industrial Code Rule 56. Workers shall take and successfully complete the "Worker" course. On-site supervisors and technical support personnel shall take and successfully complete the "Contractor/ Supervisor" course. Worker and Contractor/Supervisor courses taken more than 1 year prior to commencement of work are acceptable provided that the individual has successfully completed the annual refresher training as required by the regulatory agency.

B. Prior to the commencement of work, each worker shall be instructed by the Contractor's on-site "competent person" supervisor in the following project specific training: the hazards and health effects of the specific types of ACM to be abated, the content and requirements of the Contractor's Accident Prevention Plan, Hazard Communication Program, Site Safety and Health Plan, work practices, the use requirements and limitations of the personal protective clothing and equipment to be used, hands-on-training for each asbestos abatement technique to be employed, heat and/or cold stress monitoring specific to this project, personal hygiene and housekeeping requirements, air monitoring program and procedures, medical surveillance to include medical and exposure record keeping procedures, the association of cigarette smoke and asbestos-related disease, security procedures, emergency response requirements and all additional requirements of 29 CFR 1926, Section 1926.1101.

C. Training shall also include, for each employee, a respirator fit test administered by an Industrial Hygienist as required by 29 CFR 1926, Section 1926.1101.

1.6 RESPIRATORY PROTECTION PROGRAM

A. The Contractor shall establish in writing, and implement a respiratory protection program in accordance with 29 CFR 1926, Section 1926.1101, 29 CFR 1910, Section 1910.134, ANSI Z88.2, CGA G-7 and CGA G-7.1.

The Contractor shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations encountered during the performance of the asbestos abatement work. The Contractor's respiratory protection program shall include, but not be limited to, the following elements:

1. The company policy, used for the assignment of individual responsibility, accountability, and implementation of the respiratory protection program.

2. The standard operating procedures covering the selection and use of respirators. Respiratory selection shall be determined by the hazard to which the worker is exposed.

3. Medical evaluation of each user to verify that the worker may be assigned to an activity where respiratory protection is required.

4. Training in the proper use and limitations of respirators.

5. Respirator fit-testing, i.e., quantitative, qualitative and individual functional fit checks.

6. Regular cleaning and disinfection of respirators.

7. Routine inspection of respirators during cleaning and after each use when designated for emergency use.

8. Storage of respirators in convenient, clean, and sanitary locations.

9. Surveillance of work area conditions and degree of employee exposure (e.g., through air monitoring).

10. Regular evaluation of the continued effectiveness of the respiratory protection program.

11. Recognition and procedures for the resolution of special problems as they affect respirator use (e.g., no facial hair that comes between the respirator face piece and face or interferes with valve function; prescription eye wear usage; prohibition of wearing contact lenses; etc.).

12. Proper training in donning and doffing procedures.

1.7 HAZARD COMMUNICATION PROGRAM

A. A hazard communication program shall be established and implemented in accordance with 29 CFR 1926, Section 1926.59.

1.8 SAFETY AND HEALTH COMPLIANCE

A. In addition to detailed requirements of this specification, the work shall comply with applicable laws, ordinances, criteria, rules, and regulations of Federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials and with the applicable requirements of 29 CFR 1910, 29 CFR 1926, 40 CFR 61, Subpart A, and 40 CFR 61, Subpart M, NFPA 10, NFPA 70, NFPA 90A, and NFPA 101. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the District shall apply.

B. The following state and local laws, rules and regulations regarding removal, encapsulation, encasement, enclosure, demolition, renovation, handling, storing, transporting and disposing of asbestos material apply:

1.	12 NYCRR Part 56	Asbestos - New York State Department of Labor
2.	6 NYCRR 364	New York State Department of Environmental Conservation, Bureau of Hazardous Waste Operations, Title 6, Part 364.

1.9 INDUSTRIAL HYGIENIST (IH)

A. Area air sampling and training shall be conducted under the direction of an IH experienced in asbestos abatement and who is currently certified by the State of New York Department of Labor as an Air Sampling Technician, retained by the District. For this project, the IH will also serve as the Project Designer's On-site Representative.

1.10 PERMITS, LICENSES, AND NOTIFICATIONS

A. Necessary permits and licenses shall be obtained in conjunction with the project asbestos abatement, transportation, and disposal actions and timely notification furnished of such actions required by federal, state, regional, and local authorities and as otherwise specified herein. The Contractor shall hold a valid NYS Asbestos Handling License. All Workers and Supervisors shall hold valid NYS asbestos certifications. Waste transporters must have valid NYS Waste Transporter Permits.

B. The Contractor shall notify the United States Environmental Protection Agency, the NYS Department of Labor Asbestos Control Bureau, Building Occupants, and the Project Designer in writing at least 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M, and NYS Department of Labor requirements

to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents and fees.

1.11 SUBMITTALS

A. The following submittals shall be submitted to the District prior to beginning work:

1. Location of decontamination units, negative air filtration units, negative air exhaust outlets, waste storage, and project phasing requirements shall be specified by the Contractor and submitted for the Owner's approval.

2. Corporate

NYS Asbestos Handling License
NYS Supervisor Certificate (for Supervisor of record on NYS License)
Insurance Certificates

3. Personnel

NYS Asbestos Supervisor Certificates
NYS Asbestos Handler Certificates
Proof of Medical Examinations
Proof of Respirator Fit Tests
Confined Space Training Certificates (if required)

4. Materials and Equipment

Manufacturer's catalog data for all materials and equipment to be used in the work, including brand name, model, capacity, performance characteristics and any other pertinent information. Test results and certificates from the manufacturer of encapsulants substantiating compliance with performance requirements of these specifications.

a. Material Safety Data Sheets for all chemicals to be used/stored on-site.

b. High efficiency filtered local exhaust equipment

c. Vacuum equipment

d. Pressure differential monitor

e. Air monitoring equipment

f. Respirators

g. Personal protective clothing and equipment

1) Coveralls
2) Underclothing
3) Other work clothing
4) Foot coverings
5) Hard hats
6) Eye protection
7) Other items required and approved by Contractor's IH

h. Glovebags

i. Duct Tape

j. Disposal Containers

1) Disposal bags
2) Fiberboard drums
3) Paperboard boxes

k. Sheet Plastic

1) Polyethylene Sheet - General
2) Polyethylene Sheet - Flame Resistant
3) Polyethylene Sheet - Reinforced

l. Wetting Agent

1) Amended Water
2) Removal encapsulant

m. Strippable Coating

n. Prefabricated Decontamination Unit(s)

o. Other items

p. Chemical encapsulant

q. Chemical encasement materials

r. Material Safety Data Sheets (for all chemicals proposed)

5. The following submittals shall be submitted to the District and the Project Monitor as they are available during the project:

a. Contractor OSHA personal air monitoring reports

b. Pressure differential recordings for local exhaust systems

c. Asbestos Regulated Work Area Entry Logs

d. Contractor Daily Logs

e. Asbestos Waste Shipment Record(s), (Waste Manifests)

6. Pressure Differential Recordings:

Pressure differential recordings shall be provided as required by Industrial Code Rule 56. Readings shall be reviewed by the Contractor's competent person supervisor prior to submittal. The Project Designer's on-site representative shall be notified immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.005 fiber per cubic centimeter (f/cc) or background, whichever is higher.

7. Notifications:

The United States Environmental Protection Agency, the New York State Department of Labor Asbestos Control Bureau, and the School District shall be notified in writing 10 days prior to the start of asbestos work.

A Notification to Building Occupants must be posted 10 days prior to the start of asbestos work as required by 12 NYCRR Part 56 Subpart 56-1.8. This notification must remain in place until project completion and must include:

a. The room, location(s) or area designation of the asbestos project.

b. The amounts and types of asbestos or asbestos material, in square feet and/or linear feet that is being handled, removed, enclosed, encapsulated, or disturbed.

c. The commencement and completion dates of the asbestos project.

d. The name, address, and asbestos license number of the contractor performing the asbestos project.

e. The name and address of the air monitor and laboratory for the project.

A copy of the written notification shall be provided to any rental company concerning the intended use of rental equipment and the possibility of asbestos contamination, the decontamination procedures that will be used prior to the return of the equipment. A copy of the rental company's written acknowledgment and agreement shall be included in the submittal.

8. Vacuum, Filtration and Ventilation Equipment

Manufacturer's certifications showing compliance with ANSI Z9.2 for:

a. Vacuums.

b. Water filtration equipment.

c. Ventilation equipment.

d. Other equipment required to contain airborne asbestos fibers.

9. Respirator Program:

Records of the respirator program as required by ANSI Z88.2, CFR 1910, Section 1910.134, 29 CFR 1926, Section 1926.1101.

10. Asbestos Waste Shipment Record(s) (Manifest):

Final completed copies of the Waste Shipment Record for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records as specified herein. Detailed information of all asbestos waste disposals on the "MANDATORY WASTE SHIPMENT RECORD" form in accordance with revised 40 CFR 61 Subpart M. Such completed forms signed and dated by the agent of the landfill shall be submitted within 3 days after date of delivery of ACM to the landfill, but not later than 35 days from the date that the waste left the site.

1.12 PERSONAL PROTECTIVE EQUIPMENT

A. Three complete sets of personal protective equipment shall be made available to the Project Designer's on-site representative and authorized visitors for entry to the asbestos regulated work area at all times for inspection of the asbestos regulated work area. Authorized visitors shall be provided with training equivalent to that provided to Contractor employees in the selection, fitting, and use of the required personal protective equipment and the site safety and health requirements. Contractor workers shall be provided with personal protective clothing and equipment as specified herein and the Contractor shall ensure that it is worn properly. The Contractor's designated competent person supervisor shall select and approve all the required personal protective clothing and equipment to be used.

1.12.1 Respirators:

A. Respirators shall be selected and used in accordance with manufacturers recommendations, and shall be approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (MSHA/NIOSH) for use in environments containing airborne asbestos fibers.

B. Personnel who handle ACM, enter asbestos regulated work areas that require the wearing of a respirator, or who are otherwise carrying out abatement activities that require the wearing of a respirator, shall be provided with approved respirators that are fully protective of the worker at the measured or anticipated airborne asbestos concentration level to be encountered.

C. For air-purifying respirators, the particulate filter portion of the cartridges or canister approved for use in airborne asbestos environments shall be Type H, high-efficiency particulate air (HEPA). As a minimum a half-mask respirator shall be worn during the startup of abatement activities, unless otherwise approved in writing by the Project Designer. The upgrading or downgrading of respirator type, from the minimum requirements specified for start-up, shall be made by the Project Designer based on the measured or anticipated airborne asbestos fiber concentrations to be encountered. All recommendations made by the Contractor to downgrade respirator type shall be submitted in writing to the Project Designer for acceptance. Contractor's actions to upgrade respirator type shall be verbally conveyed to the Project Designer.

D. Respiratory protection shall comply with the 29 CFR 1926, and 29 CFR 1910. A qualitative or quantitative fit test conforming to 29 CFR 1926, Appendix C shall be conducted by the Contractor for each Contractor worker required to wear a respirator, and for the authorized visitors who enter an asbestos regulated work area where respirators are required to be worn. A respirator fit test shall be performed for each worker prior to initially wearing a respirator on this project and every 6 months thereafter. If physical changes in a worker develop that will affect the fit, a new fit test shall be performed. Functional fit checks shall be performed by employees each time a respirator is put on and in accordance with the manufacturer's recommendations.

1.12.2 Whole Body Protection:

A. Personnel exposed to asbestos shall be provided with whole body protection as specified herein and such protection shall be worn properly. The Contractor's competent person supervisor shall select and approve the whole body protection to be used. Disposable whole body protection shall be disposed of as asbestos contaminated waste upon exiting from the asbestos regulated work area. Reusable whole body protection worn shall be either disposed of as asbestos contaminated waste upon exiting from the asbestos regulated work area or be properly laundered in accordance with 29 CFR 1926 and as specified. Asbestos abatement whole body protection shall not be removed from the work site by a worker to be cleaned.

1.12.2.1 Coveralls:

Disposable - breathable coveralls with a zipper front shall be provided. Sleeves shall be secured at the wrists, and foot coverings secured at the ankles.

1.12.2.2 Gloves:

Disposable plastic or rubber gloves shall be provided to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but shall not be used alone. Where there is the potential for hand injuries (i.e., scrapes, punctures, cuts, etc.) a suitable outer glove shall be provided and used.

1.12.2.3 Under Clothing:

Disposable underwear shall be provided and worn next to the skin or cloth under clothing.

1.12.2.4 Work Clothing:

An additional coverall similar to that required in paragraph "Coveralls" (1.12.2.1) shall be provided when the abatement and control method employed does not provide for the exit from the asbestos regulated work area directly into an attached decontamination unit. Cloth work clothes shall be provided for wear under the protective coverall and foot coverings when work is being conducted in low temperature conditions. Cloth work clothes shall be either disposed of as asbestos contaminated material or properly laundered in accordance with 29 CFR 1926.

1.12.2.5 Foot Coverings:

Cloth socks shall be provided and worn next to the skin. If rubber boots are not used foot wear and disposable foot coverings shall be provided. Rubber boots shall be used in moist or wet areas. Only rubber boots shall be removed from the asbestos regulated work area after being thoroughly decontaminated. All other protective foot covering shall be disposed of as ACM.

1.12.2.6 Head Covering:

Hood type disposable head covering shall be provided. In addition, protective head gear (hard hats) shall be provided as required. Hard hats shall only be removed from the asbestos regulated work area after being thoroughly decontaminated.

1.12.2.7 Protective Eye Wear:

Contact lenses shall not be worn in asbestos regulated work areas. When vision correction is necessary to perform the work task, prescription safety eye wear shall be used.

Fog-proof goggles shall be worn by personnel engaged in asbestos abatement activities in the asbestos regulated work area when the use of a full face-piece respirator is not required. Eye protection provided shall be in accordance with ANSI Z87.1.

1.12.2.8 Other Items:

All other items of whole body protection shall be provided as required and approved by the Contractor's competent person.

1.13 DECONTAMINATION UNIT, LOAD OUT UNIT AND ACCESS TUNNEL

A. A temporary negative pressure decontamination unit shall be provided. Utilization of prefabricated units shall have prior approval of the Project Designer. Decontamination and load-out unit shall be attached in a leak-tight manner to each asbestos regulated work area, unless otherwise stated specifically in the approved site specific variance. The unit shall be lockable. A key shall be given to the Owner so that the work area can be accessed while the Contractor is off-site. The decontamination unit shall have a separate equipment locker room and a clean locker room with a shower that complies with 29 CFR 1910, Section 1910.141 in between. Two separate lockers shall be provided for each asbestos worker, one in each locker room. Street clothing and street shoes shall be kept in the clean locker.

B. Upon exiting from the asbestos regulated work area to the equipment room, respirators shall be worn while asbestos contaminated protective clothing is HEPA-vacuumed, removed, and placed in approved labeled containers for disposal. Workers shall shower before changing into street clothes.

C. The Contractor shall provide a minimum of 2 showers. There shall also be at least one shower provided per six workers. Flow and temperature controls shall be located within the shower and be adjustable by the user. Should sufficient hot water be unavailable, the Contractor shall provide a minimum 150 liters (40 gallon) electric hot water heater with minimum recovery rate of 75 liters (20 gallons) per hour and a temperature controller for each shower head. Instantaneous type in-line water heater may be incorporated at each shower head in lieu of hot water heater upon approval by the Project Designer.

D. Used shower water shall be collected and filtered to remove asbestos contamination. Filters and residue shall be disposed of as asbestos contaminated material. Filtered water shall be discharged to the sanitary system.

E. The waste water pump shall be sized for 1.25 times the shower head flow rate at a pressure head sufficient to satisfy the filter head loss and discharge line losses.

The pump shall supply a minimum 1.6 liters per second (25 gallons per minute) flow with 11 m. (35 ft.) of pressure head. Waste water filters shall be installed in series with the first stage pore size of 20 micrometer (microns) and the second stage pore size of 5 micrometer. (microns.) Waste water must be filtered prior to discharge to the sanitary system. Water that is not filtered must be drummed and disposed of as asbestos containing waste.

F. The floor of the decontamination unit's clean room shall be kept dry and clean at all times. Water from the shower shall not be allowed to wet the floor in the clean room. Surfaces of the clean room and shower shall be wet-wiped 2 times after each shift change with a disinfectant solution. Proper housekeeping and hygiene requirements shall be maintained.

G. Soap and towels shall be provided for showering, washing and drying. Any cloth towels provided shall be disposed of as ACM waste or be laundered in accordance with 29 CFR 1926.

H. Surfaces of the equipment room shall be wet-wiped 2 times after each shift change. Surfaces of the Load-Out-Unit and personnel decontamination unit shall be adequately wet-wiped 2 times after each shift change. Materials used for wet wiping shall be disposed of as asbestos contaminated waste.

1.14 WARNING SIGNS AND TAPE

A. Contractor shall ensure that all personnel understand the warning signs. Warning signs and tape printed in English and Spanish shall be provided at the regulated boundaries and entrances to asbestos regulated work areas. Signs shall be located at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Warning signs as shown and described herein shall be in vertical format conforming to 29 CFR 1910, and 29 CFR 1926, minimum 500 by 360 mm (20 by 14 inches) and displaying the following legend in the lower panel. Spacing between lines shall be at least equal to the height of the upper of any two lines:

Legend	Lettering
Danger	3 inch Sans Serif Gothic or Block
Asbestos	1 inch Sans Serif Gothic or Block
Cancer and Lung Disease Hazard	1 inch Sans Serif Gothic or Block
Authorized Personnel Only	1 inch Sans Serif Gothic or Block
Authorized Personnel Only	1 inch Gothic
Respirators and Protective Clothing are Required in this Area	1 inch Gothic

B. Decontamination unit signs shall be as herein.

C. Warning tape shall be provided.

1.15 WARNING LABELS

A. Warning labels shall be affixed to all asbestos disposal containers used to contain asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements specified herein are acceptable. Warning labels shall conform to 29 CFR 1926 and shall be of sufficient size to be clearly legible displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE
HAZARD

B. In addition to the required warning labels, all waste bags/containers shall be labeled with Waste Generator Labels per 40 CFR 61.150 (a)(v). Labels shall read as follows:

Waste Generator Labels for this Contract are to read as shown below:

Name of School District
Name of Project
Town, State

1.16 LOCAL NEGATIVE PRESSURE EXHAUST SYSTEM

A. A local negative pressure exhaust system shall be provided in the asbestos regulated work area in accordance with ANSI Z9.2 and 29 CFR 1926. The system will provide at least 4 air changes per hour inside of the containment or as required by the site specific variance. The local exhaust system shall be operated 24 hours per day, until the asbestos regulated containment area is removed. The exhaust system shall be equipped with HEPA filters and must be leak proof to the filters. The local exhaust system shall terminate out of doors.

B. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.51 mm (0.02 inch) of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic recording instrument.

C. In no case shall the building ventilation system be used as the local exhaust system for the asbestos regulated work area. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586.

Filter shall be UL labeled. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

1.17 TOOLS

A. Vacuums shall be leak proof to the filter, equipped with HEPA filters, be of sufficient capacity and provide the necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material.

B. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system or has otherwise been approved for use by the Project Designer.

C. All residual asbestos shall be removed from reusable tools prior to storage and reuse. Reusable tools shall be thoroughly decontaminated prior to being removed from asbestos regulated work areas.

1.18 RENTAL EQUIPMENT

A. If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification shall be obtained from the rental agency.

1.19 AIR MONITORING EQUIPMENT

A. The air sampling technician, supplied by the School District under a separate Professional Services contract, shall select the air monitoring equipment to be provided and used for evaluation of airborne asbestos fiber concentrations. The equipment shall include, but not be limited to:

1. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to approximately 10 liters per minute when equipped with a sampling train of tubing and filter cassette.

2. Standard 25 millimeter diameter, 0.45 and 0.80 micrometer (micron) pore size, mixed cellulose ester membrane filters and cassettes with non-conductive barrels and shrink bands, to be used with high flow pumps when conducting environmental area sampling using NIOSH Pub No. 84-100 Methods 7400 and 7402 and the transmission electric microscopy method specified at 40 CFR 763.

3. Appropriate plastic tubing to connect the air sampling pump to the selected filter cassette.

4. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 20 degrees C (minus 4 degrees F) (minus 4 degrees Fahrenheit) to plus 60 degrees C (140 degrees F) (140 degrees Fahrenheit) and traceable to a National Institute for Standards and Technology (NIST) primary standard.

1.20 EXPENDABLE SUPPLIES

1.20.1 Glove Bags:

Glove bags shall be provided as described in 29 CFR 1926. The glove bag assembly shall be prefabricated with preprinted OSHA warning label and shall typically be constructed of 0.152 mm (6 mil) thick transparent polyethylene or polyvinyl chloride sheeting and at least two inward projecting long sleeves and an internal pouch. The glove bag shall be constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process. The glove bag shall have sufficient capacity to hold removed materials and permit leak-tight sealing.

1.20.2 Duct Tape:

Industrial grade duct tape shall be provided in 50 mm (2 inch) and 76 mm (3 inch) widths and shall be suitable for bonding sheet plastic and disposal containers specified herein.

1.20.3 Disposal Containers:

Leak-tight disposal containers shall be provided for ACM generated wastes as specified herein. Leak-tight means that solids, liquids or dust cannot escape or spill out. All disposal containers shall be either pre-labeled or affixed with OSHA warning label as specified in 29 CFR 1926.

1.20.4 Disposal Bags:

One hundred fifty two thousandths millimeter (6 mil) thick leak-tight pre-labeled (OSHA warning label) bags shall be provided for placement of asbestos generated waste.

1.20.5 Leak-tight Wrapping:

Two layers of 0.152 mm (6 mil) minimum thick polyethylene sheet stock shall be used for the containment of removed asbestos-containing components or materials such as reactor vessels, large tanks, boilers, insulated pipe segments and other materials too large to be placed in disposal bags. Upon placement of the ACM component or material, each layer shall be individually leak-tight sealed with duct tape.

1.20.6 Fiberboard Drums:

Fiberboard drums are not required by state or local requirements.

1.20.7 Cardboard Boxes:

Heavy-duty corrugated cardboard boxes are not required.

1.20.8 Sheet Plastic:

Sheet plastic shall be provided as specified herein and in the largest sheet size necessary to minimize seams, as indicated on the project drawings.

1.20.8.1 Polyethylene Sheet – General:

One hundred fifty two thousandths millimeter (6 mil) minimum thick polyethylene film shall be clear and conform to ASTM D 4397.

1.20.8.2 Polyethylene Sheet - Flame Resistant:

Where a potential for fire exists, 0.152 mm (6 mil) minimum thick flame-resistant polyethylene sheet shall be provided. Flame-resistant polyethylene film shall be frosted and shall conform to the requirements of NFPA 701.

1.20.8.3 Polyethylene Sheet-Reinforced:

One hundred fifty two thousandths millimeters (6 mil)thick reinforced polyethylene sheet shall be provided where high skin strength is required such as where it constitutes the only barrier between the asbestos regulated work area and the outdoor environment. The sheet stock shall consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between two layers of polyethylene film. Film shall meet flame resistant standards of NFPA 701.

1.20.8.4 Viewing Inspection Window:

Where feasible, a minimum of one clear 3.2 mm (1/8 inch) thick acrylic sheet, 450 mm by 600 mm, (18 inches by 24 inches) shall be installed as a viewing inspection window at eye level on a wall in each containment enclosure. All such windows shall be sealed leak-tight with industrial grade duct tape.

1.20.9 Wetting Agents:

1.20.9.1 Amended Water

Amended water shall meet the requirements of ASTM D 1331.

1.20.9.2 Removal Encapsulant:

Removal encapsulant (a penetrating encapsulant) shall be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water.

The removal encapsulant shall be capable of wetting the ACM and retarding fiber release during disturbance of the ACM equal to or greater than provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS.

1.20.10 Strippable Coating:

Strippable coating in aerosol cans shall be used to adhere to surfaces and to be removed cleanly by stripping at the completion of work. Since these coatings have a hydrocarbon carrying agent, their use shall be confined to well ventilated areas.

1.21 MATERIAL SAFETY DATA SHEETS

Material safety data sheets (MSDS) shall be provided for all hazardous materials brought onto the work-site. One copy shall be provided to the Project Designer's on-site Representative and one copy shall be included in the Contractor's Hazard Communication Program.

1.22 OTHER ITEMS

A sufficient quantity of other items shall be provided that may include, but not be limited to: scrapers, brushes, brooms, staple guns, tarpaulins, shovels, rubber squeegees, dust pans, other tools, scaffolding, staging, enclosed chutes, wooden ladders, lumber necessary for the construction of asbestos regulated containment work areas, UL approved temporary electrical equipment, material and chords, ground fault circuit interrupters, water hoses of sufficient length, fire extinguishers, first aid kits, portable toilets, logbooks, log forms, markers with indelible ink, spray paint in bright color to mark areas, project boundary fencing, etc.

1.23 PRECONSTRUCTION CONFERENCE

The Contractor, the Contractor's designated supervisor and the Project Designer's Representative shall meet with the School District prior to beginning work at a safety preconstruction conference to discuss the details of the Contractor's work procedures and safety precautions. Once accepted by the Project Designer's Representative, these procedures and precautions will be enforced as if an addition to the specification. Any changes required in the specification as a result shall be identified specifically in the plan to allow for free discussion and acceptance by the Project Designer's Representative prior to the start of work.

PART 2 - PRODUCTS

2.1 ENCAPSULANTS

A. Encapsulants shall conform to US EPA requirements, shall contain no toxic or hazardous substances and no solvent and shall meet the following requirements:

ALL ENCAPSULANTS

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Combustion Toxicity Zero Mortality	University of Pittsburgh Protocol
Life Expectancy - 20 years	ASTM C 732 Accelerated Aging Test
Permeance - Minimum 2.288 by 10E 8 grams per Pascal per second per square meter (0.4 perms)	ASTM E 96

Additional Requirements for Bridging Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test - 2394 Pa (50 psf)	ASTM E 736
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance - Minimum 0.495 kg meters (43 inch pounds)	ASTM D 2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D 522 Mandrel Bend Test

Additional Requirement for Penetrating Encapsulant

Requirement	Test Standard
Cohesion/Adhesion Test - 2394 Pa (150 psf) 50 pounds of force/square foot	ASTM E 736
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E 119
Impact Resistance - Minimum 0.495 kg meters (43 inch pounds)	ASTM D 2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D 522 Mandrel Bend Test

Additional Requirement for Lock-Down Encapsulant

Requirement	Test Standard
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength; 4788 kPa (100 psf) (Tests compatibility with cementitious and fibrous fireproofing)	ASTM E 736

PART 3 - EXECUTION

3.1 GENERAL

A. All asbestos abatement work tasks as shown on the detailed plan, illustrated in the drawings, as summarized in Section 1.3 (DESCRIPTION OF WORK), shall be performed as specified herein.

B. Personnel shall wear and utilize protective clothing and equipment as specified herein when working with both friable and non-friable asbestos materials during all phases of abatement work, including precleaning, work area preparation, abatement, and post cleanings work.

C. Eating, smoking, drinking, or applying cosmetics shall not be permitted in the asbestos regulated work area.

D. All hot work (burning, cutting, welding, etc.) shall be conducted under strictly controlled conditions in conformance with 29 CFR 1926. The Project Designer and District Representative must be notified prior to beginning hot work.

E. Personnel of other trades not engaged in asbestos abatement activities shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions as required herein are complied with.

F. Electrical service shall be disconnected and locked-out. The Contractor shall provide temporary electrical service and lighting where needed using ground fault interrupt protected circuits (GFCI). The Contractor is responsible to ensure that unprotected electric power running into or through the work areas has been locked-out prior to allowing personnel to begin work.

G. The building heating, ventilating, and air conditioning system shall be shut down, openings to the system capped, and temporary ventilation provided prior to the commencement of abatement work.

H. The Contractor shall install critical barriers that seal all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grilles, diffusers, and any other penetration of the work area.

I. If an asbestos spill occurs outside of the asbestos regulated work area, work shall be stopped and the Project Monitor shall be notified. The condition shall be corrected to the satisfaction of the Project Monitor including air sampling, prior to resumption of work.

J. The Contractor shall stop abatement work in the asbestos regulated work area immediately when the measured airborne total fiber concentrations, as sampled and analyzed as required herein, (1) equals or exceeds 0.01 f/cc or the pre-abatement concentration, whichever is greater - outside the asbestos regulated work area, or (2) equals or exceeds 1.0 f/cc inside the asbestos regulated work area. The Contractor shall correct the condition to the satisfaction of the Project Designer, including visual inspection and air samplings. Work resumption will only be allowed upon notification by the Project Designer. Corrective actions shall be documented.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

A. Asbestos abatement work shall be performed without damage or contamination of adjacent work or area. Where such work or area is damaged or contaminated as verified by the Project Designer using visual inspection and/or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the District as deemed appropriate by the Project Designer.

This includes inadvertent spill of dirt, dust or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, work shall stop in all affected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and/or sampling analysis results are obtained and have been evaluated by the Project Designer and the District, work may proceed.

3.3 FURNISHINGS

3.3.1 Removal of Furnishings:

Movable furniture and equipment will be removed from the areas of work by the School District before asbestos abatement work begins.

3.3.2 Furnishings to Remain in Place: None.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

A. Any building ventilating system supplying air into or returning air out of an asbestos regulated work area shall be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910, Section 1910.147, to prevent accidental start-up and isolated by airtight seals to prevent contaminant spread through the system.

B. Air-tight critical barriers shall be installed on all building ventilating openings that supply, or return air from the building ventilation system or serves to exhaust air from the building, that are located inside the asbestos regulated work area. The critical barriers shall consist of 2 layers of 0.152 mm (6 mil) fire-retardent polyethylene. Edges to wall, ceiling and floor surfaces shall be sealed with industrial grade duct tape.

3.5 PRECLEANING

A. After installation of the personnel and waste decontamination unit(s), installation of critical barriers, and establishment of negative air pressure differential all surfaces shall be cleaned by HEPA vacuum and adequately wet wiped prior to constructing tent enclosures, hanging glovebags, or establishment of full containment.

3.6 ASBESTOS CONTROL AREA REQUIREMENTS

A. Work under this contract is indoors, and as such, shall be in indoor regulated work areas, isolated within containment enclosures, and otherwise secured by means of physical barriers, boundary warning tape, and signs, etc., to control access by unauthorized persons.

B. Regulated containment areas shall be established and maintained for each abatement work task.

Viewing inspection windows shall be installed on the wall of the containment enclosure, as specified in paragraph Viewing Inspection. The following procedures shall be performed sequentially and each activity shall be completed before proceeding to the next.

1. Furnishings in the asbestos regulated work area shall be removed as specified at paragraph FURNISHINGS.

2. Tools, scaffolding, staging, etc., necessary for the work shall be placed in the area to be isolated prior to erection of work area enclosed containment.

3. Building ventilating systems serving the work area shall be shutdown or isolated.

4. Power to the asbestos regulated work area shall be locked-out by switching off all breakers serving power or lighting to this area in accordance with 29 CFR 1910, and 12 NYCRR Part 56.

5. Power running through the asbestos regulated work area to other areas of the building shall be locked-out by switching off all breakers serving power through the area in accordance with 29 CFR 1910, and 12 NYCRR Part 56.

6. The Contractor's electrician will hook up the Contractor's GFI electrical panel to the building electrical system.

7. The Contractor shall provide temporary lighting.

8. Personnel Decontamination Unit shall be installed as specified. Load-Out unit shall be installed as specified herein.

9. Critical barriers shall be installed as required for building ventilation system.

10. Surfaces shall be precleaned as required by paragraph PRECLEANING.

11. Local exhaust ventilation system shall be installed as specified.

12. Containment areas shall be installed as required for each abatement task as specified.

3.7 CLEAN-UP

A. The Contractor shall maintain a clean work area by performing the following housekeeping functions on a daily basis as required, and at the end of each shift:

1. Asbestos containing waste shall not be allowed to accumulate, but shall be bagged upon removal.

2. Loose ACM shall be prepared for disposal by packaging the waste and removing it from the work area to the load-out area.

3. Meticulous attention shall be given to restricting the spread of dust and debris.

4. Work area shall be HEPA vacuumed.
5. Negative air filtration equipment shall be inspected and maintained in good working order. Pre-filters and HEPA filters shall be checked and changed as needed. Exhaust ducts shall be checked and repaired/changed as needed.

6. Polyethylene in work and high traffic areas shall be inspected and repaired.

7. Containment area shall be HEPA vacuumed and wet wiped if air sample results exceed prescribed level.

3.8 GLOVE BAG

A. Glove bag Operations shall be conducted in accordance with 12 NYCRR Part 56 Subpart 56-16 or Applicable Variance AV-108. Asbestos regulated work areas may be established as required for glove bag abatement. Designated boundary limits for the asbestos work shall be established with warning tape or other continuous barriers and all other requirements for asbestos control areas shall be maintained including area signs and boundary warning tape as specified.

B. Area monitoring of airborne asbestos fibers shall be conducted during each work shift at the designated boundary limits, and personal air monitoring shall be performed for each worker engaged in asbestos handling (removal, disposal, transport, and other associated work) at such frequency as specified in 29 CFR 1926.1101 and the air monitoring plan.

C. If the concentration of asbestos fibers monitored at the breathing zone of the workers or at designated boundary limits at any times exceeds 0.01 f/cc or the pre-abatement level, whichever is greater, work shall be stopped and the Project Designer shall be notified. The Contractor shall correct the condition to the satisfaction of the Project Designer to include visual inspection and air sampling. Work resumption will only be allowed upon notification by the Project Designer. If adjacent areas outside the regulated work area are contaminated, the Contractor at his expense, shall clean the contaminated area. The Project Monitor shall visually inspect the cleaned area, and conduct air monitoring at the Contractor's expense.

Tent Method:

This method shall be used as a full containment around the asbestos materials to be abated. Width of tent shall be a minimum of 6 feet. Tent Procedures shall be conducted as follows:

A. Tent procedures shall be accomplished in a constructed or commercially available plastic tent, plasticizing and sealing all surfaces not being abated within the tent periphery forming an enclosure. The tent shall be of double layered 6-mil PVC at a minimum, with seams heat-sealed, or double-folded, stapled and taped airtight and then taped flush with the adjacent tent wall. Tent construction shall have vertical studs at 2 foot spacing maximum.

B. Asbestos handlers involved in the tent procedure shall wear two disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment. A decontamination unit (with shower and clean room) is contiguous to the work area, only one layer of disposable personal protective equipment shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.

C. The tent shall be attached to the surface to produce an airtight seal except for an appropriate section to allow for make-up air into the tent.

D. A Negative Air Machine shall be used to continuously exhaust the enclosed area. A minimum of 5 volume changes per hour is required.

E. Removal of ACM shall be by wet methods.

F. ACM removed shall be placed in a leak-tight container.

G. Upon completion of abatement, and prior to tent collapse, the enclosed surfaces shall:

    1. be wet cleaned using rags, mops or sponges; and

    2. be permitted sufficient time to dry, prior to HEPA vacuuming all substrates; and

H. Upon barrier disturbance, loss of engineering controls, or termination of tent usage, the tent and the enclosed surfaces shall be treated according to subdivision (G) above.

I. The bagged waste shall be wet cleaned or HEPA vacuumed and then transferred outside the tent, double bagged, and appropriately handled prior to disposal.

J. All abated surface shall receive a light coat of Encapsulant after clearance air test results are achieved.

K. Tent shall not be dismantled until acceptable clearance air results have been achieved.

Glovebag Method

This method shall be used to abate any piping not directly inside a tent or full containment.

Glovebag Procedures - Glovebag procedures on pipe lagging shall be done using commercially reliable glovebags of PVC or polyethylene, appropriately sized for the project. Glovebags may not be shifted down a pipe or duct and shall not be removed from the initial pipe to another pipe, or reinstalled on the initial pipe once removed.

A. Abatement of ACM's shall be by wet methods. Dry removal activities of ACM's is prohibited.

B. Stationary glovebag procedures on pipe lagging shall be done using commercially available glovebag of a minimum of 6-mil clear plastic, appropriately sized for the project. These glovebags shall not be shifted, moved, installed or reused once used for ACM removal.

C. The glovebag procedures shall be performed in accordance with the following:

1. All necessary tools and materials shall be brought into the work area before the glovebag procedure begins.

2. Air monitoring shall be conducted.

3. Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.

4. The pipe insulation diameter worked shall not exceed one half the bag working length above the attached gloves.

5. The ACM within the secured glovebag shall be wetted with amended water prior to stripping.

6. The bag shall be attached over duct tape which has been placed securely around the insulation, forming a smooth seal. The bag shall be securely attached to the insulation in a manner to prevent air transfer.

7. The integrity of the glovebag seal shall be smoke tested. The contents of the smoke tube shall be aspirated through the water port access sleeve of the bag. After twist sealing the access sleeve, the bag shall be squeezed gently to check for leakage points which are then taped airtight.

8. If the pipe insulation adjacent to the section which will be worked on is damaged, or if the pipe insulation terminates or is jointed or contains an elbow adjacent to the work section, the adjacent insulation shall be wrapped in 6-mil polyethylene sheeting and sealed airtight with duct tape.

9. After the insulation has been removed, the pipe shall be sprayed with amended water and brush-scrubbed to remove all visible ACM. The pipe, the interior of the bag, the insulation and the tools shall then be sprayed with amended water. The enclosed volume shall be misted and time allowed for the mist to settle out before breaking the seal or removal of the glovebag.

10. Any pipe insulation ends created by this procedure shall be thoroughly wetted before bag removal and sealed with wettable cloth end caps and bridging encapsulant or any combination of these materials immediately following bag removal.

11. The tool pouch shall be separated from the bag prior to disposal by twisting it and the wall to which it is attached several times, and taping the twist to hold it in place, thus sealing the bag and the pouch which are severed at the midpoint of the twist. Alternatively, the tools can be pulled through with one or both glove inserts, thus turning the gloves inside out. The glove(s) is/are then twist sealed forming a new pouch taped and severed mid-seal forming two separate bags.

12. A HEPA vacuum shall be used for evacuation of the glovebag in preparation for removal of the bag from the pipe or duct, for clean-up in the event of a spill, and for post project cleanup.

13. With the glovebag collapsed and the ACM in the bottom of the bag, the bag shall be twisted several times and taped to seal that section during bag removal.

14. A 6-mil plastic bag shall be slipped around the glovebag while it is still attached to the pipe. The bag shall be detached from the pipe by removing the tape or cutting the top with a blunt scissors.

15. The asbestos-containing waste, the clean-up materials, and protective clothing shall be wetted sufficiently, double-bagged minimizing air content, sealed separately, and disposed of.

NOTE: Glovebag procedures which are large asbestos projects or part of a large asbestos project shall be conducted in accordance with all large asbestos project procedures.

3.9 ASBESTOS HANDLING PROCEDURES

A. The Contractor shall employ proper handling procedures in accordance with 29 CFR 1926 and 40 CFR 61, Subpart M, 12 NYCRR Part 56, and the specification requirements herein. The specific abatement techniques shall include but not limited to details of construction materials, equipment, and handling procedures. Following task descriptions detail the required abatement handling technique:

3.9.1 Following Mechanical components shall be removed:

Floor Tile and Mastic
Floor Tile Mastic / Leveling Compounds
Other Materials Not Listed May Be Present And May Contain Asbestos.

After completion of all asbestos removal work, surfaces from which asbestos containing materials have been removed shall be wet wiped and sponged clean, or cleaned by some equivalent method to remove all visible residue. Run-off water shall be collected and filtered through the dual filtration system. A first filter shall be provided to remove fibers 20 micrometers and larger and a final filter provided that removes all fibers 5 micrometers and larger. Waste water must be filtered prior to discharge to the sanitary system. Water that is not filtered must be drummed and disposed of as asbestos containing waste.

After the gross amounts of asbestos have been removed from every surface, all remaining visible accumulations of asbestos on floors shall be collected using plastic shovels, rubber squeegees, rubber dustpans and HEPA vacuum cleaners as appropriate to maintain the integrity of the containment barrier. When all insulation has been removed, handlers shall use HEPA vacuum cleaners to vacuum every surface. Particular attention shall be paid to those surfaces or locations which could harbor accumulations or residual asbestos dust. All work areas must ultimately be cleaned in accordance with ASTM E 1368 Visual Inspection of Asbestos Abatement Projects.

3.9.2 Sealing Contaminated Items Designated for Disposal:

Contaminated architectural, mechanical, and electrical appurtenances such as Venetian blinds, full height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit panels, and other contaminated items designated for removal shall be coated with an asbestos lock down encapsulant at the demolition site before being removed from the asbestos control area. These items need not be vacuumed prior to application of the lock-down encapsulant.

The asbestos lock down encapsulant shall be tinted a contrasting color. It shall be spray applied by airless method. Thoroughness of sealing operation shall be visually gauged by the extent of colored coating on exposed surfaces.

3.10 FINAL CLEANING AND VISUAL INSPECTION

A. The abated asbestos regulated work area shall be cleaned by collecting, packing, and storing all gross contamination. A final cleaning shall use HEPA vacuum and wet cleaning of all exposed surfaces and equipment in the asbestos regulated work area.

B. Upon completion of the cleaning, the Contractor shall conduct a visual pre-inspection of the cleaned area in preparation for a final inspection before final air clearance monitoring and reclean, as necessary.

C. Upon completion of the final cleaning, the Contractor and the Project Monitor shall conduct a final visual inspection of the cleaned work area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection as specified. If the Industrial Hygienist rejects the abatement area as not meeting final cleaning requirements, the Contractor shall reclean as necessary and have a follow-on inspection conducted with the Industrial Hygienist.

D. Recleaning and follow-up reinspections, including air sampling, shall be at the Contractor's expense.

3.11 OSHA PERSONAL AIR SAMPLING

A. Sampling and analysis of airborne concentration of asbestos fibers inside the work area shall be performed by the Contractor in accordance with 29 CFR 1926 Section 1926.1101, as specified herein. Personal air monitoring samples shall be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Results of the personal samples shall be posted at the job site no later than 24 hours after from the end of the work shift, and made available to the Project Designer as specified herein.

B. The Contractor shall maintain a fiber concentration inside enclosed containment regulated work area equal to or less than 0.1 f/cc expressed as an 8 hour, time-weighted average (TWA) during the conduct of the asbestos abatement. If fiber concentration rises above 0.1 f/cc, work procedures shall be investigated with the Project Designer to determine the cause.

C. The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 f/cc, as average over a sampling period of 30 minutes.

Should either an environmental concentration of 0.1 f/cc expressed as an 8-hour TWA or a personal excursion concentration of 1.0 f/cc expressed as a 30-minute sample occur inside the contained (enclosure) regulated work area, the Contractor shall stop work immediately, notify the Project Designer, and implement additional engineering controls and work practice controls to reduce airborne fiber levels below prescribed limits in the work area. Work shall not restart until authorized by the Project Designer.

D. Monitoring shall be performed to provide air monitoring results at the 95 percent confidence level.

E. For personal sampling required by 29 CFR 1926 Section 1926.1101, the NIOSH Pub No. 84-100 Method 7400 shall be used for sampling and Phase Contrast Microscopy (PCM) analysis. The Contractor shall obtain the services of an independent testing laboratory with qualified analysts and appropriate equipment to conduct sample analyses of air samples using the methods prescribed in 29 CFR 1926 Section 1926.1101 to include NIOSH Pub No. 84-100 Method 7400.

3.12 AREA AIR MONITORING

A. Work Area sampling performed in accordance with 29 CFR 1926 Section 1926.1101, and 12 NYCRR Part 56 Subpart 56-17 shall be performed by the air sampling technician. Sampling performed after final clean-up, i.e. final clearance air sampling, shall be performed by the air sampling technician. For environmental quality control and final air clearance NIOSH Pub No. 84-100 Method 7400 (PCM) shall be used. For environmental and final clearance samples, sampling will be conducted at a sufficient velocity and time to collect a sample volume necessary to establish the limit of detection of the method used at 0.005 f/cc. Asbestos fiber concentration confirmation of the total fiber concentration results of environmental, quality assurance and final air clearance samples, collected and analyzed by NIOSH Pub No. 84-100 Method 7400, will be conducted.

3.12.1 Sampling Prior to Asbestos Work:

The baseline air sampling shall be established one day prior to the masking and sealing operations for each abatement area site. The background shall be established by performing area sampling in similar but uncontaminated sites in the building. Pre-abatement NIOSH Pub No. 84-100 Method 7400, PCM air samples shall be collected at a minimum of five locations. These locations are: outside the building, inside the building, but outside the abatement area perimeter and inside each abatement area. One sample shall be collected for every 185 square meters (2000 square feet) of floor space. At least two sample locations shall be collected outside the building. The PCM samples shall be analyzed immediately.

3.12.2 Sampling During Asbestos Abatement Work:

During abatement NIOSH Pub No. 84-100 Method 7400, PCM air samples shall be collected at a minimum of five locations outside the work area per 12 NYCRR Part 56 on a daily basis. Sampling inside work areas during abatement may be required to monitor work done utilizing Applicable Variances, or site specific variances obtained by the Contractor.

If the sampling outside the containment area shows airborne fiber levels have exceeded background or 0.01 f/cc, whichever is greater, all work shall be stopped immediately, and the Project Designer notified. The condition causing the increase shall be corrected. Work shall not restart until authorized by the Project Designer. Where glove bag methods are used, personal and area air sampling shall be performed at locations and frequencies that will accurately characterize any evolving airborne fiber levels.

The Contractor shall provide OSHA personal sampling as indicated in 29 CFR 1926 Section 1926.1101 and discussed in paragraph 3.11 of this specification.

3.12.3 Sampling After Final Clean-Up (Clearance Sampling):

Prior to conducting final air clearance monitoring, the Contractor and the industrial hygienist shall conduct a final visual inspection of the Contractor's final clean-up of the abated asbestos regulated work area as specified. Final clearance air monitoring shall not begin until acceptance of the final cleaning by the industrial hygienist. The air sampling technician will provide area sampling of airborne fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 or as otherwise required by Federal or State requirements. The sampling and analytical method used will be NIOSH Pub. No. 84-100 Method 7400 for PCM and AHERA Regulation 763 Part E, for Transmission Electron Microscopy. The final clearance air samples shall be collected at least 12 hours after wet cleaning has been completed with no visible water in the work area.

3.12.3.1 NIOSH Method:

For Phase Contrast Microscopy (PCM) sampling and analysis using NIOSH Pub No. 84-100 Method 7400, the fiber concentration inside the abated asbestos regulated work area, for each airborne sample shall be less than 0.01 f/cc. Decontamination of the abated asbestos regulated work area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 f/cc then abatement is incomplete and recleaning is required. Upon completion of any recleaning, Re sampling with results to meet the above clearance criteria is required.

3.12.3.2 EPA Method:

An additional set of Final Clearance inside work area samples will be collected and analyzed per EPA 40 CFR 763 Subpart E Method Transmission Electron Microscopy(TEM).

3.12.3.3 Air Clearance Failure:

Should clearance sampling results fail to meet the final clean-up requirements, the contractor shall pay all costs associated with the recleaning, Re sampling and analysis, including costs of the building owner, until final clean-up requirements are met.

3.13 SITE INSPECTION

While performing asbestos abatement work, the Contractor shall be subject to on-site inspection by the Project Designer's Representative, who may be assisted or represented by quality assurance, safety, and industrial hygiene personnel. If the work is found to be in violation of this specification, the project designer or his representative will issue a stop work order to be in effect immediately until the violation is resolved. Costs associated with the standby time required to resolve the violation shall be at the Contractor's expense.

3.14 CLEAN-UP AND DISPOSAL

3.14.1 Housekeeping:

Surfaces of the regulated work area shall be kept free of accumulation of asbestos-containing debris. Meticulous attention shall be given to restricting the spread of dust and debris. HEPA filtered vacuum cleaners shall be used. The space shall not be blown down with compressed air. When asbestos removal is complete, all asbestos waste is removed from the work site, and final clean-up is completed, the Project Designer will certify the areas as safe before before the warning signs and boundary warning tape can be removed. The Project Designer's representative will visually inspect all surfaces within the containment for residual material or accumulated debris. The contractor shall reclean all areas where dust or residual materials are identified until they are certified clean by the representative. The project designer shall certify in writing that the area may be reoccupied before entry by uncertified personnel is permitted.

3.14.2 Title to Materials:

Material resulting from abatement work, except asbestos waste, shall become the property of the Contractor and shall be disposed of as specified in applicable federal, state and local regulations. The contractor is responsible to properly handle, label, manifest, transport and dispose of asbestos waste.

3.14.3 Collection and Disposal of Asbestos:

Asbestos waste, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, shall be collected and placed in sealed, leak tight containers (e.g. double 0.152 mm (6 mil) plastic bags) or sealed in 0.152 mm (6 mil) double wrapped polyethylene sheets. Waste within the containers must be wetted in case the container is breached. An OSHA warning label, Waste generator label, and Department of Transportation (DOT) label shall be affixed or preprinted on each bag. Waste asbestos material shall be disposed of at an EPA, state and local approved asbestos landfill. For temporary storage, sealed impermeable containers shall be stored in the asbestos holding area or in a storage/transportation conveyance (i.e. dumpster, roll off waste box, etc.), in a manner as accepted by and in an area assigned by the District. The procedure for hauling and disposal shall comply with 40 CFR 61, Subpart M, state, regional, and local standards.

3.14.4 Asbestos Waste Shipment Record:

The contractor shall complete and provide final completed copies of the Waste Shipment Record (Waste Manifest) for all shipments of waste material as specified in 40 CFR 61, Subpart M and other required state waste manifest shipment records within three days of delivery to the landfill. The Waste Shipment Record must be signed by the Contractor (generator), the transporter, and the landfill representative. The completed waste shipment record must be delivered to the District no later than 35 days after the waste leaves the site.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01700 - CONTRACT CLOSEOUT

CONTENTS

1. Scope
2. Punch List and Final Inspection
3. Operations and Maintenance Instructions
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5. Emergency Repairs
6. Certificate of Substantial Completion
7. Contractor's Guarantee

1. SCOPE

Prior to the release of final accrued retainage monies, the Contractor shall comply with the procedures for closing out the Construction Contract and to effect the project's transition to the Owner as summarized herein below.

2. PUNCH LIST AND FINAL INSPECTION

a. Preparation of Punch List:

1. When the Contractor determines that the project is substantially complete, he shall prepare a "Punch List" of the last items to be completed or corrected and shall notify the Owner in writing through the Architect that the project will be ready for a final inspection on a definite date which shall be stated in such notice. Such notification shall be given at least ten (10) days prior to the date stated for final inspection.

2. It shall be noted here, and emphasized, that preparation of the "Punch List" is a responsibility of the Contractor and not the Architect. The Architect's sole role will be that of an observer to assure that the design intent is carried out, and as an administrator of the Construction Contract.

3. The Contractor’s failure to include an item of deficiency on the punch list issued to the Contractor shall not relieve the Contractor of its responsibility to perform its work in accordance with the Drawings and/or Specifications, and as such, the punchlist may be revised, updated, and/or reissued at any time.

b. Review and Substantial Completion:

The Architect will review the Contractor's "Punch List" and on the basis of his inspection will verify the condition of substantial completion and prepare the Certificate of Substantial Completion, A.I.A. Document G704.

c. Completion and Final Inspection:

1. Written notice shall also be given to the Architect by the Contractor upon completion of any work which, on the above stated final inspection, was determined to be incomplete, incorrect, or unsatisfactory and not to the stage of substantial completion. On receipt of such notice, additional inspection(s) will be made until completion of all contract requirements are effected. If the Architect is required to inspect the Contractor’s work more than twice, the Contractor shall be liable to the Owner for the services performed by the Architect as a result of additional inspections.

2. The final inspection is intended to be a last review to determine that the work included in the contract has indeed been executed in accordance with all of the Contract Documents. Requests to render a final inspection of an incomplete building or to prepare the Contractor's "Punch List" will not be honored.

3. OPERATIONS AND MAINTENANCE INSTRUCTIONS

a. The Contractor shall start up, test, adjust, balance and otherwise place in a satisfactory working condition all items of mechanical and electrical systems, and shall fully instruct representatives of the Owner in the care and operation of such systems.

b. Instruction of the Owner's Maintenance Supervisor in the proper methods of cleaning and maintaining all the finished surfaces and the proper methods of replacement of the consumable items such as filters, light bulbs, washers, etc., shall be a part of this work.

4. CONTRACT CLOSEOUT DOCUMENTS

a. After Execution of Certificate of Substantial Completion, and prior to submittal of Final Application for Payments, the Contractor shall submit the following documents to the Architect:

1. Contractor's notarized affidavit that all payrolls, bill and materials, equipment, and other indebtedness connected with the work have been paid.

2. Notarized Certificates of Waiver of Liens for himself, each Subcontractor, each material supplier or person furnishing materials or services to the project.

3. List of subcontractors and major material suppliers including address, telephone number, and name of individual to contact.

4. Validated warranties and notarized copies of all guarantees for equipment and materials specifically called for in the Contract Documents.

5. Consent of Surety to Final Payment.

6. Fire Underwriters Certification (where applicable).

7. Conformed Construction Drawings (As-builts), per section 01720.

8. Record copy of each shop drawing or installation diagram.

9. Operating manual (three (3) sets) assembled and bound, each containing:

   a. Explanatory brochures of all equipment.
   b. Catalog cut.
   c. Wiring diagrams.
   d. Instruction sheets for operation and maintenance.

10. Guarantees:

   a. Standard guarantee as per attached form.
   b. Additional specific guarantees required by Technical Section of Contract Documents.
   c. Manufacturer's warranties together with list of all items of equipment of material carrying warranty.

b. Package all items properly indexed and deliver to Architect for review and transmittal to Owner.

5. EMERGENCY REPAIRS

During a valid warranty period, if the Contractor is unable or unwilling to respond immediately to make emergency repairs under conditions which the Owner may determine to be an emergency situation, the Owner reserves the right, and the Contractor recognizes such right, to make such emergency repairs and then to bill the Contractor for a fair and reasonable amount in reimbursement for such repairs.

6. CERTIFICATE OF SUBSTANTIAL COMPLETION

Certificate of Substantial Completion, A.I.A. Document G704, is included herein for review by the Contractor. This document shall be executed in triplicate when the work is sufficiently complete to warrant issuance of this document by the Architect.

7. The following two pages are the Contractor’s Guarantee and shall be submitted along with the required Closeout Documents.

7. CONTRACTOR'S GUARANTEE

CONTRACTOR'S NAME AND ADDRESS

_____

_____

_____

OWNER'S NAME AND ADDRESS

_____

_____

PROJECT: _____

LOCATION: _____

CONTRACT FOR: _____

CONTRACT DATE: _____

The Contractor hereby guarantees that all Work performed and/or materials installed under the above referenced contract is of the quality that will comply with all specific requirements of the contract documents and hereby insures the Owner against all defects of material for two (2) years and workmanship for a period of two (2) years from and after the date of Final Payment. This does not waive stipulation of other clauses which specify guarantee periods in excess of the obligations herein.

It is further agreed that if, after due inspection, the Architect, as provided in the General Conditions of the Contract for Construction, shall decide that the replacement or repair of any of the Work is, in his opinion, necessary, such defective Work will be repaired or removed and replaced with New Work, meeting all requirements of the Contract Documents, same being done promptly and without expense to the Owner. Repairs and replacements are to include all costs of replacing or repairing other work damaged by the removal and replacements of the work covered by this guarantee and all costs necessary for restoring any portion of the building and its contents which are damaged due to defects in this Contractor's Work or materials.

The Contractor agrees to perform all corrective work necessary promptly upon receipt of written notification from the Owner unless the Owner has previously given the Contractor a written acceptance of such condition.

The Contractor stipulates and agrees that if he fails or neglects to carry out promptly the provisions of this guarantee or any part thereof, the Owner may cause all defects to be remedied and all repairs to be made without further notice to the Contractor and shall charge to and recover the expense thereof from the Contractor and/or Sureties.

Such decisions as the architect shall render in connection with this guarantee are subject to the provisions of the General Conditions.

CONTRACTOR:

CORPORATE SEAL:

BY: _____

DATED: _____

STATE OF NEW YORK, COUNTY OF _____ ss:

On the _____ day of _____, 20___, before me personally came _____

_____, to me known, who being by me duly sworn, did depose and say that he resides at _____

_____,

that he is the _____ of _____, the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of said corporation, and that he signed his name thereto by like order.

STATE OF NEW YORK, COUNTY OF _____ ss:

On the _____ day of _____, 20___, before me personally came _____

_____, to me known, and known to me to be the individual described in, and who executed the foregoing instrument, and _____ acknowledged to me that _____ executed same.

_____

NOTARY PUBLIC, State of New York

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01710 - FINAL CLEANING

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE:

A. Each prime contractor shall at all times during the progress of the work keep the building and site free from accumulation of rubbish.

B. Each prime contractor shall provide final cleaning of those areas of site and structure (exterior and interior) involved in the work of his respective contract immediately before final inspection.

1.02 PROTECTION AND CONTROL

A. Fire Protection:

1. Store volatile waste removed in final cleaning in covered metal containers, and remove from premises to comply with local and/or state ordinances and OSHA.

2. Gasoline and fuel oil storage facilities shall be located and maintained in full compliance with local and/or state ordinances and OSHA.

B. Pollution Control:

1. Conduct clean up and disposal operations to comply with local ordinances and/or state ordinances and OSHA anti-pollution laws.

2. Burning or burying of rubbish and waste materials on the project site is not permitted.

3. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS:

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

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 FINAL CLEANING:

A. General:

1. Use experienced workmen, or professional cleaners, for final cleaning.

2. Maintain cleaning until the building, or portion thereof, is occupied by the Owner.

B. Remove grease, dirt, dust, stains, labels, fingerprints, and other foreign materials, from interior and exterior surfaces.

C. Repair, patch, and touch up marred surfaces to match adjacent finishes.

D. Wash all glass installed as work of this contract.

E. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

F. Vacuum clean carpeted and similar soft surfaces.

G. Clean resilient and hard surface floors as recommended by manufacturer.

H. Clean surfaces of equipment; remove excess lubrication.

I. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.

J. Clean light fixtures and lamps.

K. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

L. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01720 – CONFORMED CONSTRUCTION DOCUMENTS (AS-BUILTS)

PART 1 - GENERAL

1.01 GENERAL:

A. Submit Conformed Construction Documents as required by Section 01700 herein specified and obtain written receipt from Architect.

B. Each prime contractor shall, upon completion of the construction work, furnish the Owner with three (3) paper sets and two (2) electronic copies (PDF acceptable) of Conformed Construction Documents.

1. The Contractor shall either use and reproduce the documents they are entitled to via the contract or they shall request and pay for additional sets from the Architect.

a. Electronic drawing files, AutoCAD format, may be available, at the discretion of the Architect, for a cost of $25.00 per drawing. Contractors requesting this service will be required to sign a disclaimer. Request for electronic files must be made in writing to the Architects office. This request must include a specific list of drawings required in this format. In response, the architect will verify the drawings requested and will forward the disclaimer for signature. Electronic files will be released upon receipt of payment and a fully executed disclaimer.

2. Incorporate all changes due to addenda modifications, change orders, field conditions and record actual locations of all items clearly and neatly. Submit prints when requested by the Architect for interim approval. Review may be made periodically during the job.

C. The Architect will review Conformed Construction Documents prior to transmittal to Owner. If in the Architect’s opinion, the submitted Conformed Construction Documents are lacking or inadequate, the Contractor shall revise and resubmit accordingly.

1.02 BUILDING CONSTRUCTION AND RECONSTRUCTION:

A. General Construction:

1. Incorporate plan changes, structural changes, and general building layout changes. For buried construction, include tie dimensions.

B. Mechanical Construction:

1. Incorporate ductwork and revisions/re-routing, registers and

diffusers, piping runs, valve locations and identification, pump locations and identification, and equipment location. For buried construction, include tie dimensions.

C. Electrical Construction:

1. Incorporate large conduit runs, switchgear and panel locations, equipment locations, and controls locations. For buried construction, include tie dimensions.

D. Plumbing Construction:

1. Incorporate above ground and underground piping runs, clean-outs, and valve locations and identification. For buried construction, include tie dimensions.

1.03 SITE WORK:

A. Parking Lot, Pavement, Fields and General Site Construction:

1. Provide a survey, signed and sealed by NYS licensed Land Surveyor. Mark-ups of the Construction Documents will not be accepted unless agreed to in advance by the Architect for small-scope projects only.

a. If a land survey of existing conditions is provided in the Construction Documents, the contractor shall update that land survey as the basis of the as-built, utilizing the surveyor that performed said original survey.

2. Incorporate layout changes, drainage structure locations, piping locations, invert elevations, fences, and topography.

a. If site work is relevant to a new building or building addition, provide actual finish floor elevations at all doorways, and actual building perimeter locations and dimensions.

B. Utility Service Construction:

1. Provide a survey, signed and sealed by NYS licensed Land Surveyor. Mark-ups of the Construction Documents will not be accepted unless agreed to in advance by the Architect for small-scope projects only.

a. If a land survey of existing conditions is provided in the Construction Documents, the contractor shall update that land survey as the basis of the as-built, utilizing the surveyor that performed said original survey.

2. Incorporate layout changes, electrical primaries and secondaries, transformers, water services, gas services, sewer lines, and sanitary systems with leaching structure locations, piping locations, and invert elevations.

a. Include tie dimensions to visible above ground elements for buried construction.

END OF SECTION

SECTION 02320 - EXCAVATION, BACKFILL, AND COMPACTION (BUILDING AREA)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

1. Refer to Division 1 for applicable local codes and regulations.

1.2 DESCRIPTION OF WORK

A. This section pertains to an area bounded by 20-feet-minimum outside of and parallel to the exterior walls of the building, including canopies, loading docks, and other structures attached to the building.

B. This work includes the following:

1. Preparing subgrade for building slabs, walks, and pavements.
2. Preparing subbase for support of building slabs.
3. Excavating and backfilling for building structure.
4. Excavating and backfilling of trenches within building lines.
5. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.
6. Excavating and backfilling for Mechanical/Electrical Work. Refer to mechanical and electrical sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.
7. Final grading and placement and preparation for topsoil for lawns and planting are specified in Division 2.

1.3 QUALITY ASSURANCE

A. Comply with: New York State Department of Transportation (NYSDOT) "Standard Specifications for Construction and Materials."

B. Routine testing of existing soils and compacted material for compliance with these specifications will be performed as part of Special Inspections.

1. Compacted material not meeting density requirements shall be removed or recompacted and retested at Contractor's expense.

1.4 SPECIAL INSPECTIONS

A. Refer to Specification Section **(01410) (01 45 33)** and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

A. Preconstruction Testing: Contractor shall employ Testing Agency acceptable to Engineer and Architect to perform the following services:

1. Test materials proposed for use by Contractor to verify specified requirements.
   a. Determine optimum moisture at which maximum density can be obtained in
      accordance with ASTM D 1557, Modified Proctor.
   b. Perform particle size analysis in accordance with ASTM D 422.

B. Submit Testing Agency qualifications demonstrating experience with similar types of projects.

C. The RDP for Geotechnical Engineering shall perform the following:

1. Identify soils requiring undercutting and replacement while observing proof rolling and when subgrade is exposed.
2. Verify footing bearing strata.
3. Review and accept materials proposed by Contractor for use as compacted fill based on test data and information submitted by preconstruction Testing Agency. Architect shall coordinate review of submittals.
4. Observe and accept filling and compaction procedures.
5. Review and approve preparation of slab-on-grade subgrade and subbase.

D. Geotechnical Engineer shall submit copies of reports to Special Inspector, Engineer, Architect, Construction Manager, and Contractor. Include date of site visit, description of work observed, and summary of observations and recommendations.

1.6 SUBMITTALS

A. Submit to RDP for Geotechnical Engineering:

1. Gradations for proposed fill materials and mix design proposed for flowable fill at least 15 days before start of backfilling. Flowable fill submittal shall include ASTM C 1260 test results.
2. Product data, specifications, and installation instructions for proprietary materials.
3. Material certifications for products specified to conform with NYSDOT references and ASTM references.

B. Prior to placement of slab on grade, submit to Special Inspector and RDP for Structural Engineering a written protection program for vapor retarder, slab subbase, and slab on grade for record only.

1.7 DEFINITIONS

A. Excavation: Removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation and remedial work directed by Architect shall be at Contractor's expense.

1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to Architect.
2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification unless otherwise directed by Architect.

C. Additional Excavation: If RDP for Geotechnical Engineering determines bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered. Replace excavated material as directed by Geotechnical Engineer.

1. Removal of unsuitable material and replacement as directed will be paid on basis of conditions of contract relative to changes in work.

D. Subgrade: Undisturbed earth or compacted soil layer immediately below granular subbase, base of structure, or topsoil materials.

E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

1.8 PROJECT CONDITIONS

A. Site Information: Subsurface investigation reports were used for basis of design and are available to Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test borings and other exploratory operations may be performed by Contractor at Contractor's option; however, no change in contract sum will be authorized for additional exploration.

B. Existing Utilities: Locate existing underground utilities in work area before starting earthwork operations. Where utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. If uncharted or incorrectly charted piping or other utilities are encountered during excavation, consult with utility owner and Architect immediately for directions. Cooperate with Owner and public and private utility companies to keep services and

facilities in operation. Repair damaged utilities as required by utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others during occupied hours except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
   a. Provide minimum 48-hours notice to Architect and receive written notice to proceed before interrupting utilities.
3. Demolish and remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives: Do not bring explosives onto site or use in work.

D. Protection of Property: Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1. Precondition Survey: Contractor shall perform a precondition survey of structures adjacent to planned excavation and foundation installation and submit to Architect for review. Survey shall include description and photographs of adjacent buildings, clearly identifying benchmarks relative to datum level sufficiently distant so as not be affected by project operations. Contractor shall be responsible for making repairs to existing structures to the Owner's satisfaction for damage caused by construction activities not in conformance with these specifications.
2. Perform excavation by hand within drip line of large trees to remain. Protect root systems from damage and from drying out to greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

1.9 PRODUCT HANDLING

A. Store materials to preserve their quality and fitness for work.

1.10 WORKMANSHIP

A. Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Architect.

B. Remove work found to be defective. Replace with new acceptable work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Fill Material: Soil materials free of clay, rock or gravel larger than 3 inches in any dimension, debris, waste, frozen

materials, vegetation, and other deleterious matter.

B. Flowable Fill Material: Cementitious, flowable, excavatable, backfill material having a compressive strength of 50 to 100 pounds per square inch (psi) at 28 days. Provide mix that minimizes shrinkage and is non-expansive.

C. Structural Fill: Sound and durable sand and gravel, free of deleterious materials such as pyritic shale, organics, or contaminants of a chemical, mineral, or biological nature and conforming to the following limits of gradation:

Percent Passing by Weight	Sieve Size
100	3 inch
90 -100	2 inch
75 - 90	3/4 inch
35 - 65	1/4 inch
5 - 40	No. 40
0 - 8	No. 200

D. Subbase Material: Sound and durable sand and gravel, free of organic and other deleterious materials, conforming to New York State Department of Transportation, paragraph 304-2.03, Type 2 or 4.

E. Drainage Fill: Washed crushed stone or crushed or uncrushed gravel conforming to NYSDOT Section 703-04, size 2.

F. Cushion Sand: Comply with requirements of NYSDOT Section 703-06.

G. Bedding: Comply with the requirements of NYSDOT Section 703-02, material requirements, crushed stone (703-0201).

H. Filter Fabric: “Geotex 351” by Propex Geosynthetics; “Mirafi 140N” by Mirafi, Inc.; or accepted equivalent.

I. Soil Stabilization Geotextile: “Geotex 315ST” by Propex Geosynthetics; “Mirafi 600X” by Mirafi, Inc.; or accepted equivalent.

J. Excavated Materials: Do not use as structural fill or subbase material. Do not use as general fill material unless accepted by Geotechnical Engineer.

K. Vapor Retarder: Provide vapor retarder cover over prepared subbase material where indicated below slabs on grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154 as follows:

1. Polyolefin not less than 15 mils thick, in compliance with ASTM E 1745 Class A and with a perm rating less than 0.02 perms. “Stegowrap 15 mil Class A” by Stego Industries LLC; “Moistop Ultra 15" by Fortifiber Building Products; “Griffolyn 15 Mil Green” by Reef Industries, Inc.; or “Vapor Block 15” by Raven Industries.
2. Provide manufacturer’s-recommended, pressure-sensitive/water-resistant seam tape and mastic for vapor retarder selected.

L. Geofoam Block Backfill: Molded expanded polystyrene conforming to ASTM C578, Type VIII or ASTM D6817 EPS 19 with a density of 1.15 pounds per cubic foot, minimum block size 2 feet by 2 feet by 4 feet as manufactured by Thermal Foams, Buffalo, NY 716-874-6474; Insulated Building Systems, Winchester, VA 540-662-0882; Insulfoam, Tacoma, WA 253-572-5111 or accepted equivalent.

M. Foundation Drainage Pipe: Perforated Polyvinyl Chloride (PVC) Pipe conforming to ASTM D 3034, SDR 35, size as noted on the Drawings. Provide bends, reducers, adapters, couplings, collars, and joint materials as required.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Examine substrates and conditions under which work shall be performed. Do not proceed with work until unsatisfactory conditions are corrected.

B. Maintain drainage and restrict traffic within building area during construction to maintain integrity of subgrade. Failure to observe these precautions will require Contractor to remove disturbed areas and correct at his expense.

3.2 COLD-WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.3 REMOVALS

A. Clear, grub, and strip site of vegetation, topsoil, and other organic materials.

B. Remove brick fragments and other construction debris. Plow-strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material can bond with existing surface.

1. When existing ground surface has a density less than that specified for a particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris. Legally dispose off Owner's property.

3.4 PROOF ROLLING

A. Following stripping and removing miscellaneous fill, grade and compact exposed subgrade. Proof roll subgrade by making five passes

across building area in each direction using smooth-drum vibrating roller having static weight of 10 tons minimum.

B. Undercut soft spots that develop during proof rolling and replace with compacted structural fill. Contractor shall be paid for this work on unit cost basis.

C. Do not perform proof rolling during or immediately after periods of inclement weather.

3.5 EXCAVATION

A. Excavation shall be considered unclassified and understood to mean all materials encountered during excavation.

B. Excavation Classifications: The following classifications of excavation will be made when rock is encountered:

1. Earth excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; and earth and other materials encountered not classified as rock or unauthorized excavation.
2. Rock excavation for trenches and pits includes removal and disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 315D and rated at not less than 115 HP flywheel power and 35,295-pound drawbar pull and equipped with a short stick and a 42-inch-wide, short-tip, radius rock bucket rated at 0.81 cubic yard (heaped) capacity. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.
3. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered that cannot be dislodged and excavated with modern track-mounted, heavy-duty excavating equipment without drilling, blasting, or ripping. Rock excavation equipment is defined as Caterpillar Model No. 973D or equivalent track-mounted loader, rated at not less than 239 HP flywheel power and developing minimum of 48,000-pound breakout force (measured in accordance with SAE J732).
   a. Typical of materials classified as rock are large boulders not capable of being removed by the indicated equipment, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
   b. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

C. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by Architect. Such excavation will be paid on basis of Contract Conditions relative to changes in work.

D. Potential rock payment lines are limited to the following:

1. Two feet outside of concrete work for which forms are required, except footings.
2. One foot outside perimeter of footings.

3. In pipe trenches, 6 inches below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3-foot-minimum trench width.
4. Outside dimensions of concrete work where no forms are required.
5. Under slabs on grade, 6 inches below bottom of concrete slab.

E. Excavations shall be laid back or sheeted and braced to prevent sloughing in of sides. Maintain sides and slopes of excavations in stable condition until completion of backfill. Incline cut slopes no steeper than permitted by OSHA standards for excavations in soil type(s) encountered.

F. Hand trim foundation excavations to remove loose soil or ridges of materials left by equipment.

G. Keep loose material and debris out of excavations.

H. For pile foundations, stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

I. Shoring and Bracing: Provide materials for shoring and bracing, including sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

1. Provide permanent steel sheet piling or pressure-creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops minimum 2 feet 6 inches below final grade, and leave permanently in place.

3.6 DEWATERING

A. Dewatering activities shall conform to Stormwater Pollution Prevention Plan (SWPPP) implemented by site operator if required as a condition of construction permit.

B. Perform excavation and filling in manner and sequence to provide proper drainage at all times.

C. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting of footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
2. Establish and maintain temporary drainage ditches and other

diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.7 STORAGE OF EXCAVATED MATERIALS

A. On-site storage of excavated materials shall conform to Stormwater Pollution Prevention Plan (SWPPP) implemented by site operator if required as condition of construction permit.

B. Stockpile excavated materials acceptable for reuse. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edges of excavations. Do not store within drip lines of trees indicated to remain.
2. Dispose of excess excavated soil material and materials not acceptable for use as general fill.

3.8 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width sufficiently wide to provide ample working room and minimum of 6 to 9 inches of clearance on both sides of pipe or conduit.

B. Do not locate trenches that are deeper than adjacent footings closer horizontally to footing than vertical distance separating bottom of trench and bottom of footing.

C. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of bedding prior to installing pipe.
2. For pipes or conduit less than 6 inches in nominal size and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

3. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with bedding or tamped cushion sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads to ensure continuous bearing of pipe barrel on bearing surface.

3.9 VAPOR RETARDER INSTALLATION

A. General: Do not begin installation of vapor retarder and slab subbase until protection is in place. See requirements in Section 03320. Following **[leveling and proof rolling of subgrade] [placement and compaction of subbase]**, place vapor retarder sheeting with longest dimension parallel with direction of **[subbase]**

[concrete slab] placement.

B. Install vapor retarder in accordance with ASTM E 1643, manufacturer's instructions, and as follows:

1. Lap joints 6 inches, and seal vapor retarder joints with manufacturer- recommended seam tape.
2. Extend vapor retarder up walls and penetrations 4 inches minimum.
3. Seal vapor retarder to walls and penetrations with manufacturer-recommended mastic to form continuous barrier.
4. Repair damaged areas by cutting patches of vapor retarder material and placing to overlap damaged areas by 6 inches each side. Seal each side of patch with seam tape.

C. After vapor retarder placement, cover with slab subbase and compact as specified to depth shown in drawings.

D. Do not allow subbase material to become wet prior to or after slab placement.

3.10 FILLING, BACKFILLING, AND COMPACTION

A. Do not place fill material on surfaces that are muddy, frozen, or contain frost or ice.

B. Place soil stabilization geotextile below structural fill where shown in drawings after subgrade has been approved and before placement of fill material.

C. Use structural fill to increase grades within building areas, as interior backfill against foundations and in trenches, as exterior backfill against walls with footing drains and as exterior backfill where pavement or walkways abut building.

D. Contractor may use flowable fill to increase grades and as interior backfill against foundations and in trenches. Allow fill to cure for at least 7 days before setting forms for concrete foundations or placing slab on grade.

E. Use subbase material directly below slabs and pavements as shown in drawings.

F. Use general fill material to increase grades outside building area except as otherwise specified.

G. Use drainage fill around footing drains as detailed in drawings. Wrap drainage fill with filter fabric.

H. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and are carried below bottom of such footings or pass under wall footings. Place concrete to level of bottom of adjacent footing.

I Backfill trenches with concrete or flowable fill where trench excavations pass within 18 inches of and are carried below bottom of

installed or existing grade beams or pile caps or that pass under grade beams. Place concrete to level of bottom of adjacent grade beam.

J. Backfill foundation excavations as soon as possible following construction of foundations and foundation walls.

K. Backfill and fill against foundation walls evenly on both sides to prevent displacement of construction. For walls with fill on one side only, do not backfill until concrete has achieved 70 percent of its design strength and walls have been braced.

L. Begin filling in lowest section of area.

M. Place fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

N. Lifts or portions thereof not compacted in accordance with specifications shall be recompacted or removed and replaced to meet compaction requirements.

O. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density in accordance with ASTM D 1557, Modified Proctor:

1. Under structures, footings, foundations, building slabs, and steps: Compact top 12 inches of subgrade and each layer of fill material to 95 percent.
2. Under pavements: Compact top 12 inches of subgrade and each layer of fill material to 95 percent.
3. Subbase Material: Compact to 95 percent with moisture content no greater than 2 percent wet of optimum.
4. Under walkways: Compact top 6 inches of subgrade and each layer of fill material to 95 percent.
5. Under lawn or unpaved areas: Compact top 6 inches of subgrade and each layer of fill material to 90 percent.
6. Cushion sand: Compact to 100 percent.

P. Where a power roller is used for compaction, do not approach nearer than 10 feet from walls of new or existing construction.

Q. Moisture Control: Where subgrade or layer of soil material must be moisture- conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

1. Remove and replace or scarify and air dry soil material too wet to permit compaction to specified density.
2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to satisfactory value.

3.11 TOLERANCES

A. Excavation for structures shall conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot except to facilitate drainage during construction stage.

B. Surface of subbase under building slabs shall be graded smooth and even, free of voids, and rolled to required elevation. Provide final grades within tolerance of 1/2 inch when tested with 10-foot straightedge.

END OF SECTION 02320

DIVISION 2 - SITE WORK

SECTION 02506 - ABANDONMENT OF EXISTING STORM WATER SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Under this work, the Contractor shall abandon in place (as shown on the drawings) any and all components comprising the on-site storm drainage systems.

B. All abandonment work of storm systems shall be in accordance with the latest requirements and regulations of the local authority having jurisdiction and the US EPA.

C. The contractor is responsible for ascertaining and coordinating any testing and inventorying required by the local authority having jurisdiction and the US EPA.

D. Structures shall be cleaned of all foreign material and backfilled with clean sand and gravel using adequate compaction methods to ensure no future settlement or void spaces within the structures.

E. Non-leaching structures shall be perforated so they will not retain liquids.

F. Portions of systems to be abandoned in place shall be disconnected and all piping capped or sealed.

G. The contractor is responsible for coordinating controlled inspections of backfilling activities.

H. The contractor is responsible for contacting the local authority having jurisdiction and the US EPA to coordinate any required abandonment inspections.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

B. Concrete paving and walks are specified in Division 2.

C. Section 03320: Concrete Slab on Grade.

D. Section 03325: Concrete Slab on Metal Deck.

E. Section 03326: Concrete Topping on Precast Concrete Plank.

F. Waterproofing is specified in Division 7.

1.2 DESCRIPTION OF WORK

A. This section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete."
2. ACI 301 "Specifications for Structural Concrete for Buildings."
3. ACI 303 "Guide to Cast-in-Place Architectural Concrete Practice."
4. ACI 304 "Guide for Measuring, Mixing, Transporting, and Placing Concrete"
5. ACI 305 "Hot-Weather Concreting."
6. ACI 306 "Cold-Weather Concreting."
7. ACI 311 "Guide for Concrete Inspection" and "Batch Plant Inspection and Field Testing of Ready-Mixed Concrete."
8. ACI 315 "Details and Detailing of Concrete Reinforcement."
9. ACI 318 "Building Code Requirements for Structural Concrete."
10. ACI 347 "Guide to Formwork for Concrete."
11. ACI SP-15 "Field Reference Manual." A copy of this publication shall be kept in the field office at all times during concrete construction.
12. AWS "Structural Welding Code - Reinforcing Steel."
13. CRSI "Manual of Standard Practice."
14. NYSDOT "Standard Specification for Construction and Materials."

B. To minimize irregularities in appearance or color, obtain cement, aggregates, admixtures, and water for each type of concrete construction exposed to view in completed project from same source for duration of that type of construction.

C. For architecturally exposed concrete finishes, cast sample areas in nonexposed locations for review and acceptance by Architect.

1. Use materials, workmanship, and techniques which are to be used in exposed areas.
2. Architecturally exposed concrete shall be considered to include exposed concrete except in service spaces such as mechanical rooms, electrical rooms, and other utilitarian spaces.

1.4 SPECIAL INSPECTIONS

A. Refer to Specification Section 01410 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

A. Preconstruction Testing: Contractor shall employ Testing Agency acceptable to Engineer and Architect to perform material evaluation tests and evaluate concrete mixes prior to submitting.

B. Submit concrete testing service qualifications demonstrating experience with similar projects.

C. Require concrete supplier to provide delivery tickets for each truckload of concrete. Tickets shall be presented to and reviewed by Contractor and Special Inspector or Testing Agency prior to discharging concrete into structure.

1. Tickets shall contain project identification name, name of Contractor, name of concrete supplier, location of batch plant, date and time of concrete batching, truck number, delivery ticket number, concrete type and class, concrete mix number, design compressive strength at 28 days, concrete mix proportions and materials, and amount of total mix design water that can be added at site prior to discharging into structure if total mix design water was not used when batched. See Part 3 of this section for maximum water amount that can be added at site.

D. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture and the Special Inspector will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify RDPs 48 hours before anticipated time of completion of reinforcement for a given section of work so they may determine if site observations are required. If site observations are required, do not place concrete until RDPs have had opportunity to observe reinforcement.

1.6 SUBMITTALS

A. Shop Drawings:

1. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Show bar schedules, bar spacing, diagrams of bent bars, and arrangements of concrete reinforcement. Include special reinforcement required for openings through concrete.

a. Show elevations of reinforcement for all members at minimum 1/4 inch = 1 foot scale.
b. Show locations of construction and control joints.
c. Reference Contract Drawing number and addendum number in each shop drawing.
d. Do not place reinforcing information from more than one design discipline (structural, civil, landscape) in each drawing.

2. Submit formwork, shoring, and reshoring drawings and details for structural concrete slab and beams for information only. Design and construction of formwork, shoring, and reshoring remains sole responsibility of Contractor. Formwork drawings shall be prepared and stamped by New York State Professional Engineer.

B. Mix Designs: Submit proposed mix designs for concrete 15 days minimum before start of concreting. Submittal must be in the Concrete Mix Design Submittal Form at end of this section for each class of concrete.

C. Submit data and installation instructions for proprietary material.

D. Submit to Special Inspector and Engineer material certificates certifying each material complies with specifications.

E. Submit chloride ion content of proposed admixtures prior to submitting mix design.

1.8 PRODUCT HANDLING

A. Store materials so as to preserve their quality and fitness for work. Store reinforcement and formwork in manner to prevent damage and accumulation of dirt.

1.9 WORKMANSHIP

A. Contractor shall be responsible for correction of concrete work not conforming to specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as directed by Architect.

B. Remove work found to be defective. Replace with new acceptable work.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed/plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown in drawings. Plywood materials shall be one of the following:

1. Overlaid plywood complying with U.S. Product Standards PS-1 "A-C or B-B High Density Overlaid (HDO) Concrete Form," Class 1, exterior grade or better.
2. Plywood complying with U.S. Product Standard PS-1 "B-B (Concrete

Form) Plywood," Class 1, exterior grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

D. Forms for Cylindrical Columns and Supports: Metal, fiberglass-reinforced plastic, or paper or fiber tubes. Provide paper or fiber tubes of laminated plies with water-resistant adhesive and wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.

E. Form Coatings: Provide commercial formulation form-coating compounds with maximum VOC of 450 g/l that will not bond with, stain, or adversely affect concrete surfaces or impair subsequent treatments of concrete surfaces requiring bond or adhesion or impede wetting of surfaces to be cured with water or curing compound.

F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off, metal form ties, designed to prevent form deflection and spalling concrete upon removal. Provide units that will leave no metal closer than 1 inch to exposed surface.

1. Provide ties that will leave holes no larger than 1-inch diameter in concrete surface when removed.
2. Unexposed concrete: “Type A-3 Snap Tie Standard” by Dayton Superior or accepted equivalent.
3. Exposed concrete: “Type A-3 Snap Tie Heavy” by Dayton Superior or accepted equivalent.
4. Architectural exposed concrete: “Type B-1 Two Strut Coil Tie” or “Type B-1/B-3 Screw-on Coil Tie,” with coil bolts and plastic cones at each end, by Dayton Superior, or accepted equivalent. Provide “Type B-54 Coil Cone Concrete Plugs,” by Dayton Superior, or accepted equivalent; color as selected by Architect.

5. Provide galvanized or stainless steel ties for concrete elements that are reinforced with epoxy-coated or galvanized reinforcing.
6. Internal wood spreaders are prohibited.

G. Shores and Reshores: Wood (minimum 4 by 4) or steel with integral screw-type jacks. Members shall be straight and without twist or warp.

2.2 REINFORCING MATERIALS

A. Deformed bars: ASTM A 615, Grade 60. Deformed bars to be welded, ASTM A 706.

B. Deformed Epoxy-Coated Reinforcing Bars: ASTM A 775.

C. Deformed Galvanized Reinforcing Bars: ASTM A 767.

D. Steel Wire: ASTM A 82, plain, cold-drawn steel.

E. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Use wire bar-type or all plastic-type supports complying with CRSI specifications. Use chairs with sand plates or horizontal runners where base material will not support chair legs.

1. Concrete bricks may be used to support footing reinforcing. Stagger brick locations.
   a. Do not use clay bricks.
   b. Do not use bricks to support epoxy-coated or galvanized reinforcing.
2. Supports for epoxy-coated reinforcing shall be either wire bar-type coated with epoxy, plastic, or vinyl compatible with concrete for a minimum distance of 2 inches from the point of contact with reinforcing or all plastic-type.
3. Supports for galvanized reinforcing shall be either galvanized wire bar-type or all-plastic type.
4. Finish (epoxy-coated or galvanized) for supports formed from reinforcing bars shall match the finish of the supported reinforcing.
5. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are plastic-protected (CRSI, Class 1) or stainless-steel protected (CRSI, Class 2).

F. Minimum 16-gauge annealed tie wire, ASTM A 82.

1. Provide coated wire ties for use with epoxy-coated or galvanized bars. Acceptable coatings include epoxy, nylon, or vinyl. Galvanized wire ties may be used with galvanized bars. Do not use plain wire ties.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Aggregates: NYSDOT-approved, Section 703-02 (normal weight), one source and as specified.

1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps, or other deleterious substances.
2. Coarse Aggregate: Clean, uncoated, processed aggregate free from clay, mud, loam, or foreign matter.
   a. For footings, foundation walls, piers, grade beams, basement walls, retaining walls, and interior walls, blend of NYSDOT size 1 and 2 (25 percent size 1 and 75 percent size 2) or gradation conforming to ASTM C 33, size 467:

Sieve Size	Percent Passing
2 inch	100
11/2 inch	95 to 100

3/4 inch	35 to 70
3/8 inch	10 to 30
No. 4	0 to 5

b. For other applications, blend of NYSDOT size 1 and 2 (40 percent size 1 and 60 percent size 2) or gradation conforming to ASTM C 33, size 57:

Sieve Size	Percent Passing
1 1/2 inch	100
1 inch	95 to 100
1/2 inch	25 to 60
No. 4	0 to 10
No. 8	0 to 5

c. No size requirement for stair-pan fill and lean concrete.

C. Water: Clean, fresh, drinkable.

D. Air Entraining: ASTM C 260.

E. Water-Reducing Admixture: "Eucon WR-75" or "WR-89" by Euclid Chemical Co.; "Pozzolith 220N" by Master Builders; or "Plastocrete 161" by Sika Chemical Corp. Admixture shall conform to ASTM C 494, Type A, and not contain more chloride ions than in municipal drinking water.

F. Water-Reducing Retarder: "Eucon Retarder-75" by Euclid Chemical Co; "Pozzolith 100XR" by Master Builders; or "Plastiment" by Sika Chemical Corp. Admixture shall conform to ASTM C 494, Type D, and not contain more chloride ions than in municipal drinking water.

G. Noncorrosive, Nonchloride Accelerator: ASTM C 494, Type E, and not contain more chloride ions than in municipal drinking water.

H. Fly Ash: ASTM C 618, Type F, with a loss on ignition of less than 4 percent.

I. Ground-Granulated, Blast-Furnace Slag: ASTM C 989, Grade 120.

J. High-Range, Water-Reducing Admixture (Superplasticizer): "Eucon 37" by Euclid Chemical Co. or "Sikament" by Sika Chemical Corp. Admixture shall conform to ASTM C 494, Type F or G, and not contain more chloride ions than in municipal drinking water.

K. Nonchloride Waterproofing Admixture: "KIM - Krystol Internal Membrane" by Kryton International Inc.; "Xypex Admix C-500, C-1000, or C-2000" by Xypex Chemical Corporation; or "Anti-Hydro – NC or NCR Waterproof Concrete" by Anti-Hydro International, Inc.

L. Prohibited Admixtures: Calcium chloride, thiocyanates, and admixtures containing more than 0.05 percent water-soluble chloride ions by weight of cement or more than 0.3 percent thiocyanates by weight of cement shall not be permitted.

2.4 RELATED MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing

approximately 9 ounces a square yard and complying with AASHTO M 182, Class 2.

B. Curing-Sheet Materials: One of the following moisture-retaining covers, complying with ASTM C 171: waterproof paper, polyethylene film, or polyethylene-coated burlap.

C. Clear Curing and Sealing Compound (VOC compliant): ASTM C 309 with minimum 18 percent solids content. Use "Diamond Clear VOX" by Euclid Chemical Co. or accepted equivalent.

D. Horizontal Joint Sealants: "Sonolastic SL2" by Sonneborn Building Products; "Sikaflex-2c SL" by Sika Corp.; "Eucolastic 2 SL" by Euclid Chemical Co.; or accepted equivalent.

E. Vertical Joint Sealants: "Eucolastic 2" by Euclid Chemical Co.; "Sonolastic NP2" by Sonneborn Building Products; "Sikaflex-2c NS" by Sika Corporation; "Brutem 92" by Master Builders, Inc.; or accepted equivalent.

F. Joint Filler: ASTM D 1751, ½-inch-thick, premolded, expansion joint filler strips.

G. Backer Rod: "Sonofoam" polyethylene closed-cell foam by Sonneborn Building Products or accepted equivalent.

H. Water Stops: "Volclay Waterstop-RX," 1 inch by 3/4 inch, by American Colloid Company or accepted equivalent at below-grade wall construction joint locations and at locations shown in drawings.

I. PVC Water Stops: Polyvinyl Chloride, dumbbell-type or center bulb-type, conforming to Corps of Engineers CRD-C 572. "Wirestop CR-6380" or "Wirestop FD-6380" by Paul Murphy Plastics Company; "Sealtight PVC Waterstop 6380" by W.R. Meadows; or accepted equivalent at below-grade wall control joint locations and at locations shown in drawings.

J. Chamfer Strips: Provide wood, metal, PVC, or rubber chamfer strips fabricated to provide 3/4-inch chamfer on exposed edges.

K. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gauge) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

L. Sleeves:

1. Schedule 40, PVC for 12-inch diameter or smaller.
2. ASTM A 53, hot-dip galvanized for larger than 12-inch diameter.

M. Anchor Rods and Leveling Plates: Furnished in Section **(05100) (05 12 00)** and installed under this section.

N. Non-shrink Grout: Corp of Engineers CRD-C 621. "Conspec 100" by Conspec Manufacturing Co.; "NS Grout" by Euclid Chemical Co.; "SikaGrout 212" by Sika Corp.; "Masterflow 928" or "Set Grout" by Master Builders, Inc.; "Sonogrout" by Sonneborn Building Products; or accepted equivalent.

O. Bonding Agent: "Strongbond" by Conspec Manufacturing Co.; "SBR Latex" by Euclid Chemical Co.; "Everbond" by L&M Construction Chemicals, Inc.; "Acryl-Set" by Master Builders, Inc.; "SikaLatex" by Sika Corp.; "Sonocrete" by Sonneborn Building Products; or accepted equivalent.

P. Chemical Adhesive for Doweled Reinforcement:

1. Anchors to solid concrete, grouted CMU, solid brick, or stone:

a. Anchors for use when base material temperature is 0°F or greater: "HIT-Ice" by Hilti; "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.

b. Anchors for use when base material temperature is 40°F or greater; "HIT HY 150" or "HIT HY 150 MAX" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET Epoxy-Tie" by Simpson/Strong-Tie; or accepted equivalent.

2.5 PROPORTIONING AND MIX DESIGN

A. Prepare design mixes for concrete. Use independent testing facility acceptable to Architect for preparing and reporting proposed mix designs.

B. Where concrete production facility can establish uniformity of its production for concrete of similar strength and materials based on recent test data, the average strength used as a basis for determining mix design proportions shall exceed specified design strength by requirements of ACI 318, Section 5.3.2.1 or ACI 301, Section 3.9.

C. When a concrete production facility does not have field-test records for calculation of standard deviation, the required average strength shall be determined in accordance with ACI 318, Section 5.3.2.2.

D. Pozzolans:

1. Pozzolans may be substituted for cement in normal-weight concrete, including fly ash, at a maximum rate of 20 percent by weight or ground-granulated, blast-furnace slag at a maximum rate of 35 percent by weight.
2. Submittals shall include actual mix design, including percentage of pozzolans and test results showing mix meets specified 7-day compressive strength where indicated, 28-day compressive strength, and air content.
3. Protect and heat concrete containing pozzolans during cold-weather conditions. Maintain protection and heat until 70 percent of specified design strength is achieved.

E. Quantity of coarse aggregate in pounds must be in the range of 1.25 to 1.5 times quantity of fine aggregate in pounds.

F. Concrete Quality:

Location	Required 7-day Compressive Strength psi	Required 28-day Compressive Strength psi	Maximum Water/Cement Ratio	Percent Entrained Air
Footings, interior stair pans, misc. concrete.	NA	3,000	0.55	4.5*
Retaining walls, basement walls, interior walls, foundation walls, piers, grade beams, underpinning.	3,000	4,000	0.5	4.5*
Lean concrete	NA	1,500	0.65	4.5*

* Plus or minus 1.5 percent.

G. Slump:

1. Footings, foundation walls, piers, grade beams, misc. concrete: 3 inches to 5 inches.
2. Retaining walls, basement walls, interior walls: 4 inches maximum.
3. Concrete containing high-range, water-reducing admixture (superplasticizer) shall have a maximum slump of 9 inches unless otherwise accepted by Engineer. Concrete shall arrive at job site at a slump of 2 to 3 inches, shall be verified, then high-range, water-reducing admixture added to increase slump as required for placement and workability.
4. Type G superplasticizer may be added at plant if adequate quality control measures are implemented to verify slump and admixture quantities at plant before addition of superplasticizer. Concrete shall maintain required slump during transportation and placement. Quality control testing at plant shall be performed by an independent testing laboratory employed by Contractor and acceptable to Architect.
5. Ready-Mix Concrete: ASTM C 94.
6. Provide batch ticket for each batch discharged and used in work indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

2.6 REINFORCING FABRICATION

A. Fabricate bars to required lengths, shapes, and bends. Do not rebend or straighten reinforcement in manner that could weaken material.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Examine conditions under which concrete shall be placed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 FORMWORK INSTALLATION

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, sleeves, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent concrete mortar leakage.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, etc., for easy removal.

D. Erect forms in logical sequence to allow placement and inspection of reinforcement and other embedded items.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for concrete placement. Securely brace temporary openings, and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

F. Provide cleanout panels at bottoms of deep wall and column forms.

G. Chamfer exposed corners and edges as indicated using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Fit corners and joints with gaskets or tape to prevent leakage.

I. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

J. Sleeves: Provide sleeves in concrete formwork for plumbing,

electrical, and mechanical penetrations. Coordinate size and location of sleeves with Contractors and mechanical, electrical, and plumbing drawings.

1. Accurately place and secure in forms.
2. Coordinate sleeve locations with reinforcing bars.
3. Penetrations shall not occur through footings, piers, columns, beams, joists, grade beams, or supported slabs unless shown in structural drawings.

K. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before placing concrete as required to prevent mortar leaks and maintain proper alignment.

L. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form-facing materials are not acceptable. Apply new form-coating compound material. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets.

M. Clean and coat forms before erection. Do not coat forms in place.

N. Place concrete plugs in exposed holes left by form-tie cones.

3.3 SHORES AND SUPPORTS

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction and as herein specified.

B. Provide thermometers adjacent to formwork to record curing temperatures.

C. Design formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure.

D. Formwork for beams, slabs, and other parts that support weight of concrete shall remain in place at least 7 days and until concrete has reached 75 percent of the 28-day design strength as indicated by field-cured cylinders. No additional loads of any sort shall be permitted on the structure until it has reached its 28-day design strength or has been properly reshored. Forms shall be removed at risk of the Contractor, and no pointing or patching shall be done until Engineer has observed the concrete and permitted such work.

E. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

F. Reshore removal shall be based on compressive test results of field-cured cylinders and shall not occur until concrete has reached the 28-day design strength.

G. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for

24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations and provided curing and protection operations are maintained.

H. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.4 REINFORCEMENT PLACEMENT

A. Clean reinforcement of loose rust, mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

B. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, hangers, or concrete brick as required.

1. Wire-tie intersections as required to prevent displacement of reinforcement.
2. Do not wet set reinforcing bars. Wet setting is not permitted.

C. Place reinforcement to obtain at least minimum concrete coverages for protection of bars. Minimum required concrete cover is noted in drawings.

D. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Use of nails in forms and use of clay brick to support reinforcement shall be prohibited.

F. Lap bar splices as indicated. Stagger splices in adjacent bars. Wire-tie splices.

G. Splice reinforcement at joints of low stress.

H. At points where bars lap-splice, including distribution steel, provide wire-tied minimum lap of 30-bar diameters unless otherwise required.

I. Coordinate placement of reinforcement with openings, including sleeves and other embedded items. Where one or more bars are interrupted, provide additional reinforcement at openings. Additional reinforcement is noted in drawings.

J. Place concrete in manner to ensure alignment of elements remains unchanged.

K. Touch up damaged epoxy-coated reinforcement in field after placement with epoxy patching material provided by coating manufacturer.

L. Comply with manufacturer-recommended procedures for installing and

anchoring of doweled reinforcement using chemical adhesives, including drilling and cleaning of holes and mixing and applying of adhesives.

3.5 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items including anchor rods, leveling plates, embedded plates, and angles required for other work attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

B. Do not wet set embedded items. Accurately position, support, and secure embedded items against displacing by formwork, construction, or concrete placement operations.

1. Provide No. 3 rebar ties at top and bottom of anchor rods to maintain position or other accepted method.

C. Anchor rods and embedded structural supports incorrectly located or damaged after installation shall be field modified, including repair or replacement, by Contractor.

1. Notify Engineer of defective work. Submit proposed field modifications to Engineer for review and acceptance prior to making corrections.
2. Proposed field modifications shall include design details and calculations, signed and sealed by a licensed Professional Engineer hired by Contractor.
3. Field modifications shall be tested in accordance with Section 05100. Perform pull-out tests and other appropriate tests on each repair.
4. Cost of field modifications shall be borne entirely by Contractor at no additional cost to Owner. Contractor shall reimburse Owner for cost of additional testing required.

3.6 INSTALLATION OF NON-STRUCTURAL EMBEDDED ITEMS

A. General: Notify other trades to permit installation of their work, including reglets, conduit, and piping and to coordinate requirements of this section. Cooperate with other trades in setting work as required.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings on outer face of exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. ACI 318, Article 6.3, and guidelines listed below apply to conduit and piping.

1. Do not embed aluminum items unless coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.
2. Other than those passing through concrete elements, do not embed items that are larger than one-third of thickness of concrete element in which they are embedded.

3. Unless shown otherwise in structural drawings, install items as follows:
   a. Space at least 12 inches apart and not less than three diameters or widths on center.
   b. Place so they do not cross over each other within concrete elements.
   c. Place so they do not displace reinforcing bars from their proper location.
   d. Provide at least 3/4-inch concrete cover between items and reinforcing bars or concrete surfaces not exposed to weather or in contact with ground. Do not lay items on reinforcing bars. Provide at least 1½-inches concrete cover between items and concrete surfaces exposed to weather or earth.
   e. Securely position items by wire tying to support chairs or supports formed from reinforcing bars.
   f. Install sleeves at penetrations for nonstructural items passing through concrete elements.

3.7 PREPARATION OF FORM SURFACES

A. General: Coat contact surfaces of forms with an accepted form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or to come in contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

C. Coat steel forms with a nonstaining, rust-preventive material. Rust-stained steel formwork is not acceptable.

3.8 CONSTRUCTION JOINTS

A. Locate and install construction joints not shown in drawings so as not to impair strength and appearance of structure as acceptable to Architect.

1. Provide keyways at least 1 1/2 inches deep in construction joints in walls. Roughen joints between reinforced concrete walls and footings.
2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as otherwise indicated. Do not continue reinforcement through sides of strip placements.
3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
4. Provide water stops in construction joints below grade and where indicated. Install water stops to form continuous diaphragm in each joint. Make provisions to support and protect exposed water stops during progress of work. Field-fabricate joints in water stops in accordance with manufacturer's printed instructions.

3.9 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in.

1. Notify other trades to permit installation of their work. Cooperate with other trades in setting work as required.

B. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete" and as specified.

C. A maximum of 2 1/2 gallons for each cubic yard of total mix design water can be added in field. Water must be added prior to discharging and testing concrete. At no time shall total water exceed amount listed in accepted mix design.

D. Deposit concrete continuously or in layers of such thickness that no concrete shall be placed on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within section. Provide construction joints if section cannot be placed continuously.

E. Deposit concrete as nearly as practicable to its final location to avoid segregation caused by rehandling or flowing.

F. Deposit concrete in forms in horizontal layers not deeper than 24 inches and in manner to avoid inclined construction joints.

G. Keep excavations free of water. Do not deposit concrete in water, mud, snow, or on frozen ground.

H. Maximum drop of concrete shall not exceed 5 feet. Use hopper and trunk for greater drops.

I. Maintain reinforcing in proper position during concrete placement.

J. Contractor shall be responsible for controlling the proper placing of embedded pipe, conduit, and other embedded items. See section “Installation of Non-Structural Embedded Items” for additional information.

K. Pumping concrete is permitted only if mix designs specifically prepared and used previously for pumping are submitted. Pump line shall have 5-inch-minimum inside diameter and be used with 5-inch pumps.

3.10 CONSOLIDATION

A. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

B. Do not use vibrators to transport concrete inside formwork.

C. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Vibrators shall penetrate placed layer of concrete at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set.

D. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

E. Do not allow vibrator to come in contact with form.

3.11 SURFACE FINISHES

A. Rough-Form Finish: Provide as-cast, rough-form finish to formed concrete surfaces that shall be concealed in finished work or by other construction. Standard rough-form finish is concrete surface having texture imparted by form-facing material used, with tie holes and other defective areas repaired and patched, and fins or other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Form Finish: Provide smooth-form finish for formed concrete surfaces that shall be exposed to view or covered with material applied directly to concrete such as waterproofing, dampproofing, veneer plaster, painting, or other similar systems. Produce smooth-form finish by selecting form material to impart a smooth, hard, uniform texture and arranging them orderly and symmetrically with minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish to scheduled smooth-form finished concrete surfaces not later than one day after form removal.

1. Moisten smooth-form finished concrete surfaces, and rub with carborundum brick or other abrasive until uniform color and texture are produced.
2. Do not apply cement grout other than that created by the rubbing process.

D. Grout-cleaned Finish: Provide grout-cleaned finish to scheduled smooth-form finished concrete surfaces.

1. Combine 1 part portland cement to 1 1/2 parts fine sand by volume and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to consistency of thick paint. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout shall match adjacent surfaces.
2. Thoroughly wet smooth-form finished concrete surfaces. Apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.12 CURING AND PROTECTION

A. Protect concrete from premature drying, excessive hot or cold temperature, and mechanical injury in accordance with provisions of

ACI 301, Section 5.3.6.

B. Curing Methods: Perform concrete curing by wet-curing or moisture-retaining cover curing or combinations thereof as specified.

C. Provide wet-curing by following methods:

1. Keep concrete surface continuously wet by covering with water.
2. Use continuous water-fog spray.
3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges with 4-inch lap over adjacent absorptive covers.

D. Provide moisture-cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair holes or tears during curing period using cover material and waterproof tape.

E. Curing Vertical-Formed Surfaces:

1. Keep forms in place for minimum of 7 days, 14 days in cold weather or until concrete has achieved 70 percent of its design strength.
2. If forms are removed before minimum time period, alternate methods of curing, wet-curing, moisture-retaining cover curing, or liquid-membrane curing, are required.
   a. Contractor shall submit procedures to Architect for review.
   b. Forms shall remain in place for a minimum of 24 hours when alternating methods of curing are used. For placement during cold weather, the minimum time to form removal shall be extended based on expected weather conditions and Contractor’s submitted procedures.

F. Cure concrete placed under cold-weather conditions completely covering exposed surface of concrete with moisture-retaining cover completely sealed around edges. Cure concrete 14 days minimum with concrete temperature at or above 40 degrees F or 7 days minimum with concrete temperature at or above 70 degrees F.

G. During hot weather after concrete has hardened, loosen form ties, keeping forms in place, and apply water to inside face of form to keep concrete continuously moist.

3.13 COLD-WEATHER CONCRETING

A. Place concrete in accordance with ACI 306.

B. For cold-weather concreting (defined as a period when for more than 3 successive days the mean daily temperature is below 40 degrees F), maintain concrete temperature in accordance with Table 3.1, and maintain concrete protection in accordance with Table 5.3 in "Cold-Weather Concreting" reported by ACI Committee 306.

C. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain concrete mixture temperature recommended in Table 3.1 of ACI 306.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators.

3.14 HOT-WEATHER CONCRETING

A. Place concrete in accordance with ACI 305.

B. Cool ingredients before mixing to maintain concrete temperature below 85 degrees F at time of placement.

C. Mixing water may be chilled or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water.

D. Cover reinforcing steel with water-soaked burlap if temperature of reinforcing steel exceeds ambient air temperature.

E. Wet forms thoroughly before placing concrete.

F. Fog-spray forms and reinforcing steel just before placing concrete.

G. Use water-reducing, retarding admixture when required by high temperature, low humidity, or other adverse placing conditions when acceptable to Architect.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after form removal when acceptable to Architect.

1. Cut out honeycombs, rock pockets, voids over 1/2 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but not to a depth of less than 1 inch. Make edges of cuts perpendicular to concrete surface. Thoroughly clean, dampen with water, and brush-coat area to be patched with bonding agent. Place patching mortar before bonding compound has dried.
2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so patching mortar will match surrounding color when dry. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. These include surface defects such as color, texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form-

tie holes, and fill with dry-pack mortar or precast-cement cone plugs secured in place with bonding agent.

1. Where possible, repair concealed formed surfaces containing defects affecting concrete durability. If defects cannot be repaired, remove and replace concrete.

C. Repair of Unformed Surfaces: Test unformed surfaces for smoothness, and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using template having required slope.

1. Repair finished unformed surfaces containing defects affecting concrete durability. These include surface defects such as crazing, cracks, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

D. Repair methods not specified above may be used subject to acceptance of Architect.

3.16 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades unless otherwise shown or directed after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown in drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel-Pan Stairs: Provide concrete fill for steel-pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown in drawings. Screed, tamp, and finish concrete surfaces as scheduled.

3.17 TOLERANCES

A. Footings and Pile Caps:

1. Variation of dimensions in plan: plus 2 inches or minus 1/2 inch.
2. Variation of center from specified center in plan: 2 percent of width in direction of variation, plus or minus 2-inches maximum variation.

3. Variation of bearing surface from specified elevation: plus or minus 1/2 inch, unless otherwise specified.

B. Piers, Columns, Walls, and Grade Beams:

1. Variation in cross-sectional dimensions of piers, columns, grade beams, and in thickness of walls: plus or minus 1/4 inch.
2. Variation in plan from specified location in plan: plus or minus 1/2 inch for any member in any location.
3. Deviation in plan from straight lines parallel to specified linear building lines: 1/4 inch for adjacent members less than 20 feet apart or any wall length less than 20 feet; 1/2 inch for adjacent members 20 feet or more apart or any wall length of 20 feet and greater.
4. Deviation from plumb: 1/4 inch for any 10 feet of height; 1 inch maximum for entire height.
5. Variation in elevation from specified elevation: plus or minus 1/2 inch for any member in any location.
6. Deviation in elevation from lines parallel to specified grade lines: 1/4 inch for adjacent members less than 20 feet apart or any wall length less than 20 feet; 1/2 inch for adjacent members 20 feet or more apart or any wall length of 20 feet and greater.

C. Anchor Rods and Sleeves:

1. Variation from specified location in plan: plus or minus 1/4 inch.
2. Variation from specified elevation: plus or minus 1/2 inch.

D. Embedded Items (plates, angles, etc.) other than anchor rods and sleeves:

1. Variation from specified location in plan: plus or minus 1/4 inch.
2. Variation from specified elevation: plus or minus 1/4 inch.

END OF SECTION 03300

NOTES TO ENGINEER **REVISED 02/10**

Coordinate work specified in other Sections. For buildings with slab on grades, use 03320; slabs on metal deck, use 03325; topping slabs on precast concrete plank, use 03326. **NOTE: RPI has not allowed fly ash in slabs in the past; check with Architect to see if this must be edited out for slabs on RPI jobs.**

Fly ash is required to have a maximum loss on ignition of 4 percent. If proposed material indicates compliance with NYSDOT 711-10, this is acceptable since it has the same requirement.

Coordinate Special Inspection services.

- Delete requirement for inspection of bolts and anchor rods if allowable loads have not been increased.
- Delete requirement for verification of in-situ concrete strength if there are no beams and structural slabs.

Coordinate materials and finishes required for Project. Engineer must delete items not in Project.

Watertightness Testing is for use with concrete tanks and must be deleted if no tanks.

Non-chloride Waterproofing Admixture is for use with concrete tanks or special waterproofing conditions, and must be deleted if no tanks or special conditions.

- The KIM product will delay setting times so an accelerator may be required if placing in cold weather.
- Xypex C-500 is formulated for mixes which include slag or fly ash. Xypex C-1000 is designed for Portland cement only. Xypec C-2000 has a set retarder for high temp placement.
- Anti-Hydro NCR has a set retarder for hot weather placement. Keep this in mind when reviewing submittals.

All foundation concrete except footings is specified as 4,000 psi. If your job just has frost walls, piers and footings, make them all 3,000 psi. If you have frost walls that also retain earth in some locations, leave all foundation concrete (except footings) as 4,000 psi to avoid confusion.

Coordinate locations of Architectural Exposed Concrete with Architect and indicate on Drawings.

Coordinate surface finishes for exposed concrete with Architect. Schedule areas on Drawings which are to receive special finishes. These could include smooth form finish using HDO forms, smooth-rubbed finish, grout-cleaned finish, form liners, or other finish requested by Architect. Delete these paragraphs regarding smooth-rubbed finish and grout-cleaned finish from Specifications if they are not used. HDO plywood forms shall remain in the specification; if not required, the Contractor still has the option to use HDO.

Coordinate type of form-tie plug required for Project's exposed concrete.

Curing/sealing compound may not be compatible with all coating systems. If Architect will be using a coating, check for compatibility.

Revise aggregate gradations for out-of-state projects.

PVC and galvanized sleeves are noted. Sleeves which will be subjected to load must be galvanized and must be detailed.

If self-consolidating concrete is to be specified, consider adding the following test requirements to the Special Inspections and to the mix design submittal requirements and submittal form:

$ ASTM C 1611 - Test Method for Slump Flow of Self-Consolidating Concrete
$ ASTM C 1621 - Test Method for Passing Ability of Self-Consolidating Concrete

Review the ASTM requirements for familiarity before adding to the specification.

Delete LEED references and requirements for non-LEED projects.

Delete shoring and reshoring references if you do not have structural slabs and beams.

If rebar couplers are required, add the following to the reinforcement products section:

A. Reinforcement Couplers: "Lenton Concrete Products" by Erico; "Bar-Lock Rebar Coupler System" by Dayton Superior;

Dayton Superior's products are for splicing bars only. Lenton has a larger range of products including bar splicing, form-saver products, and bar development couplers. Be sure to specify the right product for your project.

SECTION 03320 – CONCRETE SLAB ON GRADE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

B. Section 03300: Cast-In-Place Concrete.

C. Vapor retarder is specified in Section 02320.

1.2 DESCRIPTION OF WORK

A. This section supplements Section 03300: Cast-In-Place Concrete, with specific emphasis on concrete slabs on grade. The general requirements of Section 03300 pertain to this section unless otherwise specified in this section.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. ACI 302 "Guide for Concrete Floor and Slab Construction."

B. Hold a slab preconstruction meeting at least 14 days prior to initial planned date of slab placement. Discussion shall include subbase preparation, reinforcing and dowel placement, slab joints, concrete mix designs, and procedures for concrete placement, finishing, curing, and protection. Attendees shall include Contractor, Placement Subcontractor, Concrete Supplier, Special Inspector, Testing Agency, Engineer, and Architect.

C. Provide protection from precipitation for vapor retarder and slab subbase prior to slab-on-grade placement. Provide protection for slab on grade from direct exposure to sun, wind, precipitation, and excessive cold or hot temperatures starting during placement and lasting until end of curing period.

1. After curing period, provide protection from precipitation for slab openings (column blockouts, mechanical blockouts, expansion/isolation joints, etc.) to prevent moisture from entering slab subbase.
2. Contractor shall be responsible for cost of repairing slab defects resulting from deficient protection methods.
3. One method of protection is installing roof membrane and roof drains prior to installing vapor retarder, slab subbase, and slab on grade.

1.4 SPECIAL INSPECTIONS

A. Refer to Specification Section 01410 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

A. Contractor shall secure services of company field advisor from manufacturer of concrete surface treatment products, including sealers, hardeners, sealants, and finishes. Field advisor shall be certified in writing by manufacturer to be technically qualified in product installation. Personnel involved solely in sales do not qualify. Field advisor shall be present at beginning of installation of product and as required during duration of project to:

1. Render technical assistance to Contractor regarding installation procedures of product to satisfy warrantee or guarantee requirements.
2. Provide specialized training in use of product to Contractor's personnel.
3. Verify surface preparation procedures and suitable substrates for material application.
4. Verify proper mixing proportions and procedures for product.
5. Verify proper temperature and other environmental controls.
6. Verify proper tools and application procedures.
7. Verify proper curing and protection of installed product.
8. Familiarize Contractor/Owner/Architect/Engineer with entire system, including inspection techniques.
9. Answer questions that arise.

B. Field advisor shall prepare a written report summarizing information listed above. Submit report to Special Inspector, Contractor, Owner, Architect, and Engineer.

C. Contractor shall be responsible for expenses of field advisor and verifying credentials of advisor.

1.6 SUBMITTALS

A. Comply with Section 03300.

B. Submit option for slab placement (see Part 3 of this section) and layout of slab joints.

C. Prior to slab placement, submit to Special Inspector and Engineer for information only a written protection program for vapor retarder, slab subbase, and slab on grade.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C 150. Type II or Type I/II only.

B. Reinforcement: ASTM A 615, Grade 60 for uncoated deformed bars.
1. ASTM A 775 for epoxy-coated, deformed bars.
2. ASTM A 767 for galvanized deformed bars.

C. Supports for Reinforcement: Use wire bar-type supports complying with CRSI specifications. Use chairs with sand plates or horizontal runners where base material will not support chair legs.

1. Concrete bricks may be used to support reinforcing. Stagger brick locations.
   a. Do not use clay bricks.
   b. Do not use bricks to support epoxy-coated or galvanized

reinforcing.

2. Supports for epoxy-coated reinforcing shall be either wire bar-type coated with epoxy, plastic, or vinyl compatible with concrete for minimum distance of 2 inches from point of contact with reinforcing or all plastic-type.
3. Supports for galvanized reinforcing shall be either galvanized wire bar-type or all plastic-type.
4. Finish (epoxy-coated or galvanized) for supports formed from reinforcing bars shall match finish of supported reinforcing.

D. Minimum 16-gauge annealed tie wire, ASTM A 82.

1. Provide coated wire ties for use with epoxy-coated or galvanized bars. Acceptable coatings include epoxy, nylon, or vinyl. Galvanized wire ties may be used with galvanized bars. Do not use plain wire ties.

E. Aggregates: NYSDOT-approved, Section 703-02 (normal weight), one source and as herein specified.

1. Fine Aggregate: Coarse, clean, sharp, uniformly graded natural sand free of loam, clay, lumps or other deleterious substances. Less than 10 percent passing No. 100 sieve and less than 3 percent passing No. 200 sieve.
2. Coarse Aggregate: Uniformly graded to 1 1/2 inches, clean, processed, crushed stone with low absorption and free of flat/elongated particles. NYSDOT-approved, size 3A gravel can be used to meet large diameter requirement. Gradation similar to blended NYSDOT Type CA 2 and size 1A or ASTM C 33 Type 57 and Type 8, blended and modified as follows:

Sieve Size	Percent Passing
1 inch	95 to 98.5
3/4 inch	75 to 94
1/2 inch	25 to 50
3/8 inch	10 to 25
No. 4	0 to 10

F. Water: Clean, fresh, drinkable.

G. Fly Ash: ASTM C 618, Type F, with loss on ignition of less than 4 percent.

H. Ground-Granulated, Blast-Furnace Slag: ASTM C 989, Grade 120.

I. Air Entraining: ASTM C 260.

J. Set-Control Admixtures: Not permitted.

K. Calcium Chloride: Not permitted.

L. High-Range, Water-Reducing Admixture (Superplasticizer): "Eucon 37" by Euclid Chemical Co. or "Sikament" by Sika Chemical Corp. Admixture shall conform to ASTM C 494, Type F or G, and not contain more chloride ions than in municipal drinking water.

M. Water-Reducing Admixture: ASTM C 494, Type A.

N. Mid-Range, Water Reducer/Finish Enhancer: ASTM C 494, Type A/F.

"Daracem 55" or "Daracem 65" by W.R. Grace or accepted equivalent.

O. Dowel Bars:

1. Construction Joints.
   a. 1-inch-square steel bars with 1/4-inch-compressible foam on vertical faces.
   b. 3/8-inch by 4.5-inch-square "Diamond Dowel" plate and sleeve by PNA Construction Technologies or accepted equivalent.
2. Contraction Joints.
   a. 1-inch-diameter steel bars, greased and supported by dowel baskets.

P. Premolded Joint Filler: Provide resilient and nonextruding, premolded, bituminous fiberboard units complying with ASTM D 1751; 1/2-inch-thick, full slab depth.

Q. Construction Joint Form: Square edge form only. Keyed joint not permitted.

R. Joint Sealant for Interior Slabs: "Sikadur 51SL" by Sika; "Spec-Joint CJ" by Conspec Manufacturing Co.; "Masterfill CJ" by Master Builders, Inc.; "Euco 700" or "Euco QUIKjoint 200" by Euclid Chemical Co.; or accepted equivalent.

S. Joint Sealant for Exterior Slabs: "Sikaflex-2c SL" by Sika; "Sonolastic SL2" by Sonneborn Building Products; "Eucolastic 2 SL" by Euclid Chemical Co.; "Urexpan NR-200" by Pecora Corporation; or accepted equivalent.

T. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 ounces a square yard and complying with AASHTO M 182, Class 2.

U. Curing-Sheet Materials: ASTM C 171; waterproof paper, polyethylene film, or polyethylene-coated burlap.

1. For slabs exposed to view, provide one of the following or accepted equivalent:
   a. "HydraCure S16" by PNA Construction Technologies.
   b. "UltraCure NCF/SUN" by McTech Group.

V. Penetrating Exterior Anti-Spalling Sealer: "Euco-Guard VOX" by Euclid Chemical Co. (mixed to 17.5 percent concentration); "Masterseal SL 40" by Master Builders; "Enviroseal 40" by Hydrozo, Inc.; "Aquapel+Plus" by L&M Construction Chemicals; or accepted equivalent.

W. Evaporation Retarder: Monomolecular, film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss. "Aquafilm" by Conspec Manufacturing Co.; "Eucobar" by Euclid Chemical Co.; "Confilm" by Master Builders, Inc.; or accepted equivalent.

X. Crack Repair Material: "Sika Pronto 19" by Sika; "Crack-Fill 4" by Metzger/McGuire; or accepted equivalent.

Y. Hardener: "Lapidolith" by Sonneborn Building Products or accepted equivalent for exposed slabs.

2.2 PROPORTIONING AND MIX DESIGN

A. CONCRETE QUALITY

Location	Required 28-Day Compressive Strength (psi)	Approximate Cement Content (pounds)	Maximum Water/Cement Ratio	Percent Entrained Air
Interior slabs on grade	3,500	530	0.50 (265 pounds maximum total water)	2*
Exterior slabs on grade	4,500	611	0.45	6 **

* Do not add air-entraining admixtures. Air entrainment occurs as result of mixing.
** Plus or minus 1.5 percent.

B. Slump: 5-inch maximum for normal and mid-range, water-reduced mixes.

C. Concrete containing a high-range, water-reducing admixture (superplasticizer) shall have maximum slump of 6 inches unless otherwise accepted by Engineer. Concrete shall arrive at job site at slump of 2 to 3 inches, be verified, then high-range, water-reducing admixture added to increase slump as required for placement and workability.

D. Use 6.0 sacks maximum of cement for each cubic yard for interior slabs and minimum sand content.

E. Quantity of coarse aggregate in pounds must be in range of 1.25 to 1.5 times quantity of fine aggregate in pounds. Provide minimum of 1,800 pounds of coarse aggregate for each cubic yard of concrete.

F. Pozzolans:

1. **Pozzolans may be substituted for cement in normal-weight concrete for interior slabs, including fly ash at a maximum rate of 20 percent by weight or ground-granulated, blast-furnace slag at a maximum rate of 35 percent by weight.**
2. Pozzolans are not permitted for exterior slabs.
3. Submittals shall include actual mix design, including percentage of pozzolans and test results showing mix meets specified 7-day compressive strength where indicated, 28-day compressive strength, and air content.
4. Protect and heat concrete containing pozzolans during cold-weather conditions. Maintain protection and heat until 70 percent of specified design strength is achieved.

G. Pumping concrete is permitted only if mix designs specifically prepared and used previously for pumping are submitted. Mix designs not previously used for anticipated pump line lengths shall be tested by Contractor to verify suitability for project before use at site. Pump line shall have 5-inch-minimum inside diameter and be used with 5-inch pumps.

PART 3 - EXECUTION

3.1 GENERAL

A. Examine conditions under which work shall be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 OPTION FOR SLAB PLACEMENT

A. For placement of slabs that will be exposed in final structure, place construction and contraction joints as shown in drawings or as recommended by ACI 302 if not shown.

B. For placement of slabs that will be subsequently concealed with an architectural finish material, Contractor has two options. Option 1 is to place slabs with few joints or construction joints only. Option 2 is to place slabs with construction and contraction joint spacings as recommended by ACI 302, "Guide for Concrete Floor and Slab Construction." Contractor shall submit option to be used and joint layout to Architect and Engineer for review.

C. If Option 1 is selected, shrinkage cracking will likely occur but potential for curling will be reduced. Contractor shall be responsible for repairing cracks and curled areas. If Option 2 is selected, probability of shrinkage cracking will be less but probability of curling will increase. Contractor shall be responsible for repairing cracks and curled areas.

3.3 PRECONCRETE PLACEMENT

A. Just before concrete placement, slab subbase shall be dry.

B. Whenever possible, air temperature should be rising after concrete placement. Attempt to schedule slab placements according to favorable weather reports.

C. Subgrade shall be frost-free.

3.4 EDGE FORMS AND SCREED STRIPS FOR SLABS

A. Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surfaces. Provide secure edge forms or screed strips to support strike-off templates or compacting vibrating-type screeds. Wet screeding is not permitted.

3.5 REINFORCEMENT PLACEMENT

A. Place slab reinforcing one-third of slab thickness below top surface of slab. Support reinforcement by metal chairs, runners, bolsters, or concrete brick as required.

B. Dedicate workers to placement of reinforcement to continuously monitor and adjust reinforcement location during concrete placement.

C. Touch up damaged epoxy-coated reinforcement in field after placement with epoxy patching material provided by coating manufacturer.

3.6 ISOLATION JOINTS

A. Construct isolation joints in slabs on grade at points of contact with vertical surface and elsewhere as indicated.

3.7 CONSTRUCTION JOINTS

A. Locate and install construction joints not shown in drawings so as not to impair strength and appearance of structure as acceptable to Engineer.

B. Construction joints in exposed slabs shall be doweled joints.

C. Continue half of bar reinforcement through construction joints in concealed slabs.

3.8 CONTRACTION JOINTS

A. Saw cut contraction joints as soon as possible after finishing, generally within 4 to 16 hours. Make sample cut to determine if concrete surface is firm enough so it is not torn or damaged by blade.

B. Use soft-cut contraction joints. Depth of cut shall be one-fifth of slab thickness with minimum of 1 inch.

C. Obtain permission from Engineer if diamond blade cutting is to be used.

D. Contraction joints in exposed slabs shall be doweled joints.

E. Continue half of bar reinforcement through contraction joints in concealed slabs.

3.9 DOWELED JOINTS

A. Install dowel bars parallel to slab surface and perpendicular to joints. Support dowel bars by use of parallel construction supports.

B. Use square cushioned dowels or Diamond Dowel plates and sleeves in construction joints.

C. Use round greased dowels in contraction joints.

3.10 PLACING CONCRETE SLABS

A. Maximum of 2 1/2 gallons for each cubic yard of total mix design water can be added in field. Water must be added prior to discharging and testing concrete. At no time shall total water exceed amount listed in accepted mix design.

B. Use strip pour methods and mechanical vibratory screed whenever possible.

C. Deposit and consolidate concrete in continuous operation within limits of construction joints until placing of panel or section is complete.

D. Consolidate concrete during placing operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

E. Maximum placement width shall not exceed 20 feet for very-flat and super-flat slabs.

F. Bring slab surfaces to correct level with a straightedge and strike off. Uniformly slope to drains. Use darbies to smooth surface, leaving it free of humps or hollows. Do not sprinkle water or portland cement on plastic surface. Do not disturb slab surfaces before beginning finishing operations.

G. Maintain reinforcement in proper position during concrete placement operations. See requirements for reinforcement placement.

H. Slab thicknesses shown in drawings are minimum allowable. Maximum allowable thickness shall be 1 inch greater than specified thickness.

I. For floor areas with drains, Contractor shall be responsible for finishing concrete slabs to proper elevations to ensure surface moisture will drain freely to floor drains and no puddle areas exist. Reference elevations shown in drawings.

J. Cost of corrections to provide positive drainage shall be responsibility of Contractor.

3.11 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerances for floor flatness (F_F) of 15 and floor levelness (F_L) of 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Power Float Finish: Apply power float finish to slab surfaces that will subsequently be trowel finished or covered with waterproofing membrane. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating using float blade or float shoes when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to overall tolerances of F_F 18 and F_L 13, and minimum local tolerances of F_F 13 and F_L 10. Cut down high spots and fill low spots. Uniformly slope surface to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin-film finish-coating system. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation. Surface shall be free of trowel marks, uniform in texture and appearance, and leveled to an overall tolerance of F_F 25 and F_L 20 and minimum local tolerance of F_F 17 and F_L 13 for carpet and ceramic or quarry tile finishes and overall tolerance of F_F 35 and F_L 25 and minimum local tolerance of F_F 25 and F_L 17 for exposed slabs and other finishes. Grind smooth surface defects that would telegraph through applied floor-covering system. Exposed surfaces are to be overtrowelled to "burn" surface to a dense, hard, dark finish.

1. Where test sample area includes multiple floor finishes, more stringent tolerances shall apply to entire test sample area.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified and immediately follow with fine brooming to slightly scarify surface.

E. Nonslip Broom Finish: Apply nonslip, heavy broom finish to exterior concrete slab surfaces. Immediately after trowel finishing, roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

F. Delay finishing as long as possible. Allow bleed water to evaporate before finishing.

G. Finish slabs to specified tolerances given. Patching low spots shall not be permitted. Perform grinding as soon as possible, preferably within 3 days, but not until concrete is sufficiently strong to prevent dislodging coarse aggregate particles.

3.12 COLD-WEATHER CONCRETING

A. Comply with Section **(03300) (03 30 00).**

B. Provide temporary heat with vented heaters only.

C. Use foggers to maintain humidity at 50 percent minimum.

3.13 HOT-WEATHER CONCRETING

A. Comply with Section **(03300) (03 30 00).**

3.14 CURING AND PROTECTION

A. Protect freshly placed slabs from premature drying and excessive cold or hot temperature. Maintain without drying at a relatively constant temperature for time period necessary for cement hydration and proper hardening.

B. Cure exterior slabs completely by moist-curing using burlap absorptive cover, soaker hoses, and ponding for at least 7 days. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers. Avoid rapid drying at end of curing period. Allow absorptive cover to remain an additional 3 days.

C. Cure interior slabs by sheet-curing by covering slabs with curing sheet material for 7 days minimum. Avoiding rapid drying at end of curing period. Place curing cover in widest practicable width with sides and ends lapped at least 3 inches and sealed with waterproof tape or adhesive. Immediately repair holes or tears in cover during curing period.

D. Do not allow foot or other traffic over slabs during 7-day curing period.

E. Cure slabs or pads 14 days minimum before placing equipment.

F. Interior Nonexposed Slabs:

1. Place finish toppings, coatings, tile, and other materials to be bonded to slabs when the following have been satisfied:
   a. Slabs have cured minimum of 90 days.
   b. Acceptable moisture vapor emission and alkalinity test results have been achieved.
   c. Acceptable 72-hour Bond Test results have been achieved. Bond test by floor finish installer.

G. Interior Exposed Slabs:

1. Apply two coats of hardener after slabs have cured 28 days minimum at rate of 100 square feet/gallon in accordance with manufacturer's recommendations.

H. Exterior Slabs:

1. Apply penetrating exterior anti-spalling sealer to exterior concrete slabs, walks, platforms, steps, ramps, and curbs according to manufacturer's directions.

3.15 JOINT SEALANT

A. Install joint sealant in exposed construction, isolation, and contraction joints in accordance with manufacturer's recommendations.

B. Clean joints thoroughly before applying sealant.

C. Apply sealant after slabs have cured 90 days minimum.

3.16 REPAIR OF SURFACES

A. Contractor shall be responsible for cost of repairing slab defects.

B. Test surfaces for smoothness and level tolerances. Test uniform surfaces sloped to drain for trueness of slope.

C. Correct flatness and levelness defects by grinding or removing and replacing slab. Patching low spots not permitted. Repair areas shall be remeasured and accepted by Owner.

D. Repair cracks only when slab is more than 90 days old. Use crack repair material. For cracks over 1/8 inch, fill crack with oven-dried sand prior to application of crack repair material as recommended by manufacturer. Contractor has option to remove and rebuild areas of cracking. Mask cracks to limit crack repair material to crack only.

E. Repair curling only when slab is more than 90 days old.

F. Curling at slab edges exceeding 1/8 inch when measured with a 10-foot straightedge shall be made level by grinding or planing. Locate straightedge with its end at the slab edge, and measure space between straightedge and slab.

G. If curling exceeds 1/4 inch, level slab by grinding or planing as stated above. In addition, core-drill slab 10 inches from joint at 2 foot intervals, alternating on each side of joint, and inject

nonshrink grout to fill void beneath slab.

H. Repair edge spalls occurring from shrinkage cracking or from Contractor's operations with methods acceptable to Engineer.

END OF SECTION 03320

DIVISION 3 - CONCRETE

SECTION 03650 – SELF-LEVELING CEMENTITIOUS UNDERLAYMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. Related Sections include the following:

1. Section 01618 – Removal of Asbestos Contaminated Substrate Material
2. Section 03300 – Cast-in-Place Concrete
2. Section 09300 – Ceramic Tile
3. Section 09650 – Resilient Flooring

1.02 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials, equipment, and appliances necessary or required to furnish and install all work of this section as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Provide a self-leveling cementitious underlayment in accordance with the Contract Documents.

2. This system consists of the use of a primer and a mix of special cements and binders which, when mixed with water, becomes a highly liquid cement compound that seeks its own level and produces a smooth and flat surface. Finished surface shall be true to plane in accordance with ACI 117, Standard Specifications for Tolerances for Concrete Construction & Materials, or as directed by the floor finish manufacturer.

B. For this project, it is the expressed intent that all self-leveling products are to be provided in accordance with the Specifications by the General Contractor at all necessary and appropriate thicknesses at all locations requiring self-leveling product application due to new or existing slabs/subfloors not meeting required finish flooring product tolerances or infill of recessed slabs/subfloors. Refer to the specifications and manufacturers requirements for additional tolerance requirements specific to each type of finish flooring.

1.03 MANUFACTURER AND QUALITY ASSURANCE

A. Self-leveling underlayment concrete shall be "Ardex K-15" as

manufactured by Ardex, Inc., 400 Ardex Park Dr, Aliquippa PA 15001 (Allison Birkmeyer 724-777-2799).

1. Installation of ARDEX K 15 must be by a factory-trained applicator, such as an ARDEX LevelMaster Elite Installer, using mixing equipment and tools approved by the manufacturer. Please contact ARDEX at (888) 512-7339 for recommended Installers.

2. Underlayment shall be able to be installed from 1/8" over the highest point in the space and up to 1 1/2" in one pour and up to 5" with the addition of aggregate. It may also be feathered to match existing elevations.

3. Underlayment must be product is cement-based having a primary hydraulic cement inorganic binder, to include Portland cement per ASTM C150: Standard Specification for Portland Cement and other specialty hydraulic cements. Gypsum based materials are not allowed.

4. Underlayment shall be walkable after 2 hours and allow floor covering to be installed after 16 hours at 70°F.

5. Underlayment compressive strength shall be 4100 psi after 28 days per ASTM C109/mod (air cure only)

6. After proper substrate preparation, underlayment shall be suitable for use over the following substrates.

   a. New construction: Un-level concrete, rough concrete, rained-on concrete, frozen concrete, unfinished concrete, rough-screeded concrete, wooden or metal subfloors.
   b. Rehabilitation projects: Existing concrete, wood, metal, terrazzo, quarry tile, ceramic tile, and over cutback adhesive residue.

1.04 SUBMISSIONS

A. General: Comply with provisions of Section 01300.

B. Product Data: Manufacturer of the underlayment shall provide individual product specification sheets and technical data to include installation instructions and limitations of each product used.

   1. Complete materials list of all items proposed to be furnished and installed under this Section.

   2. Manufacturer's specifications and other data required demonstrating compliance with specified requirements.

   4. Manufacturer's certification that the product specified is suitable for the intended use when installed according to the parameters described in the manufacturer's printed literature and installation instructions.

5. Installer Qualifications: Manufacturer's written approval that installer is trained and qualified to perform work of this type.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original, unopened packages and protect from freezing, direct sun exposure and exposure to moisture. Recommended storage temperature is below 80°F.

1.06 SITE CONDITIONS

A. Ardex underlayments are cementitious materials. Observe the basic rules of concrete work. Do not install below 50°F surface temperature. Install quickly if floor is warm and follow hot weather precautions available from the manufacturer's Technical Service Department. Never mix with cement or additives other than manufacturer-approved products.

PART 2 – PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Materials:

1. The Portland cement-based self-leveling, cementitious underlayment or patching material shall be:

a. Ardex K-15 self-leveling underlayment concrete (for all standard self-leveling).

b. Technical Data: All data is based on a mixing ratio of 3.5 p.b.v. of powder to 1 p.b.v. of water at 70°F.

i. Flowing Time: Approximately 10 minutes
ii. Initial Set, ASTM C191: Approximately 30 minutes
iii. Final Set, ASTM C191: Approximately 90 minutes
iv. Compressive Strength, ASTM C-109/mod:4100 psi(28 days)
v. Flammability, ASTM E84-81a:

Flame Spread	-0-
Fuel Contribution	-0-
Smoke Development	-0-

vi. Coverage: Approx. 60 sq.ft. at 1/8", 30 sq.ft. at 1/4".

2. Primer for standard absorbent concrete shall be Ardex P-51 Primer.

3. Primer for non-porous subfloors such as burnished concrete, terrazzo, quarry and ceramic tile shall be ARDEX P 82 Ultra

Prime.

4. Primer for non-porous subfloors, cut-back and non-water soluble adhesive residues, and metal and wooden subfloors shall be Ardex P-82 Ultra Prime.

5. The additive to be mixed with Ardex K-15 when used over cut-back adhesive, metal, or wooden subfloors shall be Ardex E-25 Resilient Emulsion.

6. Aggregate shall be well-graded, washed pea gravel (1/8" to 1/4" or larger) for use when underlayment is installed over 1 1/2" thick. (Max. installation is 5")

7. Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

8. Portland cement-based trowel-grade underlayment (for patch & skim coating) shall be:

   a) Ardex SD-P Instant Patch Self-Drying, Fast-Setting Concrete Underlayment Patch (for repairing substrates and ramping).

   b) Ardex SD-F Feather Finish Self-Drying, Cement-Based Finishing

B. Moisture Vapor Suppression (For use where the level of moisture emissions from the concrete slab exceed the maximum permitted by the manufacturer of the finished flooring):

   1. Moisture Control System shall be Ardex MC Rapid one-coat moisture control system for use over new or existing concrete. Use of a moisture control system shall be field determined based upon relative humidity measurements within the concrete in accordance with ASTM F2170 or surface of the concrete in accordance with ASTM F2420. Labor and material costs for the installation of the moisture control system are excluded from the contractors Base Bid and shall be applied via agreed upon Change Order or Allowance Authorization in accordance with the General Conditions of Contract.

2.02 MIX DESIGNS

A. Ardex K-15 Self-Leveling Underlayment Concrete (standard underlayment):

1. Standard mixing ratio: Ardex K-15 shall be mixed in 2-bag batches at one time. Mix each bag of Ardex K-15 (55 lb.) with 7 quarts of water. Product shall be mixed in T-10 mixing drum using a T-1 mixing paddle and a 1/2" heavy-duty drill (min. 650 rpm). Mix thoroughly for approximately 2-3 minutes to obtain a lump-free mixture. Follow written instructions per the Ardex K-15 bag label.

2. Resilient mix for applications over cutback and non-water soluble adhesive residues, wood, and metal: Use 6 qt. of water and 2 qt. of Ardex E-25 Resilient Emulsion for each bag of Ardex K-15.

3. Aggregate mix: For areas to be installed over 1 1/2" thick and up to 5”, aggregate may be added to reduce material costs. Mix Ardex K-15 with water first, then add from 1/3 up to 1 part by volume of aggregate (1/8" to 1/4" or larger). Do not use sand.
4. For pump installations, Ardex K-15 shall be mixed using the Ardex Levelcraft Automatic Mixing Pump. Start the pump at 210 gallons of water per hour, and then adjust to the minimum water reading that still allows self-leveling properties. DO NOT OVERWATER. Check the consistency of the product on the floor to ensure a uniform distribution of the sand aggregate at both the top surface and bottom of the pour. If settling is occurring, reduce the water amount and recheck. If settling is occurring, reduce the water amount and recheck. Conditions during the installation, such as variations in water, powder, substrate, and ambient temperature, require that the water setting be monitored and adjusted carefully to avoid overwatering.

B. Ardex SD-P Instant Patch Self-Drying, Fast-Setting Concrete Underlayment Patch (for repairing substrates and ramping):

1. Mix 1 bag of Ardex SD-P (40 lbs.) with 4 quarts of water. Product can be mixed in a clean 5-gallon pail using a mixing paddle and a ½” heavy-duty drill (min. 650 rpm). Mix thoroughly for approximately 2-3 minutes to obtain a lump-free mixture. Follow written installation instructions per Ardex SD-P bag label.

C. Ardex SD-F Feather Finish Self-Drying, Cement-Based Finishing Underlayment (for flash patching & skim coating):

1. The recommended mixing ratio is 2 parts powder to 1 part water by volume. Mix the Ardex SD-F powder with water to the desired trowelable consistency using a margin trowel or an approved paddle and drill.

PART 3 - EXECUTION

3.01 GENERAL

A. In addition to the general procedures described herein, refer to manufacturer's current published product literature for complete installation details for the underlayment system being installed.

3.02 SUBSTRATE PREPARATION

A. All subfloors, regardless of material, must be solid, thoroughly cleaned, and properly primed. Gypsum, latex patches, asphalt, coal

tar and lightweight insulating concrete are not suitable substrates to receive cementitious underlayment.

1. All concrete subfloors must be of adequate strength, clean and free of all oil, grease, dirt, curing compounds, and any substance which might act as a bond breaker before priming. Mechanically clean if necessary using shot blasting or other methods. **Acid etching and the use of sweeping compounds and solvents are not acceptable.**

2. Wooden subfloors must be clean and free of all foreign matter. Sand to bare wood, then vacuum to remove all dust. Re-nail any loose boards exhibiting movement.

    a. Note: Ardex SDF Feather Finish shall be used to fill in the seams in strip wood so the Ardex K15 Self Leveling Underlayment does not flow in to the seams.

3. Metal decking subfloors must be clean and free of all rust and foreign matter. Where required, a corrosive resistant coating should then be applied, and be allowed to dry before priming.

4. Cut-back and other non-water soluble adhesive residues must be wet-scraped to a thin, solid, well bonded layer.

5. Non-porous surfaces such as ceramic tile, quarry tile, terrazzo etc., should be clean and free of wax and sealers. If necessary, have the surface professionally cleaned.

6. All cracks in the subfloor shall be repaired to minimize telegraphing through the underlayment.

7. Prior to installation, substrates shall be inspected and corrected for moisture or any other conditions that could affect the performance of the underlayment or the finished floor covering. If moisture vapor emissions exceed the flooring manufacturer's recommendations, installation of an ARDEX MC™ Moisture Control System (ARDEX MC RAPID, MC PLUS or MC Ultra) will be required. For complete installation instructions, please refer to the appropriate ARDEX MC Moisture Control Technical Brochure.

B. Ardex MC Moisture Control System shall be installed in accordance with manufacturers written technical instructions.

3.03 JOINT PREPARATION

A. Moving Joints – honor all expansion and isolation joints up through the underlayment or Ardex MC Moisture Control System.

B. Saw Cuts and Control Joints – fill all non-moving joints with Ardex SD-F or Ardex SD-P.

C. When using an Ardex MC Moisture Control System, installation shall be in accordance with manufacturers written technical instructions for the treatment of saw cuts, control joints and dormant cracks.

3.04 PRIMING

A. Primer for standard absorbent concrete subfloors:

1. Prime with Ardex P-51 Primer. Mix Ardex P-51 1:1 with water and apply evenly with a soft pushbroom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry to a clear, thin film (minimum 3 hours, maximum 24 hours). Underlayment shall not be applied until primer is dry.

2. Primer coverage is approximately 400 to 600 square feet per gallon.

B. Primer for extremely absorbent concrete subfloors:

1. Make an initial application of Ardex P-51 mixed with 3 parts water using a soft pushbroom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry thoroughly before proceeding with a standard application of primer as described in Section 3.04 A. Item 1.

C. Primer for non-porous subfloors, wooden or metal subfloors, or cut-back adhesive residue or other non-water soluble adhesive residues over concrete:

1. Prime with Ardex P-82. Mix Part A (red) with Part B (white) and apply with a short-nap or sponge paint roller, leaving a thin coat of primer no heavier than a thin coat of paint. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry to a clear, slightly tack film (minimum 3 hours, maximum 24 hours). Underlayment shall not be installed until primer is dry.

2. Primer coverage is approximately 200 to 400 feet per gallon.

a. Minimum drying time for Ardex P-82 Ultra-Prime over cut-back adhesive residue is 18 hours.

3. Note: When using an Ardex MC Moisture Control System, the Ardex MC will act as the prime layer for Ardex K15.

3.05 APPLICATION OF ARDEX K-15:

A. Installation:

1. Pour or pump the liquid Ardex K 15 and spread in place with the Ardex T-4 Spreader. Use the ARDEX T-5 Smoother for featheredge and touch-up. Wear baseball shoes with non-metallic cleats to avoid leaving marks in the liquid Ardex K 15. Underlayment can be walked on in 2-3 hours at 70° F.

2. Wood subfloors require the use of the mesh-reinforced ARDEX K-15 + E-25 Underlayment System. After priming, install 3.4 galvanized diamond metal lath by stapling to the wooden subfloor approximately every 6 inches on center.

2. Steel subfloors require that the substrate first be primed with an anti-corrosive paint. After thorough drying of the paint, prime this surface with ARDEX P-82 Ultra Prime.

3.06 APPLICATION OF ARDEX SD-P:

A. Installation:

1. Non-porous subfloors require that the substrate first be primed with Ardex P-82 Ultra Prime and allowed to dry thoroughly prior to installing the Ardex SD-P.

a. Underlayment shall be installed using a wood or magnesium float. When underlayment begins to harden, finish with a steel trowel.

B. Drying Time:

1. When the underlayment can be worked on without adversely affecting the surface, proceed with the installation of floor covering. The surface of the Ardex SD-P does not have to be dry to receive ceramic tile, carpet, or vinyl floor coverings. It only needs to be hard enough to permit application of the adhesive with a notched trowel without marking the surface. Typical times range from 45 minutes to 1 hour depending upon ambient conditions.

2. All other floor coverings require a minimum of 16 hours of drying time at 70˚F and 50% relative humidity.

3.07 APPLICATION OF ARDEX SD-F:

A. Installation:

1. No priming is required on all standard substrates as listed in the technical brochure. Non-standard substrates such as epoxy floor covering shall first be primed with Ardex P-82 Ultra Prime and allowed to dry thoroughly prior to installing the Ardex SD-F.

2. Underlayment shall be installed using a steel trowel.

B. Drying Time:

1. When the underlayment can be worked on without adversely affecting the surface, proceed with the installation of floor covering. The surface of the Ardex SD-F does not have to be dry to receive ceramic tile, carpet, or vinyl floor coverings. It only needs to be hard enough to permit application of the

adhesive with a notched trowel without marking the surface. Typical times range from 15 minutes to 1 hour depending upon ambient conditions.

2. All other floor coverings require a minimum of 16 hours of drying time at 70°F and 50% relative humidity.

3.08 PREPARATION FOR FLOORING INSTALLATION

A. Underlayment can accept finish floor covering materials, to include Carpet, after 16 hours at 70°F and 50% relative humidity.

B. The surface of the underlayment shall be checked to ensure that it meets the flooring manufacturer's specifications for flatness before beginning the flooring installation. Areas out of tolerance shall be repaired using the appropriate Ardex underlayment (described herein based upon tolerance discrepancy) as required at the contractors expense.

C. Due to the wide range of adhesives that are used to install floor coverings, some adhesives may dry more quickly over underlayments than over other substrates. If this condition occurs, priming the surface of the underlayment with Ardex P-51 Primer diluted 1:3 with water will even out the drying of the adhesive. Allow the primer to dry 1-3 hours before proceeding with the adhesive installation.

3.09 FIELD QUALITY CONTROL

A. Field sampling of the Ardex underlayment is to be done by taking an entire unopened bag of the product being installed to an independent testing facility to perform compressive strength testing in accordance with ASTM C 109/modified: air-cure only. There are no in situ test procedures for the evaluation of compressive strength.

3.10 PROTECTION

A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK / SUMMARY:

A. Extent of each type of masonry work is indicated on drawings and schedule.

B. This Section includes unit masonry assemblies consisting of the following:

1. Brick masonry.
2. Mortar and grout.
3. Reinforcing steel.
4. Masonry joint reinforcement.
5. Ties and anchors.
6. Miscellaneous masonry accessories.

C. Related Sections include the following:

1. 03300 – Cast-In-Place Concrete
2. 05120 – Structural Steel
3. 06100 – Rough Carpentry
4. 07200 – Building Insulation
5. 07231 – Air / Vapor Barrier System
6. 07600 – Flashing and Sheet Metal
7. 07900 – Caulking
8. 07910 – Joint Sealers
9. 08110 - Steel Doors and Frames
10. 08211 – Flush Wood Doors
11. 08520 – Aluminum Windows

1.03 DEFINITIONS:

A. Reinforced Masonry: Masonry containing horizontal joint reinforcing and reinforcing steel in grouted cells.

B. Multi-Wythe Masonry: Masonry wall construction containing adjacent wythes of masonry with the same unit type without a cavity.

C. Composite Masonry: Masonry wall construction containing adjacent wythes of masonry with different unit type without a cavity.

D. Structural Masonry: Masonry wall construction constructed to be the main supporting structure of other building components such as a floor or roof.

1.04 PERFORMANCE REQUIREMENTS:

A. Provide structural unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.

B. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.05 SUBMITTALS:

A. All Submittals shall be made in accordance with General Conditions Section.

B. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

C. Shop Drawings: Submit shop drawings for the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement". Show elevations of reinforced walls.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

4. Self-Adhering Sheet Flashing & Waterproofing Membranes: Detail all proposed application conditions, Submit manufacturer's data for membrane, primers, sealants, adhesives and associated auxiliary materials. Prior to commencing the Work, submit manufacturer's complete set of standard details for waterproofing systems.

D. Samples: Submit samples of the following materials:

1. Unit masonry samples in small scale form showing full extent of colors and textures available for each type of exposed masonry unit required.

2. Face brick, in the form of straps of five or more bricks. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.

3. Colored masonry mortar samples showing full extent of colors available.

4. Include size variation data verifying that actual range of sizes for

brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.

5. Accessories embedded in masonry.

E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and submission of materials in accordance with this section have been provided for review by the Architect and approved in writing.

F. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. Masonry units. Include material test reports substantiating compliance with requirements.

2. Cementitious materials. Include brand, type, and name of manufacturer.

3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

4. Grout mixes. Include description of type and proportions of ingredients.

5. Reinforcing bars.

6. Joint reinforcement.

7. Anchors, ties, and metal accessories.

G. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports, per ASTM C 780, for mortar mixes required to comply with properties specification.

2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

H. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in

ACI 530.1/ASCE 6/TMS 602.

I. Cold-Weather Procedures: Submit a detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.06 QUALITY ASSURANCE:

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Field Constructed Mock-ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made under sample submittals to demonstrate aesthetic effects and set quality standards for materials and execution, as well as for color and textural characteristics of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials, and construction; build mock-ups to comply with the following requirements:

1. Locate mock-ups on site in locations indicated or, if not indicated, as directed by the Architect.

2. Build mock-ups for each type of exposed masonry in sizes of approximately 3' long by 2' high by full thickness, including face and back-up wythes as well as all accessories including but not limited to insulation and horizontal and vertical reinforcement.

3. Include a sealant-filled joint at least 16 inches long in exterior wall mockups.

4. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.

5. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.

6. Approval of mockups is for construction of full assembly, color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

7. Protect mock-ups from the elements with weather resistant membrane.

8. Retain mock-ups during construction as standard for judging completed masonry work. When directed, demolish mock-ups and remove from site.

9. Pre-installation Conference to be after construction of mock-up but before proceeding with masonry work. Conduct pre-installation conference at Project Site.

1.07 FIELD QUALITY CONTROL:

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:

1. Payment for these services will be made by Owner.

2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

3. Refer to Specification Sections 01450 & 01451 for additional Special Inspection requirements.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Clay Masonry Unit Test: For each type of unit provided, per ASTM C 67.

E. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for mortar air content and compressive strength.

F. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.

1.08 DELIVERY, STORAGE, AND HANDLING:

A. Deliver masonry materials and accessories to project in undamaged condition.

B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, or other causes.

C. Store masonry units and cementitious material off the ground, on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If masonry units become wet, do not install until they are dry. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

F. Cold-applied elastomeric membranes should be stored in closed containers outdoors. Store membrane at temperature of 40°F and above to facilitate handling. Membrane contains petroleum solvents and are flammable; do not use near open flame. Store roll materials horizontally; store adhesives and primers at temperatures of 40°F and above to facilitate handling. Keep all solvents away from open flame or excessive heat.

1.09 PROJECT CONDITIONS:

A. Protection of Work: During construction, cover top of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

3. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

4. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

B. Stain Prevention: Prevent grout, mortar, or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings and wash down detergent.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold Weather Requirements:

1. Do not lay masonry units which are wet or frozen. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged

by frost or by freezing conditions.

2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

3. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

D. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40°F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

F. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at the time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C).

1. 40°F (4°C) to 32°F (0°C):

   a. Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C).

   b. Grout: Follow normal masonry procedures.

2. Do not heat water for mortar and grout to above 160°F (71°C).

G. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40°F (4°C) to 32°F (0°C):

   a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. 32°F (0°C) to 25°F (-4°C):

   a. Completely cover masonry with weather-resistive membrane for at least 24 hours.

3. 25°F (-4°C) to 20°F (-7°C):

   a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

4. 20°F (-7°C) and below:

   a. Except as otherwise indicated, maintain masonry temperature above

32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

H. Coordination: Ensure installation continuity of the waterproofing membranes scheduled for installation throughout the scope of this section. Work shall be so scheduled as to provide a watertight seal at the end of each working day on the areas worked upon during the day.

PART 2 - PRODUCTS

2.01 GENERAL

A. All specific products indicated within this section are to establish a level of quality. Equivalency is permitted in accordance with General Municipal Law.

2.02 BRICK MADE FROM CLAY OR SHALE:

A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.

1. Size: Provide bricks manufactured to the following actual dimensions:

   a. Standard Modular: 2-1/4" x 3-5/8" x 7-5/8".
   b. Or as indicated on the drawings.

2. Provide special molded shapes where indicated and for application requiring brick of form, size, and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

3. For sills, caps, and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.

B. Facing Brick: ASTM C 216, and as follows:

1. Grade SW.
2. Type FBS (normal size and color variations).
3. Compressive Strength: 4,500 psi, minimum, per ASTM C 67.
4. Application: Use where brick is exposed, unless otherwise indicated.
5. Texture and Color: As indicated on drawings or as selected by Architect.

2.03 MORTAR AND GROUT MATERIALS:

A. General: Do not use admixtures, including coloring pigments, air entraining agents, accelerators, retarders, water repellant agents, anti-freeze compounds, or other admixtures unless otherwise

indicated and approved by Architect.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement and lime.
3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
5. All new face brick mortars shall match existing face brick mortars where restoration work is required, samples of which shall be prepared and thoroughly tested for color, density, and uniformity before submitting samples for the approval of the Architect.

B. Option 1 – Pre-blended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.

C. Option 2 – Manual Blend: Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

D. Mortar for Unit Masonry: Comply with ASTM C 270, "Standard Specification for Mortar for Unit", Masonry Proportion Specification, for types of mortar required unless otherwise indicated.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced CMU masonry, use Type S.
3. For brick masonry walls above grade, use Type N.
4. For exterior, above-grade, load-bearing and non-load-bearing CMU walls and parapet walls; for interior load-bearing CMU walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
5. Analysis of the existing mortar to remain is required within the contract if the type required is not clear.

E. Portland Cement: ASTM C 150, "Standard Specification for Portland Cement", Type I, except Type III, may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

1. For colored pigmented mortars, use premixed colored masonry cements of formulation required to produce color indicated, or, if not indicated, as selected from manufacturer's standard formulations by Architect.

2. Available Products: Subject to compliance with requirements, masonry cements which may be incorporated in the work include, but are not limited to, the following:

   a. ***"Atlas Custom Color Masonry Cement"***; Lehigh Portland Cement

Company.

b. ***"Glen-Gery Color Martar Blend"***; Glen –Gery Corporation.

c. ***"Flamingo Color Masonry Cement"***; The Riverton Corporation.

F. For Manually Blended Colored Mortar Use Colored Mortar Pigments (for use with veneer brick and veneer block): Use pigments complying with ASTM C979, "Standard Specification for Pigments for Integrally Colored Concrete". Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment to cement ratio of 1 to 10 by weight. Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

1. Available Products: Subject to compliance with requirements, colored mortar pigments which may be incorporated in the work include, but are not limited to, the following:

   a. ***"SGS Mortar Colors"***, Solomon Grind-Chem Services, Inc.

   b. ***"True Tone Mortar Colors"***; Davis Colors, a subsidiary of Rockwood Industries, Inc.

   c. ***"Bayferrox Iron Oxide Pigments"***; Bayer Corporation, Industrial Chemical Division.

G. Water: Clean and potable.

H. Hydrated Lime: ASTM C 207, "Standard Specification for Hydrated Lime for Masonry Purposes", Type S.

I. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

J. Aggregate for Mortar: ASTM C 144, "Standard Specification for Aggregates for Masonry Mortar".

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than ¼ inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

K. Aggregate for Grout: ASTM C 404, "Standard Specification for Aggregates for Masonry Grout".

L. Grout for Unit Masonry: Comply with ASTM C 476, "Standard Specification for Grout for Masonry", for grout for use in construction of reinforced and non-reinforced unit masonry. (Refer to Table 1 Conventional Grout Proportions by Volume. Use grout of consistency indicated or, if not otherwise indicated, of

consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

TABLE 1 Conventional Grout Proportions by Volume

Type	Parts by Volume of Portland Cement or Blended Cement	Parts by Volume of Hydrated Lime or Lime Putty	Aggregate, Measured in a Damp, Loose Condition	
			Fine	Coarse
Fine grout	1	0–1/10	2-1/4 –3 times the sum of the volumes of the cementitious materials	. . .
Coarse grout	1	0–1/10	2-1/4 –3 times the sum of the volumes of the cementitious materials	1–2 times the sum of the volumes of the cementitious materials

1. Use fine grout in grout spaces less than 2" in horizontal direction unless otherwise indicated.
2. Use coarse grout in grout spaces 2" or more in least horizontal dimension unless otherwise indicated.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
4. The compressive strength of the grout shall match the compressive strength of the masonry f'm, but not less than 2,000 psi. The compressive strength of grout so specified should be determined according to ASTM C1019 (UBC 21-18).

M. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Available Products:

   a. Addiment Incorporated: ***Mortar Kick***.
   b. Euclid Chemical Compnay; ***Accelguard 80***.
   c. Grace Construction Products, a unit of W.R. Grace & Co., ***Morset***.
   d. Sonneborn, division of ChemRex; ***Trimix-NCA***.

2.04 JOINT REINFORCEMENT, TIES, AND ANCHORING DEVICES:

A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie, and anchor for size and other characteristics.

1. Zinc-Coated (mill galvanized) Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 641 for zinc coating of class indicated below:

   a. Class 1: 0.40 oz. per square foot of wire surface.

   b. Application: Use for masonry not exposed to exterior or earth.

2. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 153 for zinc coating applied after prefabrication into units.

   a. Class B-2: 1.5 oz. per square foot of wire surface.

   b. Application: Use for all masonry back-up exposed to exterior.

3. Uncoated Steel Reinforcing Bars: Of size and locations as indicated on drawings, ASTM A615, Grade 60, deformed.

4. Stainless Steel Reinforcing Bars: AISI Type 304, ASTM A580, for historical masonry reconstruction projects.

B. Joint Reinforcement: Reinforcement to conform to Standard Specification ASTM A951 & ACI/ASCE 530 (Building Code Requirements for Masonry Structures). Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet with prefabricated corner and tee units, and complying with requirements indicated below:

1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.

2. Wire (Carbon Steel): Pre-fabricated construction from cold-drawn steel wire conforming to ASTM A 82:

   Tensile Strength: 80,000 psi.

   Yield Point: 70,000 psi, minimum.

3. Wire Diameter for Cross & Side Rods: Provide standard weight 9 gauge (.148”), typical.

C. Single-Wythe Masonry: Provide type as follows with single pair of side rods:

   a. Provide Hohmann & Barnard, Inc. ***#220 Ladder Mesh Reinforcement*** - Ladder design with perpendicular cross rods spaced not more than 16" o.c.

   b. Finish: Provide mill galvanized, per ASTM A 641.

2.05 TIES AND ANCHORS

A. Materials: Provide ties, reinforcing and anchors, specified in subsequent articles, made from materials that comply with this article, unless otherwise indicated.

1. Carbon Steel Wire: ASTM A 82.

2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
3. Products meeting specified products quantities by Hohmann & Barnard, Inc. or Heckmann Building Products Inc.
4. Anchors and ties shall be 16 inches on center each way.
5. Horizontal reinforcing shall be 16 inches on center.

B. Corrugated Wall Ties: Provide Hohmann & Barnard, Inc., ***CWT – Corrugated Wall Tie,*** 7" long x 16-gauge, or length as required; hot dip galvanized to ASTM A153 B2 finish.

2.06 MISCELLANEOUS ANCHORS

A. Wedge Anchors: Anchors shall meet the physical requirements of Federal Specification A-A-1923A, Type 4. Anchors shall be non-bottom bearing type with a single piece steel expansion clip providing 360-degree contact with the base material and shall not require oversized holes for installation. Carbon steel anchors shall have an electroplated zinc finish or shall be mechanically galvanized in accordance with ASTM B695, Class 55, Type 1, as appropriate. Stainless steel anchors shall be type 303, 304 or 316. Anchors shall have an evaluation report issued by ICC-ES and have been tested in accordance with ICC-ES AC01 for all mandatory tests and including the following:

1. Seismic tension & shear
2. Combination of tension and shear loads
3. Critical and minimum edge distance

Unless otherwise noted, wedge anchors shall be ***"Wedge-All" Wedge Anchors*** by Simpson Strong-Tie (ICC-ES ESR-1396).

B. Sleeve Anchors: Anchors shall meet the physical requirements of Federal Specification A-A-1922A. Anchors shall be non-bottom bearing type with a single piece steel expansion sleeve providing 360-degree contact with the base material and shall not require oversized holes for installation. Carbon steel anchors shall have an electroplated zinc finish. Stainless steel anchors shall be type 304. Anchors shall have been tested in accordance with ICC-ES AC01 for the following:

C.

1. Static Loads
2. Critical and minimum edge distance and spacing

Unless otherwise noted, sleeve anchors shall be ***"Sleeve-All" Sleeve Anchors*** by Simpson Strong-Tie.

2.07 TRANSITION MEMBRANES: (where so noted on the drawings)

A. Primary sheet air/vapor barrier membrane shall be ***Blueskin® SA***, an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film; as manufactured by Henry Company, 909 North Sepulveda Blvd. Suite 650, El Segundo, CA, 90245; tel. (800) 598-7663; email: techservices@henry.com.

B. Primer: Primer for self-adhering membranes at temperatures above 25°F shall be Aquatac™ Primer manufactured by Henry, a polymer emulsion based adhesive, quick setting, having the following physical properties:

1. Color: Aqua.
2. Weight: 8.7 lbs/gal.
3. Solids by weight: 53%.
4. Water based, no solvent odors.
5. Drying time (initial set): 30 minutes at 50% RH and 70°F.

2.08 MISCELLANEOUS MASONRY ACCESSORIES:

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Preformed Control Joint Strips: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Control Joint Block Shear Connector: Provide sash block either side of control joint and insert Hohmann & Barnard, Inc. ***RS Series - Rubber Control Joint*** in joint full height.

E. Control Joint Foam (Mortar Excluding) Filler: Provide Hohmann & Barnard, Inc., ***NS - Closed Cell Neoprene Sponge*** expansion joint in veneer control joints held back for bond breaker and sealant. Apply sealant at cavity face of block prior to applying vapor barrier to make building airtight.

1. Compressible Control Joint Foam Filler: Provide Hohmann & Barnard, Inc., ***NS - Closed Cell Neoprene Sponge*** with adhesive backing under shelf angles to allow for vertical veneer movement. Hold back for sealant and bond breaker.

2.09 MASONRY CLEANERS:

A. Acidic Cleaner: Manufacturer's standard strength general purpose cleaner designed for new masonry surfaces of type indicated; composed of blended organic and inorganic acids combined with special wetting systems and inhibitors; expressly approved for intended use by manufacturer of masonry units being cleaned.

1. Available Products: Subject to compliance with requirements, a product which may be used to clean unit masonry surfaces includes, but is not limited to, the following:

a. "Sure Klean" No. 600 Detergent; ProSoCo, Inc.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Contractor shall examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Prepare written report, endorsed by Installer, listing any conditions requiring correction prior to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Commencement of installation indicates acceptance of conditions provided.

3.02 INSTALLATION, GENERAL:

A. Do not wet concrete masonry units.

B. Cleaning Reinforcing: Before placing, remove loose rust, ice, and other coatings from reinforcing.

C. Thickness: Build cavity and composite walls, and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

1. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.

2. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

3. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.

D. Matching Existing Masonry Work: Match coursing, bonding, color, and texture of new masonry work with existing work unless otherwise indicated or if there is a unit size different or joint thickness variation. Tooth-in new masonry when tying into existing unless otherwise indicated on the drawings.

D. Tuck Pointing: Mortar shall be pre-hydrated. The specified ingredients shall be mixed with only enough water to produce a damp

mass of such consistency that it will retain its form when pressed into a ball by the hands but will not flow under the trowel; then allowed to stand for not less than 1 hour nor more than 2 hours and remixed at once with the addition of enough water to produce satisfactory workability for immediate use. Tuck pointing is intended for use in repair work.

F. Select and arrange units for exposed brick unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed unless otherwise specifically indicated on documents.

3.03 CONSTRUCTION TOLERANCES:

A. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

B. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed 1/4" in 10", or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, or 1/2" in 40' or more. For vertical alignment of head joints, do not exceed plus or minus 1/4" in 10', 1/2" maximum.

C. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls, do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

E. Variation In Mortar Joint Thickness:

1. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

F. Variation In Face Dimensions: For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

G. Variation In Alignment: For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.04 LAYING MASONRY WALLS:

A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half size units at corners, jambs, and, wherever possible, at other locations.

B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

C. Pattern Bond: Lay exposed masonry in the bond pattern shown, or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back ½-unit length in each course; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar unless otherwise indicated.
2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
3. Fill cores in hollow concrete masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

F. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes.

1. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
2. If construction sequence does not allow simultaneous construction of intersecting or abutting walls, provide mesh wall ties @ 16” o.c. vertical install in initial wall and leave hanging out for incorporation into secondary wall.

3.05 MORTAR BEDDING AND JOINTING:

A. Lay solid masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and place units. Do not slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

C. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.

D. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.

E. Interior Exposure Joints: Provide concave joints horizontal and vertical.

F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.06 HORIZONTAL JOINT REINFORCEMENT:

A. General: Provide continuous horizontal joint reinforcements as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".

B. Cut or interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

D. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections.

E. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

1. Space continuous horizontal reinforcement as follows:
   a. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcement acts as structural bond or tie between wythes, space reinforcement as required by code but not more than 16" o.c. vertically.
   b. For foundation and parapet walls, space reinforcement at 8" o.c. vertically unless otherwise indicated.
2. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.
   a. In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

3.07 CONTROL AND EXPANSION JOINTS:

A. General: Provide vertical and horizontal expansion, control, and

isolation joints in masonry where shown. Build-in related items as the masonry work progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

1. Build-in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting non-metallic compressible joint filler of width required to permit installation of sealant and backer rod.

   a. Locate horizontal pressure relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

4. Build in vertical pressure relieving joints. Expansion joints shall be located in sizes and locations as shown on drawings.

5. Vertical control joints: unless otherwise noted, control joints shall be located as shown on drawings and/or in accordance with the ACI guidelines and specified herein. Location of all control joints shall be reviewed by Architect prior to proceeding with work.

   a. Vertical interior and exterior masonry control joints shall be ½" wide and filled with appropriate caulk.

   b. Control joint spacing for exterior and interior walls:

Wall Height (FT)	Horizontal Joint reinforcing 16" O.C.
Up to 8 feet	25 ft O.C.
8ft to 12 ft	30 ft. O.C.
Over 12 ft.	35 ft. O.C.

   c. Control joints for interior and exterior masonry shall be located at the following points of weakness or high stress concentrations:

      1. At all abrupt changes in wall height.

      2. At all changes in wall thickness, such as those at pipe or duct chases and those adjacent to columns or pilasters.

      3. Above joints in foundations and floors.

      4. Below joints in roof and floors that bear on the wall.

      5. At a distance of not over one-half the allowable joint spacing from bonded intersections or corners.

      6. At one or both sides of all door and window opening unless other crack control measures as used, such as joint reinforcement or bond beams.

B. Control joints in 2 hour fire rated CMU walls shall be as follows: Joint size maximum ½" with nominal ¾" diameter polyethylene backer rod compressed and installed into joint with minimum of ¼" thick fill materials applied within the joint flush with both surfaces of

the wall as manufactured by "3M Company" - model # FD-150+. Note: All installations shall be in accordance with UL guidelines for joint systems.

3.08 ANCHORING MASONRY TO STRUCTURAL MEMBERS:

A. Anchor masonry to structural members as detailed and indicated within the Construction Documents or where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

4. Coordinate anchors with flashing and air/vapor barrier requirements. Seal any penetrations necessary in flashing and air/vapor barriers.

B. Firewalls: Provide melt-away anchors at all firewalls to anchor masonry to structural members as detailed and indicated within the Construction Documents when required for structural bracing.

3.09 LINTELS:

A. Install steel lintels of size and configuration shown where indicated in Construction Documents. Provide galvanized steel lintels at all exterior conditions where exposure to moisture is possible.

B. Provide minimum bearing of 6" at each jamb unless otherwise indicated.

3.10 FLASHING OF MASONRY WORK:

A. Refer to Division 7 Section 07231 “Air/Vapor Barrier System” for installation requirements applicable to through wall flashing.

B. General: Provide concealed self-adhering through wall flashing in masonry work continuous at base of wall at or above shelf angles, lintels, ledges, and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior.

1. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Seal penetrations in flashing with mastic before covering with mortar.

2. Place horizontal leg of through wall flashing on sloping bed of mortar and cover with mortar. Set stainless steel drip plate into minimum of ¼” bead of water block sealant, apply spray primer and allow to dry 4 to 5 minutes; within 30 minutes of setting primer set self-adhering through wall flashing onto drip plate set back from face of exterior face of masonry.

3. Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end then provide end dams at lintels and sills. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up typically two full cmu back-up courses (16”) but a minimum of 4" where restricted, and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan.

4. Install flashing to comply with manufacturer's instructions.

5. Provide fully open cell weep hole head joints of the first course of masonry immediately above concealed flashings. Space 24" o.c. unless otherwise indicated.

6. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

7. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 “Cavity Drainage Material” Article.

8. Install vents in head joints at top course of just below or where indicated in exterior wythes at spacing indicated or 24” o.c. Use specified weep/vent products to form vents.

   a. Close cavities off vertically and horizontally with treated wood blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.11 INSTALLATION OF SELF-ADHERING TRANSITION MEMBRANES:

A. Refer to Division 7 Section 07231 “Air/Vapor Barrier System” for installation requirements applicable to self-adhering transition membranes.

B. General: Provide self-adhering transition membranes locations including window & door openings, top of wall covering wood blocking tied into roofing, changes in materials, across expansion joints, around penetrations, structural steel exposed within the cavity and wherever indicated on the construction documents.

1. Coordinate installation of transition membranes with other materials utilized as part of the air/vapor barrier system utilizing compatible products.

2. Install transition membranes to comply with manufacturer's instructions.

3.12 REPAIR, POINTING, AND CLEANING:

A. Remove and replace masonry units which are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or

holes, except weepholes, and completely fill with mortar. Point up all joints including corners, openings, and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly sets and cured, clean masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of installed masonry.

3. Fully clean installation of exterior masonry with specified cleaner; apply and rinse, remove in accordance with manufacturer instructions.

4. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

5. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

6. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner as indicated in Part 2 "Masonry Cleaners" Article.

7. Clean exterior finished concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.

E. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion. Protect waterproofing membrane and drain board work from other trades during construction. Backfill with specified materials, protect membrane from damage.

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, recycle or remove all surplus materials from the Project site(s).

END OF SECTION

SECTION 05100 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

B. Section 05200: Steel Joist Framing.

C. Section 05300: Metal Deck, including field-installed shear connectors.

1.2 DESCRIPTION OF WORK

A. This section includes structural steel.

1.3 QUALITY ASSURANCE

A. Comply with latest editions of:

1. American Institute of Steel Construction (AISC), "Manual of Steel Construction," including:
   - ANSI/AISC 360, "Specification for Structural Steel Buildings."
   - AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
   - Research Council on Structural Connections (RCSC), "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. American Welding Society, Inc. (AWS)
   a. AWS D1.1 "Structural Welding Code - Steel."
   b. AWS C5.4 "Recommended Practices for Stud Welding."
3. Research Council on Structural Connections (RCSC), Educational Bulletin No. 4, "Recommended Erection and Field Inspection Procedures for High-Strength Bolts in Structural Steel Assemblies."
4. American Hot-Dip Galvanizers Association, Inc.; Zinc Institute Inc.
   a. "Inspection Manual for Hot-Dip Galvanized Products."
5. Steel Structures Painting Council (SSPC)
   a. "Surface Preparation Specifications."
6. American Institute of Steel Construction (AISC), "Seismic Design Manual," including ANSI/AISC 341, "Seismic Provisions for Structural Steel Buildings."

B. Qualifications for Welding Work:

1. Qualify welding processes and welding operators in accordance with AWS standards.
2. Provide one of the following certifications for welders to be employed in work.
   a. Certification of satisfactorily passing AWS qualification tests within previous 12 months to perform type of welding in work.
   b. Work record signed by supervisor showing regular employment within previous 12 months to perform type of welding in work.

C. Qualifications for Fabricator, Detailer, and Erector:

1. Fabricator, Detailer, and Erector of structural steel shall have minimum 3 years experience in fabricating, detailing, and erecting structural steel.
   a. Erector Qualifications: Erector shall be AISC Certified Erector, Category CSE.
   b. Fabricator Qualifications: Fabricator shall be AISC Certified Fabricator, Category STD.
   c. AISC Certification for Fabricators and Erectors may be waived at the discretion of Owner, Architect, and Engineer provided acceptable written quality assurance and quality control plan is submitted.
2. Submit written description of ability.
3. At completion of fabrication, Fabricator shall submit Certificate of Compliance to Special Inspector and Code Enforcement Official stating work was performed in accordance with approved Construction Documents.

1.4 SPECIAL INSPECTIONS

A. Refer to Specification Section 01410 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

A. Contractor shall employ testing laboratory acceptable to Engineer and Architect to perform material evaluation tests.

B. Submit testing service qualifications demonstrating experience with similar types of projects.

C. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify RDPs 48 hours before anticipated time of completion for a given section of work so they may determine if site observations are required. If site observations are required, do not conceal framing until RDPs have had opportunity to make observations.

1.6 SUBMITTALS

A. General: Review of submittals will be for general conformance only. Compliance with requirements for materials, fabrication, erection, and dimensioning of structural steel shall be Contractor's responsibility. Resubmitted shop drawings shall have revisions identified and dated.

B. Connections: Submit proposed connection types and calculations for review before preparing detailed shop drawings. Calculations shall be stamped by a licensed Professional Engineer in New York State (Connection Design Engineer) retained by Fabricator.

C. Shop Drawings: Submit detailed drawings showing:

1. Reference Contract Drawing number and addendum number in each shop drawing.
2. Shop erection details including cuts, copes, camber, connections, holes, bolts, and other pertinent information.
3. Connection loads.
4. Material, including ASTM designations and grades or manufacturer's data as appropriate.
5. Welds with size, length, and type.
6. Anchor rod locations.
7. Location of shop-welded masonry anchors and weldable reinforcement. Coordinate with Division 4 and Masonry Contractor.
8. Shop drawings have been checked by detailer and noted as checked in drawings before submitting. Failure to submit checked shop drawings will be cause for their return without review. If drawings are not prepared by detailer under direct control of Fabricator, Fabricator shall stamp each drawing and initial or sign stamp to certify review and approval of drawings and conformance with Fabricator's shop practice and capability.

D. Material Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications. Submit producer's or manufacturer's specifications and installation instructions for the following products:

1. Structural steel, including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts, including nuts and washers.
3. Unfinished bolts and nuts.
4. Structural steel primer paint if used.
5. Welding electrodes.
6. Post-installed anchors (expansion, sleeve, or chemical adhesive) if used.

E. Bolt Certification: Submit to Special Inspector and Engineer certifications that bolts, nuts, and washers furnished comply with specifications. Submit manufacturer's inspection certificates for mill tests. For fasteners to be accepted, lot numbers on kegs, boxes, or bags must correlate with lot numbers shown in accepted test certificates and identification numbers in mill test reports. Manufacturer's symbol and grade markings must appear on bolts and nuts.

F. Field Modifications: Submit drawings showing field modifications required to conform to actual field conditions or as required to correct errors in shop drawings, fabrication, or erection.

G. Erector's Welding Procedure Specifications: Submit welding procedure specifications for joint types detailed for field welding.

1.7 PRODUCT HANDLING

A. Store material in horizontal position on supports above ground.

B. Protect from weather, and keep free of dirt and debris.

C. Handle material carefully so it is not bent or marred.

D. Store bolted fastener components in closed containers protected from moisture and contamination. Remove from protective storage containers only number of fasteners required for one shift. Return fasteners not installed at end of work day to protective storage.

E. Repair or replace damaged materials. Do not incorporate in work fastener components that accumulate rust or dirt.

1.8 WORKMANSHIP

A. Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Architect.

B. Remove work found to be defective. Replace with new acceptable work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials shall be new and free from rust.

B. Rolled-Steel Plates, Bars, and Angles: ASTM A 36.

C. Rolled-Steel C, MC, S, M, and HP Shapes: ASTM A 36 unless indicated in drawings as Grade 50 (ASTM A 572).

D. Rolled-Steel W Shapes: ASTM A 992.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

F. Hollow Structural Sections (HSS): ASTM A 500, Grade B or C.

G. Stainless Steel Plates: ASTM A 276, Type 304 or 316; smooth finish.

H. Stainless Steel Pipe: ASTM A 276, Type 304 or 316; or ASTM A 312, Grade TP304 or TP316; smooth finish.

I. Unfinished Bolts, Nuts, and Washers: ASTM A 307, Grade A.

J. High-Strength Bolts: ASTM A 325 or A 490, Type 1, plain.

K. Twist-Off-Type, Tension-Control Bolt Assemblies: ASTM F1852

L. High-Strength Bolts, Galvanized: ASTM A 325, Type 1.

M. Anchor Rods: ASTM F 1554, Grade 36.

N. Threaded Rods: ASTM A 36.

O. Nuts: ASTM A 563. Grade and finish to match bolt or rod type.

P. Washers: ASTM F 436 (ASTM F 844 for ASTM A 307 bolts, A 36 rods and F 1554 Grade 36 anchor rods). Finish to match bolt or rod type.

Q. Direct Tension Indicator Washers: ASTM F959 for use in pretensioned and slip-critical joints where direct-tension-indicator method is used. DTI "Squirter" as manufactured by Applied Bolting Technology or accepted equivalent.

R. Electrodes: E70 and in accordance with AWS.

1. E308 for Type 304 stainless steel.
2. E316 for Type 316 stainless steel.

S. Headed Stud Anchors: ASTM A 108, Grades 1010 through 1020, solid fluxed and in accordance with AWS. Use arc shield (ferrule) with each anchor. Size as indicated in drawings.

T. Nonshrink Grout: Corp of Engineers CRD-C 621. "Conspec 100" by Conspec Manufacturing Co.; "NS Grout" by Euclid Chemical Co.; "SikaGrout 212" by Sika Corp.; "Masterflow 928" or "Set Grout" by Master Builders, Inc.; "Sonogrout" by Sonneborn Building Products; or accepted equivalent.

U. Steel Primer Paint: For steel scheduled to receive finish paint, use primer compatible with finish paint specified in Division 9.

V. Hot-Dip Galvanizing: Hot-dip galvanize after fabricating in accordance with ASTM A 123. Restraighten members after galvanizing if necessary to be square and true. Items to be hot-dip galvanized are identified in drawings.

W. Cold-Galvanizing: Zinc-rich, cathodic-acting paint. "Tneme-Zinc 90-97" by Tnemec Inc.; "ZRC Galvilite" by ZRC Worldwide; or accepted equivalent. Use cold-galvanizing coatings for field touch-up of galvanized surfaces and for items identified in drawings.

X. Below-Grade Coating: Coal-Tar Epoxy, "TNEMEC 46H-413" or accepted equivalent.

Y. Expansion Anchors: "Kwik-Bolt 3" by Hilti; "Trubolt Wedge Anchors" by ITW Ramset/Red Head; "Power-Stud" by Powers Fasteners; "Wedge-All" by Simpson/Strong-Tie; or accepted equivalent.

Z. Sleeve Anchors: "HLC Sleeve Anchor" by Hilti; "Dynabolt Sleeve Anchor" by ITW Ramset/Red Head; "Power-Bolt" by Powers Fasteners; "Sleeve-All" by Simpson/Strong-Tie; or accepted equivalent.

AA. Chemical Adhesive Anchors:

1. Anchors to solid concrete, grouted CMU, solid brick, or stone:
   a. Anchors for use when base material temperature is 0°F or greater: "HIT-Ice" by Hilti; "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.
   b. Anchors for use when base material temperature is 40°F or greater; "HIT-HY 150" or "HIT-HY 150 MAX" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET Epoxy-Tie" by Simpson/Strong-Tie; or accepted equivalent.
2. Anchors to hollow masonry (brick or hollow CMU):
   a. Anchors for use when base material temperature is 0°F or greater: "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or

accepted equivalent.

b. Anchors for use when base material temperature is 40°F or greater: "HIT-HY 70" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET Epoxy-Tie" by Simpson/Strong-Tie; or accepted equivalent.

c. Provide manufacturer's standard screen tubes for use with anchors.

AB. Weld-On Masonry Anchors: No. 317 continuous weld-on anchor rod by Heckmann Building Products for columns; No. 315 anchor rod for beams.

AC. Furnish loose masonry anchors that are to be field-attached to structural steel by others. Provide No. 316 Triangular Ties and No. 318 Web Ties, size to suit wall, by Heckmann Building Products.

2.2 FABRICATION

A. Fabricate structural steel in strict accordance with reviewed shop drawings and referenced standards.

B. Fabricate and assemble structural material in shop to greatest extent possible.

C. Fit stiffeners neatly between girder flanges. Where tight fits are required to transmit bearing, mill or grind ends of stiffeners for even bearing against flange.

D. Provide camber as indicated in drawings. Where no camber is indicated, fabricate steel with mill camber up. Camber by mechanical means or by use of V-heat up to 1,200 degrees F maximum.

E. Remove extension bars or runoff plates upon completing and cooling groove welds. Grind ends of welds smooth and flush with edges of abutting parts.

F. Provide holes for securing other work to structural steel framing. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in base and bearing plates more than 3/4 inch thick.

G. For beams to be hot-dip galvanized, predrill beam to form radius portion of copes as shown in AISC "Specification Commentary." Do not punch.

H. Unless shown otherwise in drawings, Fabricator shall detail column splice using AISC standard details. Finish ends of column shafts for direct bearing.

I. Finish bottom of column and weld to base plate. Use flat base plates.

J. For column base plates up to 24 inches, use 1/4-inch-thick, flat leveling plates. For column bases over 24 inches, use leveling nuts and four anchor rods with heavy washers unless otherwise indicated in drawings.

K. Anchor Rods: Furnish anchor rods, leveling plate, or other devices

necessary for setting anchoring rods required for securing structural steel to foundation, concrete, or masonry.

L. Steel Wall Framing: Select members true and straight for fabrication of steel wall framing and lintels. Straighten as required to provide uniform, square, and true members in completed wall framing. Limit sweep to 1/8 inch for each 10 feet of length.

M. Weld headed stud anchors with automatically timed, stud-welding equipment. Remove arc shields from studs after welding.

N. Where headed stud anchors are to be welded to galvanized steel, Fabricator has the following options:

1. Remove galvanized coating from surfaces to receive headed stud anchors prior to welding. Touch-up with cold-galvanizing paint after welding.
2. Weld headed stud anchors to beams prior to galvanizing.

2.3 SHOP PAINTING

A. Shop-paint structural steel work that will remain exposed to view in final work or where indicated in drawings. Do not paint members or portions of members to be concealed in final work embedded in concrete or mortar or to receive spray-on fireproofing unless noted otherwise in drawings.

B. Do not paint the following surfaces:

1. Surfaces within 2 inches of field welds.
2. Surfaces within 1½ inches from center of high-strength, slip-critical (SC) bolts or areas within bolt pattern.
3. Top flanges of beams to receive field-installed shear connectors or weldable reinforcement. Coordinate locations with installers.
4. Top and bottom flanges of beams to receive field-installed brace angles, shear wall connectors, or hybrid connectors. Coordinate locations with installers.

C. Apply two coats of paint to surfaces that will be inaccessible after assembly or erection. Apply two coats to surfaces indicated to be cold-galvanized.

D. For steel to be spray-fireproofed, clean steel to remove dirt, grease, rust, and loose mill scale in accordance with SSPC-SP3 "Power Tool Cleaning."

E. For steel to be cold-galvanized or primed and finish-painted, clean steel to remove dirt, grease, rust, and loose mill scale in accordance with SSPC-SP6 "Commercial Blast Cleaning" unless recommended otherwise by paint manufacturer.

F. For steel to be hot-dip galvanized, prepare steel by successive immersion in chemical baths of caustic cleaning, pickling, and flux.

G. After surface preparation, immediately apply structural steel primer paint in accordance with manufacturer’s instructions at rate to provide uniform dry-film thickness of 2 mils. Use painting methods that will result in full coverage of joints, corners, edges, and exposed surfaces.

H. Apply coal-tar epoxy coating to steel below slab on grade and in contact with soil or as indicated in drawings. Extend coating 1 inch into slab.

2.4 CONNECTIONS

A. Comply with requirements of this section unless indicated otherwise in drawings.

B. A licensed Professional Engineer (Connection Design Engineer) shall be retained by Fabricator to design connections in accordance with Option 3 in AISC *Code of Standard Practice for Steel Building and Bridges,* except beam end connections that resist only shear loads (no moments, axial, or bracing loads) may be selected and completed by an experienced steel detailer in accordance Option 2 in the AISC *Code of Standard Practice for Steel Building and Bridges*. Shear connections selected under Option 2 shall use only connections published in the AISC *Steel Construction Manual* without modification.

C. Use connection dimensions and sizes complying with AISC-published recommendations and limitations shown in drawings.

D. Weld or bolt shop connections.

E. Bolt field connections wherever possible.

F. Minimum Capacity of Beam Connections: For connections not detailed, provide connection capacity for shear, axial, and moment reactions shown in drawings. If not shown in drawings, base on either Allowable Stress Design or Load and Resistance Factor Design as follows:

1. Shear Connections:
   a. At least 50 percent of uniform load from Maximum—Uniform Load Tables in AISC *Steel Construction Manual*, Part 3, for given steel member (ASD or LRFD, as appropriate).
   b. At least 70 percent of uniform load from Maximum Uniform Load Tables in AISC Steel Construction Manual, Part 3, for beams and girders with shear connectors (ASD or LRFD, as appropriate).
   c. Concentrated loads near supports must be added.

2. Moment Connections:
   a. Design moment connections for full bending capacity for given steel member.

G. Minimum Capacity of Shear Splice Connections in Cantilevered Framing Systems: For connections not detailed, provide connection capacity of reactions shown in drawings. If not shown, base on either Allowable Stress Design or Load and Resistance Factor Design as follows:

1. At least 50 percent of uniform load from Maximum—Uniform Load Tables in AISC *Steel Construction Manual*, Part 3, for given steel member (ASD or LRFD, as appropriate).

H. Beam connections to columns shall be in accordance with AISC and comply with the following.

1. Use AISC Double-Angle Shear Connection for beam connections welded to faces of HSS columns having a workable flat of 6.75 inches or greater and to faces of W column flanges that have a width of 6.75 inches or greater.

2. Use AISC Double-Angle Shear Connection for beam connections bolted to faces of W column flanges that have a width greater than 6 inches.

3. Use AISC Single-Plate Shear Connection for beam connections to faces of columns smaller than required for double-angle shear connection.

4. AISC Seated Connections are permitted as an alternative to double-angle and single-plate shear connections.

I. Use AISC Single-Plate, Single-Angle, Double-Angle, or End-Plate Shear Connection for beam-to-beam connections.

J. Provide unfinished threaded fasteners installed snug-tight for bolted bearing connections of secondary framing members to primary members including girts, door framing systems, and roof openings.

K. Provide high-strength fasteners for principal bolted connections unless otherwise indicated.

L. Fabricator shall select and detail connections to properly transmit total reactions, moments, and axial forces either indicated in drawings or reasonably inferred from information provided.

M. Provide snug-tightened joints using bearing bolts with thread condition N for bolted connections unless indicated otherwise. Provide pretensioned or slip-critical joints where shown or noted in drawings. For slip-critical joints, provide AISC Class A faying surface condition.

N. Remove burrs that prevent solid seating of connected parts.

O. ASTM F1852, twist-off-type, tension-control bolt assemblies may be used at snug-tightened joints but shall not be used at pretensioned or slip-critical joints.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.

3.2 ERECTION

A. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of a complete frame or structure before permanently fastening.

B. Fit up connections to be field welded in compliance with AWS standard tolerances for review by the Special Inspector or Testing Agency prior to field welding.

C. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact after assembly.

D. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified tolerances.

E. Contractor may field modify anchor rods and embedded structural supports incorrectly located or damaged after installation as indicated in Section **(03300) (03 30 00)** and tested by Testing Agency. Submit documentation showing proposed field modification for review and acceptance by Engineer before beginning.

F. Splice members only where shown or specified.

G. Maintain work in stable condition during erection.

H. Erect masonry shelf angles connected to structural steel to approximate elevations shown in drawings. Weld after final adjustment is made by Masonry Contractor and before application of load. Coordinate with Division 4.

I. Where weldable reinforcing bars are to be welded to structural steel members, coordinate installation of weldable reinforcement with Masonry Contractor.

J. Install snug-tightened pretensioned and slip-critical bolted joints to comply with RCSC "Specification for Structural Joints Using ASTM A325 or A490 Bolts" and to comply with RCSC Educational Bulletin No. 4, "Recommended Erection and Field Inspection Procedures for High-Strength Bolts in Structural Steel Assemblies." Install pretensioned and slip-critical joints using either turn-of-nut method or direct-tension-indicator method. Do not use calibrated wrench method or twist-off-type tension-control bolt method for pretensioned or slip-critical joints.

K. Install field connections and framing as detailed in Contract Documents and accepted shop drawings. If Contractor finds field modifications are necessary, submit documentation of proposed field modifications to Architect and Engineer for review and acceptance before beginning.

   1. Use of thermal cutting for field modifications is prohibited unless documented and accepted by Engineer before beginning.
   2. Use of thermal cutting for enlarging or cutting bolt holes in field is prohibited.

3.3 TOLERANCES

A. Tolerances shall be within limits in AISC "Code of Standard Practice."

B. Fabrication and mill tolerance shall be within limits in AISC "Standard Mill Practice."

3.4 TOUCH-UP PAINTING

A. After erection is complete, touch up paint-damaged shop coats and welded areas with shop primer paint applied in accordance with manufacturer's instructions.

B. Touch up paint-damaged galvanized surfaces and welded areas with cold-galvanizing paint applied in accordance with manufacturer's instructions.

C. Remove weld slag before applying touch-up paint.

3.5 TEMPORARY SHORING AND BRACING

A. Provide temporary shoring and bracing members as required with connections of sufficient strength to bear imposed loads.

B. Remove temporary members and connections when permanent members are in place and final connections are made.

C. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

3.6 PROTECTION

A. Do not use members for storage or work platforms until permanently secured.

B. Do not exceed load capacity of members with construction loads.

3.7 WELDING TO EXISTING STEEL

A. Clean area to be welded using mechanical grinders and solvents to remove paint, rust, and other materials.

B. Use E7018, low-hydrogen electrodes stored in ovens as prescribed by AWS. Preheat steel to be welded and maintain temperatures as prescribed by AWS.

END OF SECTION 05100

NOTES TO ENGINEER **05/12**

Quality Assurance: Delete American Institute of Steel Construction (AISC), "Seismic Design Manual," including ANSI/AISC 341, "Seismic Provisions for Structural Steel Buildings" if R = 3.

You may not want to waive AISC certification for large or complicated projects. Note that if AISC Certification is waived, the Special Inspection documentation will be more difficult and will require plant inspection.

Submittals: Edit state of licensure to match project location.

Delete LEED references and requirements for non-LEED projects.

Weathering Steel: If weathering steel is desired, add the following materials to the products section:

A. Rolled-Steel W Shapes: ASTM A 588.
B. Hollow Structural Sections (HSS): ASTM A 847.

Non-shrink grout is specified in 033000 and 051200. Delete from this specification section if 033000 if used.

Chemical Adhesive Anchors: Compare manufacturers of expansion, sleeve, and chemical anchors for actual loads (including embedments, edge distances, and spacing) to be sure each product specified is adequate. If you need maximum values, delete products that are not adequate or consider altering design to reduce loads.

Review structural requirements of masonry anchors. Strap anchors may be required for large distances from steel to masonry or large loads.

Bearings: Use slide bearings for small end beam rotations, use neoprene-backed slide bearings to accommodate end-beam rotations, use pot bearings for high-load conditions with beam-end rotations. Include detail in drawings showing component sizes and details.
If structural expansion bearings are required, add the following in the products section:

A. Slide Bearings: Structural bearing system with upper element consisting of steel bearing plate faced with stainless steel and lower element consisting of a steel bearing plate faced with PTFE (Teflon). Stainless steel shall be minimum 20-gauge, ASTM A240, Type 304, having a surface finish of less than 20 microinches RMS on side in contact with lower element. Stainless steel shall be epoxy bonded in center as well as TIG stitch welded around periphery. PTFE shall be nominal 1/16-inch-thick, glass-filled, virgin material tested in accordance with ASTM D4894 or D4895 and factory bonded with tested epoxy to steel back-up plate. Coefficient of friction shall average 0.05 under a compressive load of 2,000 psi. Bearing Type CSB as manufactured by Con-Serv Inc. or accepted equivalent.

B. Neoprene-Backed Slide Bearings: Structural bearing system with upper element consisting of steel bearing plate faced with stainless steel and lower element consisting of steel plate faced

with PTFE (Teflon) and bonded to neoprene layer that is factory vulcanized to steel bearing plate. Stainless steel shall be minimum 20-gauge, ASTM A240, Type 304, having surface finish of less than 20 microinches RMS on side in contact with lower element. Stainless steel shall be epoxy bonded in center as well as TIG stitch welded around periphery. PTFE shall be nominal 1/16-inch-thick, glass-filled, virgin material tested in accordance with ASTM D4894 or D4895 and factory bonded with tested epoxy to steel back-up plate. Neoprene, 50 Durometer shall be factory bonded or vulcanized to steel faced with PTFE and to steel bearing plate. Coefficient of friction shall average 0.05 under compressive load of 2,000 psi. Bearings shall comply with latest AASHTO specifications. Bearings as manufactured by Con-Serv Inc. or accepted equivalent.

C. *Pot Bearings: Structural bearing system with upper element consisting of steel bearing plate faced with stainless steel and lower element consisting of steel piston faced with PTFE (Teflon) and supported on elastomer confined within sealed, steel base pot. Maximum pressure on confined elastomer equal to 3,500 psi. Rotation capacity equal to 0.02 radians. Coefficient of friction shall average not more than 0.05. Bearings shall comply with latest AASHTO specifications. Bearings as manufactured by Con-Serv Inc. or accepted equivalent.*

If thermal break connections are required, add the following to the products section:

A. *Thermal Isolation Material (TIM): High-performance, fire-retardant, fiberglass-reinforced laminate composite for use between flanged connections of internal and external steelwork to limit thermal bridging, as manufactured by Fabreeka, Inc.; "Series 625 Extren" by Strongwell; or Type TBG300 by Farrat, Inc.; or accepted equivalent.*

B. *High-Strength Bolts, Stainless Steel: ASTM F 593, Alloy Group 1 Condition CW.*

C. *Stainless Steel Nuts: ASTM F 594, Alloy Group 1 Condition CW.*

Shop Painting: Structural steel that will be concealed from view in final building should not be shop painted. Steel that will be exposed to view in final building should be shop primed for field finish painting. Coordinate with Architect. A high-performance paint system or hot-dip galvanizing should be applied to steel that will be exposed to exterior environment. Use only hot-dip galvanized or stainless steel within cavity of masonry veneer walls outside of building air/vapor envelope. Steel requiring galvanizing or painting must be shown in drawings.

For exterior exposed steel to be finish painted, if full painting requirements are needed - prime, intermediate, and finish - the following is an option to consider. (This was used on Ryan-Biggs 6918.2 - Fort Ticonderoga Mars Education Center where they were trying for a LEED rating and minimizing VOC. This was proposed as an alternative to Colorgalv.)

- *Step 1: After welding and bolting is complete, sand blast steel to conform to SSPC-SP6.*
- *Step 2: Fill open joints with body filler, Tnemec 63-1500 (VOC 0).*
- *Step 3: Blow on zinc-rich primer, 2.5 to 4 mils dft, Tnemec Hydro-Zinc 94-H_2O (VOC 100 g/l).*
- *Step 4: Epoxy intermediate urethane finish, Tnemec Series L69 Hi-Build Epoxoline II (VOC 100 g/l).*
- *Step 5: Top coat waterborne polyurethane, 2 to 3 mils dft, Tnemec Series 1081 Endura-*

Shield (VOC 100 g/l).

Avoid having steel in contact with soil. If unavoidable, coat steel with coal-tar epoxy or encase in concrete.

Connections: Revise Section 2.5B if complete connection designs are shown in drawings.

1. Snug-tightened bolted joints should normally be used. Review AISC Specification Sections J1-10, J3-1, J3-2, and RCSC Specification Section 4 for locations where pretensioned or slip-critical joints should be used. For steel frames with R greater than 3, review AISC Seismic Specification, Section 7.2. Pre-tensioned and slip-critical joints must be indicated in drawings because the default in this specification is a snug-tightened joint.

1. Both the calibrated wrench method and twist-off-type tension-control bolt method are torque-controlled methods, which generally provide less uniform bolt tensions than the other two methods and is the reason they are excluded in this specification. However, AISC recognizes and accepts all four methods without preference. Avoid use of the calibrated wrench method because of the extensive and difficult documentation. Before accepting, as an alternative, the use of the twist-off-type tension-control bolt method, (Erectors generally like this method) hold a meeting with the Inspector and Erector to make sure all the proper installation procedures are being followed and documented. For the direct-tension indicator method, DTI, "Squirter" as manufactured by Applied Bolting Technology provides visual indication of tensioning. Review RCSC Educational Bulletin No. 4 available from www.boltcouncil.org for more information because any of the 4 methods may be installed incorrectly without proper care.

If rebar couplers welded to structural steel are required, add the following to the products section:

A. *Weldable reinforcement couplers: "S/CA – Series Bar Lock Structural Steel Connectors (Weldable Half Couplers)" by Dayton Superior; "Lenton Weldable Half Coupler C2 and C3J Mechanical Rebar Splice" by Erico.*

DIVISION 5 - METALS

SECTION 05300 - METAL DECKING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish material, labor, equipment, services necessary to erect all metal deck, including connections, welding and accessories required for installation of Work. Field cut and fit deck as required and cut all openings.

B. Place edge of deck at proper location to ensure proper placement of masonry. Set deck edge from a survey line based on the theoretical building line.

1.02 RELATED SECTIONS

A. Structural Steel……Section 05120

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 Testing and Materials (ASTM) standards, latest editions.

A29 Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for

A36 Standard Specification for Carbon Structural Steel.

A108 Standard Specification for Steel Bars, Carbon, Cold-finished, Standard Quality.

A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coating.

A992 Standard Specification for Steel for Structural Shapes for Use in Building Framing

B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

B. "Specification for Structural Steel Buildings" - American Institute of Steel Constructor's (AISC 360-05).

C. "Seismic Provisions for Structural Steel Buildings" (AISC 341-05).

D. "Structural Design of Composite Slabs" – American Society of Civil Engineers (ASCE 3-91).

E. "Standard for Noncomposite Steel Floor Deck" - Steel Deck Institute (ANSI/NC 1.0-06)

F. "Standard for Steel Floor Deck" – Steel Deck Institute (ANSI/RD 1.0-06).

G. Safety Requirements for Powder-Actuated Fastening Systems (ANSI A10.3), American National Standard (ANSI).

H. International Code Council Evaluation Service (ICC-ES):

1. International Building Code

2. Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43)

3. Steel Deck Diaphragms (ESR-2199)

I. "Structural Welding Code - AWS D1.1" - American Welding Society (AWS).

J. "Specifications for Mild Steel Covered Arc - Welding Electrodes - AWS A5.1" - AWS.

K. "Diaphragm Design Manual for Floor Decks and Roof Decks" 3rd Edition - Steel Deck Institute (SDI).

L. "Fire Resistance Directory" - Underwriters Laboratory (UL).

1.04 DESIGN REQUIREMENTS

A. Design of metal deck is governed by Chapter 22 of the 2020 NYS Building Code. Structural integrity requirements of the BC shall be met.

B. Metal deck unit sizes and gages are indicated on the Drawings.

C. Units shall be of three-span length except where framing layout does not permit. Deck sheets shall be butted over supports.

D. Provide shoring where required by the deck manufacturer as indicated on the approved shop drawings and where indicated on the Contract Documents.

E. Use of integral and non-piercing hanger tabs to support ceiling systems is not permitted. Piercing hanger tabs with a safe working loading of 250 lbs or greater are permitted for ceilings weights below the hanger tab capacity. Integral hanger tabs are to be used for venting purposes only.

F. Units included in a fire rated assembly must be classified in appropriate UL designs or have MEA, BSA, or OTCR approval.

G. Use fasteners or welds for decking attachment that provide adequate diaphragm shear strength, uplift resistance and stiffness for imposed load combinations.

H. Performance Requirements: FM classified Class I-90 minimum for uplift resistance and UL fire classified for roof deck.

1.05 SUBMITTALS

A. Product Data

Submit manufacturer's specifications for

1. Shear stud connectors

2. Deck Fasteners, if used

3. Primer Paint

B. Shop Drawings

1. Prepare metal deck shop drawings immediately after award of Contract.

2. Shop drawings shall include, but not be limited to the following:

a. Type and gage of metal deck.

b. Metal deck layout and orientation, including clear indication where shoring is required.

c. Welding or fastener types, sizes and pattern.

d. Side and end details of metal deck.

e. Supplementary framing details.

f. Location of all openings and fittings.

g. Shop finish.

h. Size, location, and spacing of stud shear connectors, where required, for each beam.

i. Designation of welding electrode strength to be used.

3. Shop drawings reviewed by the Engineer of Record for general conformity with the Drawings shall not relieve the Contractor or the metal deck supplier of responsibility for correctness of fit, quantities of materials, and adequacy of attachment details of deck and accessories to the structural steel. Deck must have UL or OTCR approval as part of the fire rated assembly. Approval of shop drawings does not absolve the Contractor of this requirement. Coordinate with Section 07250 and 07260.

4. Calculations in accordance with ICC-ES AC 43 or SDI Design Method verifying diaphragm shear strength and stiffness: Submit calculations for the load tables of the metal deck supplied. Calculations shall be signed and sealed by a Professional Engineer licensed in the State of New York.

C. Quality Control Submittals

1. Certificates

a. Submit notarized certificates from the manufacturers of the specified materials stating compliance with the applicable requirements set forth for all materials specified in this Section.

b. 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 licensed welders.

c. Furnish proof that deck to be used is part of a UL, MEA, BSA, or OTCR approved fire-rated assembly if other than deck shown on Drawings.

d. Submit certificate stating deck manufacturer is a member producer of SDI.

2. Manufacturers' Instructions: Furnish manufacturers' printed material, specifications and installation instructions for each type of decking, accessories, and studs.

3. Contractor Qualifications

Provide proof of Manufacturer, Erector, welder, and mechanical fastener technician qualifications specified under "Quality Assurance".

D. Surveys

Submit signed and sealed copies of surveys conducted by a Licensed Land Surveyor showing locations of edge of deck with respect to theoretical edge of deck and building survey line.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Company specializing in the manufacture of metal deck as used in this Contract shall have a minimum of five years experience and is a member producer of SDI.

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. Welders: All steel roof deck welders shall be AWS certified for welding of sheet steel.

4. Mechanical Fastener Installer: Shall be certified or licensed by the fastener and tool system manufacturer on the project site in accordance with ANSI A10.3 requirements. Certification or licensing includes all training necessary for proper tool operation, fastener selection, maintenance and troubleshooting.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYS 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: Standards specified herein shall apply to Work of this Section. Where more severe requirements then those contained in the standards are given in this section or the Building Code, requirements of this Section or the Building Code shall govern.

a. AISC 360-05 as modified by the 2020 NYS Building Code.

b. Seismic Provisions for Structural Steel Buildings AISC 341-05.

c. 2020 NYS Building Code

d. Fire Resistance Directory - UL.

1) Composite metal deck shall have UL approval with respect to the following:

a) As a component part of a floor construction of specified fire resistance rating without need for sprayed fireproofing on underside of deck.

b) As a component part of a three-hour fire resistive floor construction with use of sprayed fireproofing on underside of deck.

2) Roof deck shall have UL approval as a component part of the specified fire resistive roof construction.

3. 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 metal deck and stud shear connectors shall conform to the material acceptance, certification and inspection requirements of the BC.

2. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver deck to site undamaged. With each deck unit bearing the UL label and marking for specific system detailed.

B. Store deck units off the ground with one end elevated to provide drainage. Protect units from the elements with a waterproof covering.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Metal Deck and Accessories

1. CANAM Steel Corporation
2. Wheeling Corrugating Co.
3. Nucor, Vulcraft Group

B. Stud Shear Connectors

1. Nelson Stud Welding Co.
2. Tru-Weld/Tru-Fit Products Corporation
3. Hilti, Inc.

C. Mechanical Fasteners

1. Hilti, Inc.
2. ITW Buildex

D. Sidelap Connectors

1. Hilti, Inc.
2. ITW Buildex
3. Elco Textron

2.02 MATERIALS

A. Acoustical Cellular Roof Deck

1. Cellular Deck and Metal Accessories: Sheet steel conforming to ASTM A 611 Grade C or ASTM A 446 Grade A. Before fabrication, sheet steel shall receive ASTM A653, Class G 90, hot dip zinc coating. Accessories shall be fabricated of not lighter than 18 U.S. Standard Gauge sheet steel.

   a. Deck for Composite Construction: Galvanized deck uniformly deformed to insure a mechanical bond between concrete and steel. Metal accessories shall be galvanized.

2. Acoustical Deck: Cellular deck with bottom flat plate perforated directly below each cell and with deck manufacturer's standard sound absorbing elements consisting of an inert, non-organic, mineral fiber material which will produce a Noise Reduction Coefficient (NRC) of 0.70.

3. Self-Drilling Fasteners: No. 12-14 x 3/4 inch, hex washer head, self-drilling fastener with pilot point.

4. Cellular steel deck units shall be formed to provide smooth, completely enclosed raceways conforming to UL requirements. Deck units shall be carefully cut to required lengths at the factory within UL tolerances for length and squareness, to insure proper abutting of units at the site.

a. Length: Furnish units of continuous length over 3 spans wherever possible.

b. For steel deck properties and depth see contract drawings.

5. For cellular units, the ratio of distance between stiffened edges to metal thickness of any top horizontal surface shall not exceed 120.

6. Deck units shall have a continuous reinforcing web between top and bottom cell elements where cells are cut longitudinally 1-1/2 inches or more away from the vertical web.

7. Erect cellular steel deck and accessories under the direct supervision of the manufacturer's field advisor.

B. Miscellaneous Steel Shapes

Shall conform to the requirements of ASTM A36 or A992. Members to receive sprayed fireproofing shall be unprimed and free of lubricants or oils that would impair the adhesion of the fireproofing material.

C. Shop Finish

1. Metal deck: Steel sheet shall receive before being formed a coating of zinc conforming to ASTM A653 coating class G60 (both sides). Metal deck exposed to view, such as in the gymnasium, shall be cleaned and phosphatized prior to priming. Primer shall be applied in the shop and shall be structural steel primer paint applied at a rate of 0.6 Mils DFT minimum). Salt spray resistance of paint shall be 100+ hours when tested in accordance with ASTM B117.

2. Steel roof deck: Steel sheet shall receive before being formed a coating of zinc conforming to ASTM A653 coating class G90 (both sides). Roof deck exposed to view, such as in the gymnasium, shall be cleaned and phosphatized prior to priming. Primer shall be applied in the shop and shall be structural steel primer or coil coating paint applied at a rate of 0.6 Mils DFT minimum). Salt spray resistance of paint shall be 100+ hours when tested in accordance with ASTM B117.

D. Metal Deck Accessories (cants, pour stops, closure pieces, etc.)

Shall conform to the requirements of ASTM A653, coating class G60. Unless a thicker gage is required by design considerations, such as at cantilever edge conditions, minimum thickness shall be same gage as metal deck. Accessories to receive sprayed fireproofing shall be free of lubricants and oils that would impair the adhesion of the fireproofing material.

E. Headed Stud Type Shear Connector

1. Shall conform to the provisions of ASTM A108, meeting chemical requirements of ASTM A29, Grade 1010 through 1020, and Article 7.2.6 of AWS D1.1. Welded studs shown on the Drawing are the Basis of Design.

2. Mechanical Studs of equivalent strength to welded studs.

Unless shown on the Contract Drawings, the size, number of and location on the beam shall be in accordance with the manufacturer's published data and supported by test data.

a. Mechanical shear connectors shall be Hilti X-HVB Shear Connectors installed with Hilti X-ENP-21 HVB powder-actuated fasteners.

F. Welds and Fasteners

1. Welds:

a. Material: Welding electrodes shall conform to either E60XX or E70XX classification of AWS A5.1 as selected by the licensed welder depending on the gauge of steel deck and strength of steel member being welded to and is subject to approval by the Engineer of Record.

b. Weld Washers: Use on steel roof deck thinner than 22 gauge

2. Mechanical Fasteners:

a. Material: AISI 1070 modified

b. Hardness: Minimum Rockwell Hardness C 54.5

c. Design and Manufacture: Knurled shank with forged ballistic point. Manufacturing process shall ensure steel ductility and prevent development of hydrogen embrittlement.

d. Washers:

1) For structural steel framing: Minimum 15 mm (0.591 in.) steel washers

2) For steel bar joist framing: Minimum 12 mm (0.472 in.) steel washers

e. Corrosion Resistance:

1) For steel roof decks with waterproofing membrane: 5 micron zinc electroplated in accordance with ASTM B 633 SC1 Type III

2) For exposed steel roof decks: Minimum AISI 304 stainless steel sealing caps with bonded neoprene washer shall be installed over each fastener

f. Design Requirements:

1) ICC-ES AC43 or SDI method for diaphragm shear strength and stiffness

2) FM wind uplift resistance

3) UL fire classification

g. Approved Types

1) For use with structural steel framing supports with top flange thickness 1/4 in. or thicker:

a) Hilti X-ENP-19 L15 (1/4 in. or thicker)

b) ITW/Ramset SP

2) For use with steel bar joist supports with top chord or flange thickness 1/8 in. to 3/8 in.:

a) Hilti X-EDNK22 THQ12 (1/8 in. up to and including 1/4 in.)

b) Hilti X-EDN19 THQ12 (3/16 in. up to and including 3/8 in.)

c) ITW/Ramset 1500K and 1600WK

J. Sidelap Connectors

1. Acceptable types of sidelap connectors:

a. Top or side seam welds

1) 1½" long fillet welds in accordance with AWS D1.3 procedures.

b. Mechanical sidelap connectors

1) Drive mechanical sidelap connectors completely through adjacent lapped roof deck sheets to achieve positive engagement of adjacent sheets with a minimum of three thread penetration.

2) Material: ASTM A510 Grade 1022

3) Hardness: Minimum Vickers Surface Hardness of 450 HV0.3

4) Design and Manufacture: Hex washer head undercut with reverse serrations; self-piercing or stitch point at center

5) Corrosion Resistance:

a) For steel roof decks with waterproofing membrane: 5 micron zinc electroplated in accordance with ASTM B633 SC1 Type III.

b) For exposed steel roof decks: AISI 410 or 304 stainless steel with bonded neoprene washer.

6) Design Requirements:

a) ICC-ES AC43 or SDI method for diaphragm shear strength and stiffness

b) FM wind uplift resistance

7) Approved Types

a) Hilti S-SLC01 M HWH Sidelap Connector

b) Hilti S-SLC02 M HWH Sidelap Connector

c) Hilti S-MD 10-16x3/4 HWH #3 Stainless Steel Screw

d) Elco Textron

e) ITW Buildex Teks

c. Button punches

1) Standard or proprietary type button punches shall be deep and positively engage the male and female side edges of adjacent interlocking deck sheets in accordance with steel deck manufacturer recommendations

2) Approved Types

a) Wheeling Corrugating Gator Crimp

b) Verco Manufacturing Punchlok

I. Galvanizing Repair Paint

Shall conform to the requirements of ASTM A780 and comply with Military Specification MIL-P-21035.

J. Deck Fasteners (if used)

Deck fasteners of a type that will provide equal or greater uplift resistance than a 3/4” puddle weld.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin placement of metal deck until all surfaces and members are deemed acceptable to receive the deck. Do not proceed with Work until any unsatisfactory conditions have been corrected to the satisfaction of the deck installer.

3.02 ERECTION

A. General

1. Care should be taken to avoid overloading the supporting structural elements when placing bundles of metal deck or other construction loads on floors and roof.

2. Do not use floor deck units for storage or working platforms until they are permanently secured.

3. Employ a Licensed Professional Engineer or Land Surveyor to ensure accurate erection of the deck and end closures.

B. Metal Deck and Accessories Installation

1. Lay units in strict accordance with manufacturer's instructions and requirements and as shown on Drawings.

2. Adjust units in place before permanent fastening and accurately align end to end. Rectify inaccuracies in alignment and level of bearing before units are finally placed.

3. Provide proper bearing at all supports. Metal deck must be placed to bear fully on surface of beam flanges.

4. Provide angle and channel supports for metal deck at locations where deck cannot be properly seated due to obstructions by structural connections and as shown on Drawings. Coordinate with mechanical trades to adjust supports at columns if required to permit items to pass adjacent to column.

5. Anchor deck to steel member by welding directly through the bottom of the rib at all structural supports by welds not less than 3/4" in diameter or by using powder driven fasteners of equivalent strength, spaced not more than 12" across the width of the unit. All welds shall be of uniform size and appearance and free of pinholes, porosity, undercutting or other defects. Welds shall be free of sharp points or edges. Mechanical fasteners shall be fully engaged and washer snug and holding deck without damage. Where two units abut, each unit shall be so fastened to the steel framing. Add additional welds or fasterners where found defective.

6. Fasten side laps of adjacent units betweensupports by crimping or mechanically fastening with sheet metal screws of size and spacing required by manufacturer or as indicated on the Drawings to provide diaphragm strength required by seismic design. In no case shall fasteners exceed two feet. Fasteners for exposed to view roofdeck shall be the minimum length possible to to ensure an aesthetic appearance.

7. Furnish, install, and weld in position all accessories, including pour stops, closures, cant strips, etc., where required.

   a. Furnish sheet metal pour stops and closures for open ends of all cell raceways at columns, walls, and openings shown on Drawings. Pour stop gage is to be selected by manufacturer based on overhang. Revise gage if survey shows overhang exceeds that designed. Provide additional supports to strengthen pour stop at wedge inserts if required.

   b. Provide sheet steel cover plate (or closure tape) as required to close panel end conditions where panels change direction or abut.

   c. Furnish material for column closures to close openings between panels and structural columns.

   d. Provide welding hole cover, with friction fastening, to close welding access holes when required.

   e. Provide smooth form wood edge at locations where edge of deck will be exposed to view, such as at stairwells.

C. Stud Shear Connector Welding

1. Weld studs to steel beams through the steel deck with automatically-timed stud welding equipment.

2. Stud welding shall conform to the requirements of AWS D1.1 with respect to workmanship, quality control, and field inspection.

3. Manufacturer shall supply guidance and instruction in proper installation method

4. Additional requirements for stud welding with metal deck:

   a. Top flanges of beams must be free of paint, heavy rust, millscale, dirt, ice and water, and any other material that will interfere with the welding operation.

   b. Metal deck must be free of dirt, ice, water, and other foreign materials that will interfere with the welding operation.

D. Cutting, Drilling, and Reinforcing of Openings

1. Where predetermined openings (such as stairs, elevators, etc.) are framed by structural steel beams on all sides

(shown on the Drawings), the metal deck shall be engineered by the manufacturer to fit these conditions.

2. Any opening which is not framed by structural steel beams on all sides, and which is required in steel decking, shall be cut by the respective trades requiring it.

3. Reinforcing of Openings in Steel Deck

   a. Holes 6" or less in dimension need not be reinforced.

   b. Holes greater than 6" but less than 30" in any dimension shall be reinforced by the General Contractor as shown on the Structural Contract Drawings.

E. Field Touch Up

Clean scarred and rusted areas in galvanizing after deck installation is completed and paint welds and the scarred and rusted areas with the galvanizing repair paint. Apply in accordance with the manufacturer's instructions.

3.03 TOLERANCES

A. Edge of metal deck is to be within a tolerance of 1/4" of theoretical, set to a survey line, to ensure proper installation of masonry and installation of relieving angles. Where deck is found to be out of tolerance, make corrections and resurvey prior to placement of concrete.

3.04 FIELD QUALITY CONTROL

A. Welding/fastening of metal deck and shear studs is subject to Special Inspection and Testing and is included as part of the Quality Control Work of Section 05120 and includes, but is not limited to.

1. Weld sizes and pattern.

2. Mechanical fastener placement location and washer condition.

3. Clamping of steel roof deck to supporting steel framing

B. The Contractor shall engage an engineer licensed in the state of New York to check tolerances and inspect the erection.

C. Contractors Surveys

Provide survey of locations of edge of deck with respect to theoretical edge of deck and building survey line. Indicate discrepancies between actual installation and Contract Documents. Surveys are to be submitted in a timely manner such that corrections can be made prior to placement of concrete. Do not proceed with placing concrete until the pour stop locations are corrected.

3.05 CLEANING

A. Metal deck and accessories to receive sprayed fireproofing shall be clean of dust, grease, excessive oils, loose materials, and any other matter which would impair the adhesion of the fireproofing material to the deck and accessories.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	**DATE SUBMITTED**	**DATE APPROVED**
Product Data:		_____
1. Stud shear connector 2. Deck fastener (if used) 3. Primer Paint		
Shop Drawings:		_____
1. Metal deck drawings 2. Calculations		
Certificates:		_____
1. Deck materials 2. Welders qualifications & license 3. UL for materials 4. Steel deck manufacturer is SDI member		
Manufacturer's Instructions:		_____
1. Deck installation		
Qualifications		_____
1. Manufacturer 2. Erector 3. Welder 4. Mechanical fastener technician		
Survey:		_____
1. Deck edges		

* * *

DIVISION 5 - METALS

SECTION 05400 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.01 GENERAL:

A. Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of cold formed framing as indicated on the drawings and specified herein. Shapes, sizes and accessories as specified and detailed shall establish the type of units and materials to be used to provide the functional and finished aesthetic requirements desired.

B. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SUMMARY:

A. Extent of cold-formed metal framing is shown on drawings.

B. Types of cold-formed metal framing units include the following:

1. "C" shaped load bearing and non-load bearing steel studs.
2. "C" shaped steel joists.
3. Track Sections
4. Hat Channels
5. Clip Angles

C. Related Sections include the following:

1. Section 03300 – Concrete
2. Section 04200 – Unit Masonry
3. Section 05120 – Structural Steel
4. Section 05500 – Miscellaneous Metal
5. Section 06100 – Rough Carpentry
6. Section 06200 - Finish Carpentry
7. Section 07200 – Building Insulation
8. Section 09250 – Gypsum Wallboard

1.03 REFERENCES:

A. AISI – Specification for the design of cold-formed steel structural members, code of standard practice (COSP).
B. ASCE 7 – Minimum design loads for building or other structures.
C. ASTM A90 – Standard test method for weight (mass) of coating on iron and steel articles with zinc or zinc alloy coatings.
D. ASTM A370 – Standard test methods and definitions for mechanical testing of steel products.

E. ASTM A653 – Standard specification for steel sheet, zinc coated (galvanized) or zinc iron alloy coated (galvannealed) by the hot-dip process.

F. ASTM A780 – Standard practice for repair of damaged and uncoated areas of hot-dip galvanized coatings.
G. ASTM A924 – Standard specification for general requirements for steel sheet, metallic coated by the hot-dip process.
H. ASTM A1003 – Standard specification for steel, sheet, cold rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability.
I. ASTM A1008 – Standard specification for steel, sheet and strip, hot rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability.
J. ASTM 1011 – Standard specification for steel, sheet and strip, hot rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability
K. ASTM B633 – Standard specification for elctrodeposited coatings of zinc and iron on steel.
L. ASTM C754 – Specification for installation of framing members to receive screw attached gypsum wallboard, backing board or water resistant backing board.
M. ASTM C840 – Standard specification for application and finishing of gypsum board.
N. ASTM C955 – Standard specification for load bearing (tranverse and axial) steel studs, runners (tracks), and bracing or bridging for screw application of gypsum panel products and metal plaster bases.
O. ASTM C1007 – Standard specification for installation of load bearing (transverse and axial) steel studs and related accessories.
P. ASTM C1513 – Standard specification for steel taping screws for cold formed steel framing connections.
Q. ASTM E84 – Standard test method for surface burning characteristics of building materials.
R. ASTM E90 – Method for laboratory measurement of airborne sound transmission loss of building partitions.

1.04 DESIGN REQUIREMENTS:

A. Fire Resistive Rating: Where fire rated construction is indicated on drawings, provide materials and construction that are identical to those assemblies whose fire resistance rating has been determined per ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

1. Meet or exceed fire resistance requirements outlined under provisions of the GA-600 Fire Resistance Design Manual for wall and ceiling assemblies.
2. Meet or exceed flame/fuel/smoke requirements of ASTM E84 surface burning characteristics for finish materials

B. Sound Transmission Characteristics: For specified wall assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and

classified according to ASTM E413 by a qualified independent testing agency.

C. AISI Specifications: Comply with AISI's current 'Specification for the Design of Cold-Formed Steel Structural Members' and the following for calculating structural characteristics of cold formed metal framing:

1. CCFS Technical Bulletin: Current 'AISI Specification Provisions for Screw Connections'.

D. Fire Rated Assemblies: Where framing units are components of the assemblies indicated for a fire resistance rating, including those required for compliance with governing regulations, provide units which have been approved by governing authorities.

1.05 SUBMISSIONS:

A. All submissions shall be made in accordance with Section 01300 Submissions.

B. Product Data: Submit manufacturers data sheets on each product to be used, including:

1. Preparation instructions and recommendations
2. Storage and handling requirements and recommendations
3. Installation methods

C. Structural Calculations (For Structural Load Bearing or Supporting Assemblies):

1. Submit structural calculations prepared by manufacturer for approval. Submittal shall be sealed by a Professional Engineer registered in the state of the project
2. Description of design criteria
3. Engineering analysis depicting stress and deflection (stiffness) requirements for each framing application
4. Selection of framing components, accessories and welded connection requirements
5. Verification of attachments to structure and adjacent framing components
6. Engineer shall have a minimum of five (5) years experience with projects of similar scope

D. Shop Drawings (For Structural Load Bearing or Supporting Assemblies):

1. Submit shop drawings prepared by the manufacturer showing plans, sections, elevations, layouts, profiles and product components locations, including anchorage, bracing, fasteners, accessories and finishes.
2. Show connection details with screw types and locations, weld lengths and locations and other fastener requirements.

3. Where prefabricated or prefinished panels are to be provided, provide drawings depicting panel configurations, dimensions and locations

E. Welders Certificates: Submit manufacturers certificates, certifying welders employed on work, verifying AWS qualifications within the previous 12 months.

F. Mill Certificates: Signed by steel sheet producer indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coating thickness.

1.06 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Materials shall be provided by a firm that is experienced in manufacturing cold-formed metal framing similar to that indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for designing cold-formed metal framing and connections to comply with performance requirements. This responsibility includes preparation of Shop Drawings and design calculations by a qualified professional engineer.

B. Installer Qualifications: Work shall be installed by an experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Professional Engineer Qualifications: A professional engineer who is licensed to practice in the jurisdiction where project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent. Engage a qualified Professional Engineer to prepare design calculations, shop drawings and other structural data.

D. Mock-Up: When requested by the Architect or owner, contractor shall provide a 4’x4’ mock-up for evaluation of workmanship for each type of cold formed metal framing specified/required by the project.

1. Construct areas designated by Architect.
2. Do not proceed with remaining work until material, details, and workmanship are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.
4. Demolish mock-up at a time as a designated by the Architect.

1.07 DELIVERY, STORAGE, and HANDLING:

A. Store products in manufacturers unopened packaging until ready for installation.

B. Store materials protected from exposure to rain, snow or other harmful weather conditions, at temperature and humidity conditions per AISI COSP Section F3.

1.08 Project Conditions:

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturers absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Marino/WARE
2. Clark Steel Framing Systems.
3. Dietrich Metal Framing.

2.02 METAL FRAMING:

A. System Components: With each type of metal framing required, provide manufacturer's standard U-shaped steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.

B. Materials and Finishes:

1. For 16-gauge and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi; ASTM A 446, A 570, or A 611.
2. For 18-gauge and lighter units, which will only be attached mechanically, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 37,000 psi; ASTM A 446, A 570, or A 611.

C. Provide galvanized finish to metal framing components complying with ASTM A525 for minimum G90 coating.

1. Finish of installation accessories to match that of main framing components, unless otherwise indicated.

D. "C"-shaped Studs: Manufacturer's standard load-bearing steel studs of size, shape, and gauge indicated, with 2" flange and flange return lip.

E. Punched Channel Studs: Manufacturer's standard factory-punched, load-bearing steel studs of size, shape, and gauge indicated, with 1.375" flange.

E. Hat Shaped Furring Channels: 22 gauge with minimum 1/2" wide flanges. Minimum depth 3/4" unless otherwise noted on drawings.

F. Joists: Manufacturer's standard C-shape sections of size, shape, and gauge indicated.

G. Framing Accessories:

1. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength equal to that of main components.
2. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

a. Supplementary framing.
b. Bracing, bridging and solid blocking.
c. Web stiffeners.
d. End clips.
e. Gusset plates.
f. Stud kickers, knee braces and girts.
g. Hole reinforcing plates.
h. Backer plates.

2.03 FABRICATION:

A. General: Framing components may be prefabricated into panels prior to erection. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.

1. Fabricate framing assemblies in jig templates to hold members in proper alignment and position and to assure consistent component placement.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator.
4. Fasten other materials to cold-formed metal framing by welding, bolting or screw fastening, according to shop drawings.

B. Mechanical Fasteners: ASTM C1513, corrosion resistant coated, self-drilling, self-tapping steel drill screws. Minimum two (2) screws per connection.

C. Fabrication Tolerances: Fabricate assemblies level, plumb and true to line, to a maximum allowable tolerance variation of 1/8 inch in 10 feet, and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

D. Reinforce, stiffen and brace framing assemblies to withstand handling, delivery and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

A. Pre-installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

1. Verify that concealed wood/sheet steel blocking has been installed the proper locations.

B. Examine substrates to which metal framed construction attaches or abuts. Verify pre-set hollow metal frames, cast in anchors, and structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of wall framing.

C. Preparation: Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.02 INSTALLATION, GENERAL:

A. Manufacturer's Instructions: Install metal framing systems in accordance with ASTM C 1007 and manufacturer's printed or written instructions and recommendations, unless otherwise indicated.

B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners. Provide fasteners at corners and ends of tracks.

1. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
2. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
3. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim, and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.

C. Installation of Wall Stud System: Secure studs to top and bottom runner tracks by screw fastening at both inside and outside flanges.

1. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
2. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of the stud system. Independently frame both sides of joints.
3. Install horizontal stiffeners in the stud system, spaced (vertical distance) at not more than 4'-6" o.c. Mechanically fasten at each intersection.
4. Fasten hole reinforcing plates over web penetrations that exceed the size of the manufacturer’s standard punched openings.

D. Erection Tolerances: Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true to line joints.

1. Step in face and jog in alignment between panels not to exceed 1/16".

E. Insulation: Install insulation in exterior framing members, headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

3.03 REPAIRS AND PROTECTION:

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings and all welded areas on fabricated and installed cold-formed metal framing with galvanized repair paint, according to ASTM A 780 and manufacturer’s written instructions. Wire brush slag off of all welds.

END OF SECTION

DIVISION 5 - METALS

SECTION 05514 - STEEL RAILINGS

PART 1 - GENERAL

1.01 RELATED WORK

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

1.02 WORK INCLUDED

A. Furnish and install all steel railing and related items indicated on the drawings and specified herein.

1.03 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete
B. Section 05120 – Structural Steel
C. Section 05500 – Miscellaneous Metal
D. Section 07900 - Caulking and Sealants
E. Section 09900 – Painting

1.04 SUBMITTALS

A. All submission shall be made in accordance with Section 01300 – Submissions and as may be modified below.

B. Shop Drawings:

1. Submit shop drawings of all items specified in accordance with the requirements of the General Provisions.

2. Shop drawings shall show welding, fabrication and installation of railings including all plans, typical elevations, details of components, and attachment to other units of work.

3. Where installed products are indicated to comply with certain design loading, include structural computations material properties and other information needed for structural analysis review by the Architect.

C. Samples:

1. Submit samples of items requested to illustrate fabrication, detail, and finish, as per the requirements of the General Provisions.

2. Identify all samples completely describing material, gauge, treatment, texture, finish, and color.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural performance of railing systems:

1. Engineer, fabricate and install railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for railings, anchors, and connections. Apply each load to product the maximum stress in each of the respective components comprising railing systems.

a. Top rail of guardrail systems: Capable of withstanding the following loads applied as indicated:

i. Concentrated load of 200lbs applied at any point and in any direction.

ii. Uniform load of 50lb per linear foot applied horizontally and concurrently with uniform load of 100lb per linear foot applied vertically downward.

iii. Concentrated load need not be assumed to act concurrently with uniform loads.

b. Handrails not serving as top rails: Capable of withstanding the following loads applied as indicated:

i. Concentrated load of 200lbs applied at any point and in any direction.

ii. Uniform load of 50lb per linear foot applied in any direction.

iii. Concentrated load need not be assumed to act concurrently with uniform load.

c. Infill area of guardrail systems: Capable of withstanding the following loads applied as indicated:

i. Horizontal concentrated load of 200lbs applied to one square foot at any point in the system.

ii. This concentrated load need not be assumed to act concurrently with any other load.

2. Control of corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.06 EXAMINATION AND COORDINATION

A. The Contractor's attention is directed to the other specification sections to ascertain the scope of reinforcing, supporting, and attachment steel work specified therein. Supplementary parts

necessary to complete each item of miscellaneous metals, though such parts are not shown or specified, shall be included.

B. Examine all surfaces to which this work is to be attached. Notify the General Contractor if any conditions exist which are detrimental to the proper and timely installation of this work.

C. Cooperate in the coordination and scheduling of the work of this section with the work of other trades. Anchors, sleeves, framing, fastenings, and other miscellaneous items to be embedded in concrete or masonry, or required for securing metal work to other construction, shall be furnished as required so as not to delay the progress of the work.

D. Verify, by measurements at the job site, all dimensions affecting this work. Where railings are to fit to other construction, check actual dimension other construction before fabrication. Field dimensions which are at variance with those on the approved shop drawings shall be brought to the attention of the Architect. Where field measurements cannot be made without delaying the work, obtain guaranteed dimensions in writing and proceed without field measurements if specifically directed to do so. Starting of work will be construed as acceptance of surfaces.

E. Furnish all necessary templates and patterns required by other sections.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, receive, handle, and store all materials to prevent damage, deterioration, or delay. Remove defective materials from project site within 24 hours.

B. Store handrails and railing systems in clean, dry location away from uncured concrete and masonry, protected against damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall be new stock, free from defects impairing strength, durability or appearance and of best commercial quality for each intended purpose.

B. All steel posts, balusters, top and bottom rails shall be schedule 40 pipe carbon steel sections as indicated on the drawings, conforming to ASTM A53, Type S, Grade A.

C. Handrails shall be steel, stainless steel, brass, or bronze as indicated on the drawings. If drawings do not indicate specific handrail material, then assume 1.5” dia. schedule 40 steel, painted.

D. Expansion shields, plugs, bolts, and other anchorage devices in masonry and concrete shall be of approved type. Ferrous types shall be galvanized. Fiber or wood plugs in masonry and concrete will not be accepted.

E. Galvanizing and Cadmium Plating:

1. Galvanizing of products after fabrication: ASTM A-123 and A-153.

2. Cadmium plating: ASTM A-165, Type TS.

2.02 MATERIAL STANDARDS

A. Steel Pipe - ASTM A-120
B. Steel plates, shapes, and bars - ASTM A36.
C. Tubing - Hot-rolled, ASTD A501 or cold-rolled, ASTM A500.
D. Gray Iron Castings – ASTM A48, Class 30.

PART 3 - EXECUTION

3.01 FABRICATION AND ASSEMBLY

A. All work shall be fabricated in a first class manner by mechanics skilled in the trade, in accordance with basic details and information contained on the Construction Drawings.

B. All joints shall be as strong and rigid as adjoining sections. Welding shall be uniform and continuous along entire line of contact, except where spot welding is indicated or permitted.

C. Welding and bracing shall be of adequate strength and durability, with joining tight, flush, in plane, dressed, and smooth and clean.

D. Abutting bars shall pass through larger bars and be welded.

E. All welds shall be concealed where practical. Where exposed, welds shall be ground smooth.

F. Threaded connections shall be made up tight so that threads are entirely concealed. Removable members shall be carefully machined and fitted and secured by means of screws of bolts of proper size and approved spacing.

G. All fastening shall be concealed where practicable. Where exposed in finished surfaces, bolt and screw heads shall be flat and countersunk in exposed work and elsewhere as required unless otherwise shown or approved.

H. Long members shall be held together at end joints by concealed sleeves of similar shape, welded or braced in place, but designed to provide for expansion or contraction.

I. Fabrication, assembly, and fitting of the work shall be done in the shop, ready for installation at the site. Work which cannot be shop assembled shall be given a trial fit at the shop to insure proper field assembly.

3.02 GALVANIZING

A. Not Applicable

3.03 PAINTING

A. Not applicable

3.04 POWDER COATING

A. When noted on the Drawings, provide a two-coat powder coating system applied as per manufacturers specifications.

1. Clean all surfaces of oily or greasy residues, dirt, mill scale, oxidation, etc.

2. Mechanical pretreatment by abrasive blasting or liquid chemical pretreatment by zinc phosphate immersion.

3. Powder primer coat, Tiger Dryprotector 69/70111 or equivalent.

4. Powder finish coat, Tiger Drylac Series 75, semi-gloss, or equivalent.

B. Colors shall be as selected by Architect.

3.05 INSTALLATION

A. Perform cutting, drilling and fitting required for installation. Set products accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels.

B. Allow for thermal movement resulting from maximum change 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.

C. Provide necessary lugs and brackets for assembly of units. Use concealed fasteners wherever possible.

D. Posts shall be set in concrete in accordance with any of the following methods:

1. Core-drilling existing or new concrete, embedding posts a min. of 4” deep, and filling with setting cement. Top of setting cement

must be slightly higher than surrounding concrete and sloped for drainage.

E. Provide anchoring devices and fasteners where necessary for securing metalwork to existing construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, etc. Such accessories shall be furnished in ample time for setting and securing in place.

F. Field Welding: Comply with applicable AWS specifications for procedures, for appearance and quality of welds made, and for methods used in correcting welding work. Field-welded connections, which are not to be left as exposed joints, are only permissible where items cannot be shop welded, because of shipping size or other physical limitations. Grind exposed welded joints smooth and restore to match finish of adjacent surfaces.

G. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint and paint exposed areas with same material.

H. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required, all at the discretion of the Architect.

3.06 CLEANING, ACCEPTANCE, AND PROTECTION

A. All work shall be properly protected from defacement or damage. Defective work shall be satisfactorily repaired or removed and replaced at no additional cost to the Owner.

END OF SECTION

DIVISION 5 - METALS

SECTION 05516 – ALUMINUM RAILINGS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

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

1.02 WORK INCLUDED

A. Furnish and install all pre-fabricated aluminum railing systems and related items indicated on the drawings and specified herein.

1.03 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete
B. Section 05120 – Structural Steel
C. Section 05500 – Miscellaneous Metal
D. Section 07900 - Caulking and Sealants
E. Section 09900 – Painting

1.04 SUBMITTALS

A. All submission shall be made in accordance with Section 01300 – Submissions and as may be modified below.

B. Manufacturer's product data.

C. Shop Drawings:

1. Submit shop drawings of all items specified in accordance with the requirements of the General Provisions.

2. Shop drawings shall show welding, fabrication and installation of railings including all plans, typical elevations, details of components, and attachment to other units of work.

3. Where installed products are indicated to comply with certain design loading, include structural computations material properties and other information needed for structural analysis review by the Architect.

B. Samples:

1. Submit samples of items requested to illustrate fabrication, detail, and finish, as per the requirements of the General Provisions.

2. Identify all samples completely describing material, gauge, treatment, texture, finish, and color.

3. Samples for finish color selection purposes in the form of manufacturers color chart showing full range of colors.

4. Submit at least (2) 6" long samples of the top rail when its shape is other than standard rounds, squares, or rectangles, and when specifically requested by architect.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Engineer railing systems to withstand structural loads indicated and determine the allowable design working stresses of railing materials based on the following:

1. For aluminum: The Aluminum Association's "Aluminum Design Manual".

B. Structural performance of railing systems:

1. Engineer, fabricate and install railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for railings, anchors, and connections. Apply each load to product the maximum stress in each of the respective components comprising railing systems.

a. Top rail of guardrail systems: Capable of withstanding the following loads applied as indicated:

i. Concentrated load of 200lbs applied at any point and in any direction.

ii. Uniform load of 50lb per linear foot applied horizontally and concurrently with uniform load of 100lb per linear foot applied vertically downward.

iii. Concentrated load need not be assumed to act concurrently with uniform loads.

b. Handrails not serving as top rails: Capable of withstanding the following loads applied as indicated:

i. Concentrated load of 200lbs applied at any point and in any direction.

ii. Uniform load of 50lb per linear foot applied in any direction.

iii. Concentrated load need not be assumed to act concurrently with uniform load.

c. Infill area of guardrail systems: Capable of

withstanding the following loads applied as indicated:

i. Horizontal concentrated load of 200lbs applied to one square foot at any point in the system.

ii. This concentrated load need not be assumed to act concurrently with any other load.

2. Control of corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

a. Aluminum contacting other metals that are not considered compatible shall be protected in a manner acceptable to the manufacturer.

1.06 QUALITY ASSURANCE

A. The Contractor's attention is directed to the other specification sections to ascertain the scope of reinforcing, supporting, and attachment steel work specified therein. Supplementary parts necessary to complete each item of miscellaneous metals, though such parts are not shown or specified, shall be included.

B. Examine all surfaces to which this work is to be attached. Notify the General Contractor if any conditions exist which are detrimental to the proper and timely installation of this work.

C. Cooperate in the coordination and scheduling of the work of this section with the work of other trades. Anchors, sleeves, framing, fastenings, and other miscellaneous items to be embedded in concrete or masonry, or required for securing metal work to other construction, shall be furnished as required so as not to delay the progress of the work.

D. Verify, by measurements at the job site, all dimensions affecting this work. Where railings are to fit to other construction, check actual dimension other construction before fabrication. Field dimensions which are at variance with those on the approved shop drawings shall be brought to the attention of the Architect. Where field measurements cannot be made without delaying the work, obtain guaranteed dimensions in writing and proceed without field measurements if specifically directed to do so. Starting of work will be construed as acceptance of surfaces.

E. Furnish all necessary templates and patterns required by other sections.

F. Single Source Responsibility: Obtain railing systems and handrails from a single fabricator manufacturer.

G. All materials and workmanship covered by this section will carry a (5) year warranty from date of acceptance.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, receive, handle, and store all materials to prevent damage, deterioration, or delay. Remove defective materials from project site within 24 hours.

B. Store handrails and railing systems in clean, dry location away from uncured concrete and masonry, protected against damage.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Manufacturer and type product:

1. For purpose of determining quality and performance requirements, this specification is based on Aluminum Handrails and Guardrails by "Poma Corporation", 2040 SW Poma Drive, Palm City, FL, 34990.

2.02 METALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required:

1. Structural extrusions such as posts shall be 6061-T6 or 6005-T5 Alloy/Temper.

2. All other extrusions such as Caps, Pickets, Mid and Bottom Rails shall be at least 6063-T5.

3. Castings: To be high quality prime material or materials re-melted from prime extrusion.

2.03 GROUT AND ANCHORING CEMENT

A. Non-shrink, Non-metallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.

B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, non-shrink, non-staining, high strength 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 or provide a sealer or waterproof coating recommended for exterior use by manufacturer to be applied by the installer or other qualified contractor or subcontractor.

2.04 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler/Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Railing to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railing to other types of construction indicated and capable of withstanding design loadings.

1. For aluminum railings in coastal environments provide fasteners fabricated from stainless steel or aluminum only.

C. Fasteners for interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

2.05 FABRICATION

A. General: Fabricate handrails and railing systems to comply with requirements indicated for design dimensions, details, finish, and member sizes, including wall thickness of hollow members post spacings, and anchorage, but not less than those required to support structural loads.

B. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of handrails and railings to prevent bucking, opening up of joints, overstressing of components, connections, and other detrimental effects. Base design calculation of actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change Range: 100 deg F ambient 150 deg F material surfaces.

C. Pre-assemble railing systems 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 field assembly and coordinated installation. Use connections that maintain structural value of joined pieces.

D. Assembly shall be in a neat workmanlike manner using M.I.G. or T.I.G. Welding Processes as required. Horizontal Channels shall be punched to receive pickets and welds in this application shall be concealed from view.

1. Channels to receive a snap cover only when specifically required and noted on drawings.

2. All Posts shall be structurally welded to Top Rail and Mid and Lower Horizontal Members to assure fixed fastening for the life of the rail.

3. Corners and segmented sections shall be hairline fitted by mitre and further welded as required to obtain maximum assurance of strength through the railing's useful life.

4. All exposed weld surfaces to be ground smooth. Finish shall be NAAMM Type 2.

5. All splices shall be accomplished by butting one Top Rail to the next with a structural sleeve insert extending from one Top Rail to the next and further secured by means of a Stainless Steel Aluminum or other proper screw or pop-rivet.

   a. Butt splices to be either hairline fitted or properly gapped to provide for proper expansion and contraction movement. For expansion joints, only one side of the sleeve insert is fastened to the top rail.

6. End connection required to fasten to the building structure require either a welded end clip or separate slide clip.

7. Provide weep holes when necessary to drain closed section from pretreatment immersion and sprays also for moisture from condensation to escape.

2.06 ALUMINUM FINISHES

A. All aluminum railings to receive a baked on painted finish over full pretreatment and except when specified on the drawings to be mill finish or anodized.

B. Pretreatment Process: A multi-stage pretreatment process is required prior to shop painting.

1. The railing shall be dipped or sprayed in a concentrated alkaline cleaner then rinsed in clear water. This process provides cleaning, degreasing, and deep etching on the surface.

2. The product shall then be dipped or sprayed in a concentrated acidic treatment to deoxidize, desmut and neutralize the surface, then rinsed in clear water.

3. The product shall then be dipped or sprayed in an acidic conversion coating to act as a bonding coating for paint adhesion.

4. The product must be completely dried before painting.

C. Painting:

1. E.S.P. applied thermosetting KYNAR 500 Fluoropolymer Resin Coating with inhibitive flash primer over conversion coating. Paint shall be baked to at least 450°F. Paint to be similar to PPG DURANAR (with 70% PVDF). Meets or exceed A.A.M.A. 605-2-92 specification.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All work shall be fabricated and installed in a first class manner by mechanics skilled in the trade, in accordance with basic details and information contained on the Construction Drawings.

B. Coordinate settings drawing, diagrams, templates, instruction, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

C. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of handrails and railings. Set handrails and railing accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.

D. All panels and extrusions, exposed in the finished work, shall be free from buckle, warping, and oil canning effects. The flatness of the panels shall not deviate more than 1/16" plus or minus from a true plan if tested between any two points.

E. Built-in reinforcement wholly concealed within the finished assembly shall be as shown or required. Ferrous metal in contact with aluminum shall be insulated from contact with a solid, continuous coating of bituminous paint or other material approved by the Architect.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, of dissimilar metals with a heavy coat of paint or epoxy.

G. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railings to in-place construction.

H. Posts shall be set in concrete in accordance with any of the following methods:

1. Set in position during concrete pouring. Provide temporary bracing as required for setting of items until adequate cure time is achieved.

2. Core-drilling existing or new concrete, embedding posts a min. of

8” deep, and filling with setting cement. Top of setting cement must be slightly higher than surrounding concrete and sloped for drainage.

3. Setting sleeves in new concrete during pouring to accommodate posts in lieu of core-drilling. Follow setting instructions above.

3.04 CLEANING, PROTECTION, AND TOUCH-UP PAINTING

A. All work shall be properly protected from defacement or damage. Defective work shall be satisfactorily repaired or removed and replaced at no additional cost to the Owner.

B. On delivery all railing will have protective cover over cap only. Immediately upon completion of installation of railing installer shall remove cap cover and clean all work for inspection and approval.

C. After installation the General Contractor shall be responsible for protecting the railings during the balance of construction.

D. Painted aluminum surfaces shall be cleaned with plain water containing a mild soap or detergent. No abrasive agents or harsh chemicals are to be used.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

1.02 SUMMARY

A. Types of work in this section include rough carpentry for:

1. Framing with dimensional lumber as shown on the drawings and as specified herein.

2. Plywood, OSB, particleboard panels and/or other sheathing as shown on the drawings and as specified herein.

3. Wood blocking, nailers and/or sleepers.

1.03 RELATED SECTIONS

A. 06170 – Prefabricated Structural Wood.

B. 06164 – Gypsum Sheathing.

C. 06200 – Finish Carpentry.

D. 07200 – Building Insulation.

E. 07231 – Air Vapor Barrier System.

F. 07241 – Direct Applied Exterior Finish Systems.

G. Various Division 7 Roofing Specifications.

H. Various Division 9 Finishes Specifications.

F. If designated as a LEED project, then also:

1. Division 1 Section "LEED Requirements" for recycled content and regional materials requirements, submittals and additional LEED requirements.

2. Division 1 Section "Construction Waste Management" for recycling construction waste.

1.04 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated.

B. Exposed Framing: Framing not concealed by other construction.

C. Dimensional Lumber: Lumber of 2 inches nominal or greater, but less than 5 inches nominal in least dimension.

1.05 QUALITY ASSURANCE

A. All materials shall be provided and all work shall be performed in accordance with the NYS Uniform Building Code requirements (current version).

B. Lumber shall be certified by the following authorities/grading agencies:

1. NELMA: Northeastern Lumber Manufacturers' Association.

2. NLGA: National Lumber Grades Authority.

3. RIS: Redwood Inspection Service.

4. SPIB: The Southern Pine Inspection Bureau.

5. WCLIB: West Coast Lumber Inspection Bureau.

6. WWPA: Western Wood Products Association.

7. FSC: Forest Stewardship Council.

1.06 SUBMISSIONS

A. All submissions shall be made in accordance with Section 01300 - Submissions and as modified below.

B. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit a listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in forms of a signed copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.

C. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.

1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, note amount of preservative retained, and conformance with applicable standards.

a. For water-borne treatment include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

b. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

D. LEED Submittals; for projects requiring LEED certification, submit the following additional information:

1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements".

2. Credit EQ 4.1: Manufacturers' product data for interior field-applied construction adhesive, including printed statement of VOC content in accordance with Section 01352 "LEED Requirements".

3. Credit EQ 4.4: Composite wood manufacturer's product data for each composite wood product used indicating that product's bonding agent contains no urea formaldehyde in accordance with Section 01352 "LEED Requirements".

4. Forest Certification for the following wood products; materials produced from wood obtained from forests certified by a Forest Stewardship Council (FSC)-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Dimensional lumber framing.

2. Plywood.

1.07 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels flat with spacers between each bundle to provide for air circulation around stacks and under coverings.

PART 2 - MATERIALS

2.01 LUMBER, GENERAL

A. Lumber Standards: Manufacture lumber to comply with *"Voluntary Lumber Standard"* DOC PS20-10, or most current edition, and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

1. Grade Stamps: Factory-mark each piece of lumber with grade stamp

of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill..

2. Where nominal sizes are indicated, provide actual sizes required by DOC PS20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

3. Provide dressed lumber, S4S, unless otherwise indicated.

4. Plywood Standards: Comply with the latest edition of U.S. Product Standard PSI and APA performance standards.

5. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

1. SPIB: Southern Pine Inspection Bureau.
2. WWPA: Western Wood Products Association.

C. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing and mill.

2.02 FRAMING LUMBER

A. For items of dimensional lumber size, provide Construction or No. 2 grade lumber with 15 percent maximum moisture content of any species, unless otherwise noted on the Construction Drawings.

1. Hem-fir (north); NLGA.

2. Mixed southern pine; SPIB.

3. Spruce-pine-fir; NLGA.

4. Hem-fir; WCLIB, or WWPA.

5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

6. Species group below includes hem-fir and spruce-pine-fir (south).

7. Western woods; WCLIB or WWPA.

8. Northern species; NLGA.

2.03 MISCELLANEOUS LUMBER

A. Provide wood for support or attachment of other work including cant strips, nailers, blocking, furring, grounds, stripping, rooftop equipment bases and support curbs, and similar members. Provide lumber sizes indicated, worked into shapes shown.

1. Grade: Standard grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 boards per SPIB rules.

2.04 PLYWOOD PANELS AND ROOF SHEATHING

A. Plywood must contain no urea-formaldehyde resins.

B. Telephone and Electrical Equipment Backing Panels: DOC PS1, Exposure 1, C-D Plugged, in thicknesses as indicated, not less than ½ inch nominal thickness.

C. Plywood Roof Sheathing: Exposure 1, Structural 1 sheathing.

1. Span Rating: Not less than 48/24.

2. Nominal Thickness: Not less than 23/32 inch.

2.05 MISCELLANEOUS MATERIALS

A. Fasteners and Anchorages: Provide size, type, material, and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

1. Where rough carpentry work is exposed to weather, in ground contact, pressure-preservative treated, or in areas of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating, complying with ASTM A153.

2. Nails, brads and staples shall comply with ASTM F 1667.

3. Power-Driven fasteners shall comply with NES NER-272.

4. Wood Screws shall comply with ASME B18.6.1.

5. Lag Bolts shall comply with ASME B18.2.1.

6. Bolts: Steel bolts shall comply with ASTM A307, Grade A; with ASTM A563 hex nuts and, where so indicated, flat washers.

7. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit

masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

a. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

b. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

8. Metal Framing Anchors (where applicable):

a. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or engineered-approved equals by one of the following:

a. Simpson Strong-Tie Co., Inc.

b. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

c. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet, complying with ASTM A 653, G60 (Z180) coating designation.

d. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

D. Building Paper: Asphalt saturated felt, non-perforated conforming to ASTM D226.

E. In the absence of requirements of section 07231, provide a self-adhering vapor-permeable air barrier membrane; Blueskin Breather manufactured by Henry; a self-adhering membrane consisting of a microporous film laminate, backed with a specially applied adhesive, which allows water vapor to permeate through while acting as a barrier to air and rain water. Membrane shall have the following physical properties:

1. Air leakage: <0.002 CFM/ft2 @ 1.6 lbs/ft2 to ASTM E283-91.

2. Water vapor permeance: 37 perms to ASTM E 96.

3. Membrane Thickness: 17 mils.

4. Low temperature flexibility -40 degrees F: Pass to ASTM D3111.

5. Hydrostatic Water Resistance: 18 psi ASTM D751 Procedure

E. Sill Sealer Gaskets: Glass fiber resilient insulation fabricated in strip form for use as a sill sealer; 1" nominal thickness compressible to 1/32"; selected from manufacturer's standard widths to suit width of sill members indicated; in rolls of 50' or 100' in length.

F. Water-Repellent Preservative: (for exposed ends of posts and beams, not for treating cuts in preservative-treated lumber): NWWDA-tested and accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

G. Construction Adhesive: Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.06 FIRE RETARDANT-TREATED LUMBER

A. General: Where fire-retardant-treated lumber and plywood are indicated, use materials impregnated with fire-retardant chemicals by a pressure process or other means acceptable to authorities having jurisdiction to produce products with the following fire-test-response characteristics:

1. Flame-spread index of not greater than 25 when tested according to ASTM E 84.

B. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.

C. Exterior-Type Fire-Retardant Treatment: Organic-resin-based formulation that shows no increase in flame spread of treated material after being weathered according to ASTM D 2898, Method A.

D. Kiln-dry material after treatment to levels required for untreated material. Do not use material that does not comply with requirements for untreated material or is warped or discolored.

E. Acceptable pressure-impregnated products include Hoover’s Pyro-Guard for interior applications and Exterior Fire-X for exterior applications.

2.07 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: Where lumber or plywood is indicated as "Trt-Wd" or "Treated," or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX). Mark each treated item with the AWPB Quality Mark Requirements, and with the quality mark of an inspection agency approved by the ALSC Board of Review.

1. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2, acceptable to authorities having jurisdiction and containing no arsenic or chromium. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Do not use material that is warped or does not comply with requirements for untreated material. Treat indicated items and the following:

a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

c. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

d. Wood framing members less than 18" above grade, in crawl spaces or unexcavated areas.

e. Wood floor plates that are installed over concrete slabs-on-grade.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units with material defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

B. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

C. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other

work.

D. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

1. Unless otherwise indicated on the Construction Drawings, framing shall be at 16” centers.

E. Metal Anchors for Engineered Wood Products (where applicable): Install metal anchors to comply with manufacturer's written instructions.

F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.

2. Use copper naphthenate for items not continuously protected from liquid water.

H. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Comply with Table 2304.10.1 – “Fastening Schedule” in ICC’s International Building Code. Provide all blocking and framing as indicated and as required in order to support facing materials, fixtures, specialty items, and trim.

I. Use common wire nails, except as otherwise indicated; use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

J. Do not splice structural members between supports.

3.02 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Provide wherever shown and where required for attachment to other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

C. Provide permanent grounds of dressed, preservative treated, key-

beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.03 WALL AND PARTITION FRAMING

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness, whose widths equal that of studs. Fasten plates to supporting construction.

1. Space wood studs at 16 inches o.c., unless otherwise indicated.

2. Provide continuous horizontal blocking at mid-height of partitions more than 96 inches high, using members of 2-inch nominal thickness, and of same width as wall or partitions.

B. Construct corners and intersections with three (3) or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb (jack) studs.

1. For load-bearing walls, provide double-jamb (jack) studs for openings 60 inches and less in width, and triple-jamb (jack) studs for wider openings. Provide headers of depth indicated on the drawings.

D. Provide diagonal bracing in walls, at locations indicated, full-story height, unless otherwise indicated.

3.04 FLOOR JOIST FRAMING

A. Space joists at 16 inches o.c., unless otherwise indicated.

1. Set each joist with crown up.

2. Provide continuous horizontal blocking at mid-span of joists, using members of same nominal size of joists.

B. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of joists.

1. Provide double-joists, nailed together, directly beneath non-bearing partition walls when joist run parallel to said walls.

3.05 RAFTER FRAMING

A. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut ridge, place directly opposite each other and nail to ridge member, or use metal ridge hangers.

1. Space wood rafters at 16 inches o.c., unless otherwise indicated.

2. Set each rafter with crown up.

B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.06 PLYWOOD SHEATHING

A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Install with the long dimension of the panel across supports, except where noted, and with panel continuous over two or more spans. Suitable edge support shall be provided where indicated on drawings (or in recommendations of the American Plywood Association) by use of panel clips, tongue-and-groove panels, or lumber blocking between joists. Panel end joints shall occur over framing. Allow 1/8-inch spacing at panel ends and 1/4-inch at panel edges, unless otherwise recommended by the panel manufacturer.

C. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.

D. Nail 6 inches o.c. along panel edges and 12 inches o.c. at intermediate supports, except that when supports are spaced 48 inches o.c. or more, space nails 6 inches o.c. at all supports. Use 6d common nails for panels 1/2-inch and less and 8d for greater thicknesses, except that when panels are 1-1/8 inch, use 8d ringshank or 10d common.

3.07 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 06164 – EXTERIOR GYPSUM SHEATHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

1.02 SUMMARY

A. Section Includes: Fiberglass-mat faced, moisture-resistant gypsum sheathing.

1.03 RELATED SECTIONS

A. Section 05400 - Cold Formed Metal Framing.

B. Section 06100 - Rough Carpentry.

C. Section 07231 – Air Vapor Barrier System.

D. Section 07241 – Direct Applied Exterior Finish System.

E. If designated as a LEED project, then also:

1. Division 1 Section "LEED Requirements" for recycled content and regional materials requirements, submittals and additional LEED requirements.

2. Division 1 Section "Construction Waste Management" for recycling construction waste.

1.02 REFERENCES

A. ASTM International (ASTM):

1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.

2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

3. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.

6. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

7. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, product data and installation instructions for each product specified.

B. LEED Submittals:

1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements".

1.04 WARRANTY

A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay).

B. Manufacturer's Warranty:

1. Five years against manufacturing defects.

2. Ten years against manufacturing defects when used as a substrate in architecturally specified EIFS.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. To establish a level of quality and standard of performance, this section is based on the following products and manufactured by *Georgia-Pacific Gypsum LLC*:

1. Fiberglass-Mat Faced Gypsum Sheathing: *DensGlass Exterior Sheathing*, or architect approved equal.

2.02 MATERIALS

A. Fiberglass-Mat Faced Gypsum Sheathing, ASTM C1177: DensGlass Exterior Sheathing, Georgia-Pacific Gypsum.

1. Thickness: 1/2" or 5/8" as indicated on drawings.

2. Width: 4 feet.

3. Length: 8 feet.

4. Edges: Square.

5. Surfacing: Coated fiberglass mat on face, back, and long edges.

6. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.

7. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.

8. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.

9. Permeance (ASTM E96): 23 perms.

10. R-Value (ASTM C518): 0.56 (1/2”); 0.67 (5/8”).

11. Mold Resistance(ASTM D3273):

B. Fire-Rated (Type X) Fiberglass-Mat Faced Gypsum Sheathing, ASTM C1177: 1/2 inch and 5/8 inch DensGlass Fireguard Type X Exterior Sheathing, Georgia-Pacific Gypsum.

1. Thickness: 1/2" or 5/8” as indicated on drawings.

1. Width: 4 feet.

2. Length: 8 feet.

3. Weight: 2500 pounds per M square feet.

4. Edges: Square.

5. Surfacing: Coated fiberglass mat on face, back, and long edges.

6. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 650 pounds per square foot, dry.

7. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.

8. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.

9. Permeance (ASTM E96): Not more than 12 perms.

11. R-Value (ASTM C518): 0.56 (1/2”); 0.67 (5/8”).

2.03 ACCESSORIES

A. Screws: ASTM C1002, corrosion-resistant treated.

B. In the absence of requirements of section 07231, provide a self-adhering vapor-permeable air barrier membrane; Blueskin Breather

manufactured by Henry; a self-adhering membrane consisting of a microporous film laminate, backed with a specially applied adhesive, which allows water vapor to permeate through while acting as a barrier to air and rain water. Membrane shall have the following physical properties:

1. Air leakage: <0.002 CFM/ft2 @ 1.6 lbs/ft2 to ASTM E283-91.

2. Water vapor permeance: 37 perms to ASTM E 96.

3. Membrane Thickness: 17 mils.

4. Low temperature flexibility -40 degrees F: Pass to ASTM D3111

5. Hydrostatic Water Resistance: 18 psi ASTM D751 Procedure

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Inspection: Verify that project conditions and substrates are acceptable to the installer, to begin installation of work of this section.

2. Commencement of the work represents acceptance of the substrate conditions.

3.02 INSTALLATION

A. General: In accordance with ASTM C1280 and the manufacturer's recommendations.

1. Manufacturer's Recommendations:

a. Current "Product Catalog", *Georgia-Pacific Gypsum*.

2. Fastening:

a. Provide fastening materials and methods as recommended by the manufacturer for the particular substrate construction.

b. Fastening shall be in accordance with governing codes.

c. Fastening shall be in accordance with any governing FM requirements.

3. Air barrier:

a. Install self-adhering permeable air barrier transition membrane unless other air barrier systems are specified.

3.03 PROTECTION

A. Protect gypsum board installations from damage and deterioration until finished exterior materials are applied.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions, Division 1 Specification sections, apply to work of this section.

1.02 SUMMARY

A. Types of work in this section include finish carpentry for:

1. Exterior standing and running trim.

2. Interior standing and running trim.

3. Interior plywood.

4. Window stools & aprons.

5. Closet shelving.

B. Casework, cabinetry, countertops, and wainscot paneling systems are specified in other Division 6, Division 11, and Division 12 sections.

1.03 RELATED SECTIONS

A. 06100 – Rough Carpentry.

B. Various Division 9 Finishes Specifications.

C. If designated as a LEED project, then also:

1. Division 1 Section "LEED Requirements" for recycled content and regional materials requirements, submittals and additional LEED requirements.

2. Division 1 Section "Construction Waste Management" for recycling construction waste.

1.04 QUALITY ASSURANCE

A. Lumber: Comply with Voluntary Product Standard PS-20. Lumber shall bear grade and trademark of the association under whose rule it is produced.

1. Southern Forest Products Association (SFPA).

2. West Coast Lumber Inspection Bureau (WCLIB).

3. American Plywood Association (APA).

4. Western Wood Products Association (WWPA).

5. American Wood Preservers Bureau (AWPB).

6. National Woodwork Manufacturer's Association (NWMA).

7. National Hardwood Lumber Association (NHLA).

8. Architectural Woodwork Institute (AWI).

9. Wood Moulding and Millwork Producers (WM).

10. Forest Stewardship Council (FSC).

B. Plywood Grading Rules:

1. U.S. Product Standard PS 1-83 for Construction and Industrial Plywood.

2. American Plywood Association (A.P.A.).

C. Perform finish carpentry in accordance with AWI Quality Standards, "Custom" grade, unless otherwise noted.

1.05 SUBMITTALS

A. All submissions shall be made in accordance with Section 01300 - Submissions and as modified below.

B. Submit shop drawings and product data for architectural woodwork. Indicate materials, component profiles, jointing details, finishes, and accessories.

1. If requested, provide 6” long samples of trim pieces.

1.06 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

C. Do not deliver finish carpentry materials, until painting, wet work, grinding, and similar operations which could damage, soil, or deteriorate woodwork have been completed in installation areas.

D. Deliver interior finish carpentry only when environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas,

store only where environmental conditions meet requirements specified for installation areas.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - MATERIALS

2.01 SEASONING

A. Moisture Content: Except grades and species having a definite moisture content limitation under established grading rules, lumber shall be kiln-dried to a maximum moisture content of twelve percent (12%).

2.02 EXTERIOR STANDING AND RUNNING TRIM

A. Trim shall be of sizes, configurations, and profiles as indicated on the drawings for the following applications.

1. Finished lumber.

2. Door and window casings.

3. Fascia, rake, and associated trim.

4. Other applications as may be detailed on the drawings.

B. Exterior applications shall be clear all-heart redwood, clear heart western red cedar, southern yellow pine, or black locust, unless otherwise noted on the drawings as a different species or resin-based, hardboard, or composite material.

1. Provide WM grade P for opaque/painted finish.

2. Provide WM grade N for natural/stained finish.

2.03 INTERIOR STANDING AND RUNNING TRIM

A. Trim shall be of sizes, configurations, and profiles as indicated on the drawings for the following applications.

1. Finished lumber.

2. Door and window casings.

3. Wall base molding.

4. Chair rails.

5. Crown moldings.

6. Picture moldings.

7. Other applications as may be detailed on the drawings.

B. Interior softwood applications shall be select eastern white pine or sapwood birch; hardwood applications shall be white oak, red oak, or hard maple, unless otherwise noted on the drawings as a different species or resin-based, hardboard, or composite material.

1. Provide WM grade P for opaque/painted finish.

2. Provide WM grade N for natural/stained finish.

2.04 INTERIOR PLYWOOD

A. Exposed finished plywood applications shall utilize furniture-grade plywood of a face species coordinating with specified trim or as indicated on the drawings.

1. Provide Type II interior sound grade for opaque/painted finish.

2. Provide Type II interior grade A for natural/stained finish.

B. Thicknesses shall be as indicated on the drawings.

1. Shelving plywood shall be nominal 3/4" minimum.

C. Comply with PS 1-83. Interior plywood in proximity to water (toilet rooms, sinks, etc.): manufactured with exterior glue.

1. Plywood must contain no urea-formaldehyde resins.

2.05 WINDOW STOOLS & APRONS

A. Window stools shall be constructed of hardwood lumber species as indicated on the drawings. If no species is indicated, bids shall be based upon red oak.

1. Utilize nominal 1" board stock for widths of 7-1/4" or less. For wider applications, utilize nominal 5/4" board stock.

2. Exposed edges shall be bullnosed.

B. Aprons shall be of similar species as window stools and shall be wide enough to cover rough wood blocking or GWB edge transition beneath.

2.06 MISCELLANEOUS MATERIALS

A. Fasteners and Anchorages: Provide nails, screws, and other anchoring devices of the proper types, size, material, and finish for

application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications and reference AWI standard.

PART 3 - EXECUTION

3.01 PREPARATION

A. Condition materials to average prevailing humidity conditions in installation areas prior to installing.

B. Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Section 09900 – Painting & Staining.

3.02 INSTALLATION

A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes, or patterns.

B. Product joints which are true, tight, and well nailed with all members assembled in accordance with the Drawings. Field sand all finish trim material smooth, except Cedar, to remove saw marks, raised grain, etc. Cut all corners square and ease slightly.

C. Jointing: Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints. Install trim in pieces as long as possible, jointing only where solid support is obtained.

1. Door and window casings shall be single lengths without splicing.

D. Fastening:

1. Install items straight, true, level, plumb, and firmly anchored in place.

2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.

3. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.

4. Nail exterior trim with galvanized nails, making joints to exclude water.

5. On exposed work, set nails for putty.

E. Prime paint surfaces in contact with cementitious materials or

separate with felt.

3.03 INSTALLATION OF OTHER ITEMS

A. Set items at locations shown, in perfect alignment and elevation, plumb, level, straight, true and free from rack, scribed to adjoining work.

B. Appearance: finished surface shall be free of tool marks.

3.04 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION

A. Keep premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends, and debris.

B. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

C. Clean finish carpentry work on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

D. Protection: Installer of finish carpentry work shall advise Contractor of final protection and maintain condition necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07190 - UNDER SLAB VAPOR BARRIER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work specified in this section covers furnishing, delivery, and installation of a vapor barrier under all new interior slabs on grade (horizontal application).

B. Products supplied under this section:

1. Vapor Barrier, seam tape, mastic, pipe boots, detail strip for installation under concrete slabs.

C. Related Sections:

1. Section 03300 – Cast-in-Place Concrete.
2. Section 07200 – Building Insulation

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM E 1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

2. ASTM E 1993/E1993M-98 (2013) – Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

3. ASTM E 154-08a 2a3e1 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.

4. ASTM E 96-13 Standard Test Methods for Water Vapor Transmission of Materials.

5. ASTM E 1643-11 (2017) Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. American Concrete Institute (ACI)

1. ACI 302.2R-06 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

1.03 SUBMITTALS

A. Quality Control/Assurance

1. All submissions shall conform to General Conditions Section

G31.

2. Full set of test results per paragraph 8.3 of ASTM E 1745.

3. Manufacturer's samples, literature

4. Manufacturer's installation instructions for placement, seaming and pipe boot installation.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer's instructions.

C. Stack membrane on smooth ground or wood platform to eliminate warping.

D. Protect materials during handling and application to prevent damage or contamination.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply on frozen ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Vapor Barrier: Under typical interior slabs where finished flooring does not involve wood, provide non-woven, polyester, reinforced, polyethylene coated sheet of 15 mil thickness.

1. Vapor Barrier membrane must have the following properties:

a. Permeance as tested after mandatory conditioning (ASTM E 1745 paragraphs 7.1.2-5): less than 0.01 perms (grain/ft^2/hr/in-Hg).

b. Other performance criteria:

1. Strength: Class A (ASTM E 1745).

2. Minimum thickness of the plastic retarder material: 15 mils.

c. Basis of Design: Stego Wrap 15-mil Vapor Barrier by Stego Industries LLC.

d. Or Architect approved equal.

B. Vapor Barrier under interior slabs where finished flooring involves wood assemblies such as gymnasiums and stages provide Bituminous Vaporproofing/Waterproofing Membrane

1. Vapor Barrier must be seven-ply, weather-coated, permanently bonded, semi-flexible bituminous core board composed of a 3-ply plasmatic matrix sealed between liners of asphalt-impregnated felt and a glass mat liner. Vapor Barrier shall consist of an asphalt weather coat and covered with a polyethylene anti-stick sheet. Vapor Barrier shall meet or exceed all requirements of ASTM E 1993-98 and shall have the following characteristics:

a. Minimum Permeance ASTM F1249, calibrated to ASTM E96, Water Method: 0.0011 Perms.

b. Tensile Strength ASTM E154, Section 9: 156 LBS. force.

c. Puncture Resistance ASTM E154: 149 LBS. force/inch.

d. Premoulded Membrane® Vapor Seal with Plasmatic Core by W.R Meadows. W.R. Meadows, Inc., PO Box 338, Hampshire Illinois 60140-0338. (800) 348-5976. (847) 683-4500.Fax (847) 683-4544. website www.wremeadows.com.

2.02 ACCESSORIES FOR TYPICAL POLYESTER-REINFORCED, POLYEHTELENE COATED SHEET

A. Seam Tape

1. Tape must have the following qualities:

a. Water Vapor Transmission Rate ASTM E 96; 0.3 perms or lower.

2. Seam Tape

a. Stego Tape by Stego Industries, LLC or equal.

B. Vapor Proofing Mastic

1. Mastic must have the following qualities:

a. Water Vapor Transmission Rate ASTEM E 96; 0.3 perms or lower.

2. Mastic

a. Stego Mastic by Stego Industries, LLC or equal.

C. Pipe Boots

1. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

2.03 ACCESSORIES FOR BITUMINOUS VAPORPROOFING/WATERPROOFING MEMBRANE

A. Bonding Asphalt: Sealtight Catalytic Bonding Asphalt.

B. Adhesive: Sealtight Pointing Mastic.

C. Joint Tape: Sealtight PMPC Tape.

D. Pointing Mastic: Sealtight Pointing Mastic.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ensure that subsoil is approved by architect or geotechnical firm.

1. Level and tamp or roll aggregate, sand or tamped earth base.

B. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

C. Prepare surfaces in accordance with manufacturers instructions.

3.02 INSTALLATION

A. Install Plastic Film Vapor Barrier/Retarder:

1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98 (2005).

a. Unroll Vapor Barrier/Retarder with the longest dimension parallel with the direction of the pour.

b. Lap Vapor Barrier/Retarder over footings or seal to foundation walls.

c. Overlap joints 6 inches and seal with manufacturer's tape.

d. Seal all penetrations (including pipes) per manufacturer's instructions.

e. No penetration of the Vapor Barrier/Retarder is allowed except for reinforcing steel and permanent utilities.

f. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

B. Install Bituminous Vaporproofing/Waterproofing Membrane

1. Apply membrane in accordance with manufacturer's instructions to provide a permanent, monolithic vapor seal without voids or open seams.

2. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.

3. Place membrane in position by Dutch lap method with laps sealed with bonding asphalt.

4. Point exposed edges with pointing mastic to prevent water from traveling under membrane.

5. Place membrane collar around protrusions through concrete slab, including sewer pipes, water pipes and utility inlets to create a positive seal between protrusions and membrane. Seal in place with joint tape and point around protrusions with pointing mastic.

6. Adhere membrane to vertical surfaces with adhesive.

3.03 PROTECTION

A. Protect all vapor barriers from injury before and during placement of reinforcing and concrete. Check for and repair any puncture before start of concrete placement.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07200 - BUILDING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of building insulation as indicated on the drawings and specified herein. This Section includes the following: Rigid board insulation at exterior masonry cavity wall construction and under metal wall panels; Rigid board insulation at perimeter foundation walls; Rigid board insulation at underside of floor slabs; Fibrous blanket insulation for thermal purpose, where indicated; Miscellaneous batt insulation to maintain continuity of building thermal barrier; Protective cover over insulation board prior to placement of backfill or concrete cover.

B. Related Documents: Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

C. Related Sections include the following:

1. Division 4 Section "Unit Masonry" for concrete unit masonry.

2. Division 6 Section "Carpentry Work" for wood framing and supportive construction.

3. Division 7 Section "Firestopping" for fire-stop and smoke-stop materials at voids around penetrations through fire-rated and smoke barrier wall and roof construction assemblies.

4. Division 8 Section "Aluminum Windows" for miscellaneous batt insulation required at periphery of windows.

5. Division 8 Section "Standard Steel Doors and Frames" for miscellaneous batt insulation required at periphery of storefront framing system.

6. Division 9 Section "Gypsum Board Assemblies" for sound attenuation insulation, metal stud and drywall partition construction.

7. Division 9 Section "Suspended Acoustical Ceilings" for ceilings to receive thermal lay-in insulation.

1.02 QUALITY ASSURANCE

A. Standards: Comply with standards specified in this section and as listed in Section 01085.

B. Reference Standards:

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

a. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

b. ASTM C518 - Steady-State Thermal Transmission Properties by Means of The Heat Flow Meter.

c. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

d. ASTM D1621 - Compressive Properties of Rigid Cellular Plastics.

e. ASTM E84 - Surface Burning Characteristics of building Materials.

f. ASTM E119 - Fire Tests of Building Construction and Materials.

g. ASTM E2178 - 11 Standard Test Method for Air Permeance of Building Materials

h. ASTM E2357 - 11 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

2. Federal Specifications (FS):

a. FS HH-I-521E - Insulation Blankets, Thermal Fiber, for Ambient Temperatures.

1.03 SUBMISSIONS

A. General: Comply with requirements of Section 01300: Submissions.

B. Product Data: Submit manufacturer's specifications and installation instructions and recommended procedures for application of adhesives for each type of insulation.

C. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values (aged values for plastic insulations), densities, compression strengths, fire performance, perm ratings, water absorption ratings, and similar properties.

D. Samples for Verification:

a. Submit, to the job site, 6” x 6” samples of each type and thickness of insulation.

b. Submit appropriate sample of loose fill insulation.

c. Submit manufacturer’s verification that rigid insulation contains at least 20% combined post-consumer and post –industrial recycled content.

d. Submit manufacturer’s verification that batt insulation contains at least 30% combined post-consumer and post –industrial recycled content.

e. Submit manufacturer’s verification that cellulose insulation contains at least 85% combined post-consumer and post –industrial recycled content.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in their original, unopened packages or containers; labels shall be intact, identifying contents, manufacturer, brand name, thermal values and applicable standards. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.

B. Store all materials in a single location protected from weather, moisture, and open flame or sparks.

C. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.

D. Comply with manufacturer's written recommendations for handling, storage, and protection during installation.

E. Warning: Rigid insulation is combustible and may constitute a fire hazard; adequate protection shall be provided in accordance with National Fire Protection Association (NFPA) standards or the authority having jurisdiction.

F. Cover and protect insulation with light colored or white opaque covering while in storage; sunlight causes discoloration and deterioration that impairs adhesive bonding.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

A. General: Design is based on insulating materials as specified on drawings. The terminology used may include reference to specific manufacturers' proprietary products. Such reference shall be construed only as establishing the quality of the materials and workmanship to be used under this section and shall not, in any way, be construed as limiting competition.

B. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

C. Materials:

1. Exterior Wall Sheathing Insulation Basis-of-Design: has been specified around standard products as manufactured by Owens-Corning Foam Insulation Corporation, Toledo, OH: compliance with requirements, provide the named product or a comparable product by one of the following: Similar or equal to “Foamular”, rigid closed cell foam panels conforming to ASTM C578. Provide 1/2” thickness at exterior wall locations, typical.

2. Rigid Perimeter and Under Floor Slab Insulation Basis-of-Design: has been specified around standard products as manufactured by The Dow Chemical Company, Construction Materials Group, Midland, MI; Telephone: 1-800-232-2436. Subject to compliance with requirements, provide the named product or a comparable products by one of the following:

    1. Amoco Foam Products Company, Atlanta, GA.
    2. UC Industries, Inc., Parsippany, NJ.

3. Fiberglass Blanket Insulation Basis-of-Design: has been specified around Fiberglas Building Insulation Blankets as manufactured by Owens-Corning Fiberglas Corporation, Toledo, OH. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

    1. CertainTeed Corporation.
    2. Johns Manville Corporation.

4. Suspended ceiling insulation: Owens-Corning Fiberglass 'Sonobatts' unfaced and faced insulation or Architect approved equal – Refer to drawings for types, R-Values and thicknesses.

5. Safing insulation: *Thermafiber* safing insulation or Architect approved equal with VOC content in accordance with Section 01352 *"LEED Requirements"*.

6. Smoke seal compound: *Thermafiber* or Architect approved equal with VOC content in accordance with Section 01352 *"LEED Requirements"*.

7. Nailable Rigid roof insulation board: "*Nailboard*", 3" overall thickness (R-15.9) closed cell polyisocyanurate foam core insulation board with 5/8" thick OSB as manufactured by Johns Manville or Architect approved equal.

    a. Standard board size to be 4' x 8' x 3" thick with an averaged R-Value of 15.9.

    b. Rigid board shall be UL class A fire rated.

    c. OSB must contain no urea-formaldehyde resins.

8. Rigid roof insulation board: "*Energ'y-3*", 1 1/2" (R-10) closed cell polyisocyanurate foam core insulation board as manufactured by *Johns Manville* or Architect approved equal.

    a. Standard board size to be 4' x 8' x 1 1/2" thick with an averaged R-Value of 10.

    b. Rigid board shall be UL class A fire rated.

    c. All rigid board installation shall be in conformance with manufacturer's specifications.

D. Flame Spread & Smoke Developed Rating: All insulation materials shall have a flame spread rating of less than 25 and smoke developed not to exceed 450, in accordance with ASTM E-84.

2.02 MATERIAL REQUIREMENTS

A. Cavity Wall Insulation: *Dow "Styrofoam CAVITYMATE ULTRA INSULATION"*, rigid, extruded cellular polystyrene board conforming to air barrier test requirement ASTM E2178 for a maximum air permeance no greater than 0.004 cfm/ft2 to be used in conjunction with *"GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant"* to create an air barrier system; the air barrier qualities of this system have been tested and meet the requirements of ASTM E2357 and meet all relevant code requirements for infiltration resistance.

1. Thermal Resistance: Aged R-values of 6.0 and 5.6 min. per inch °F-ft2-h/Btu2/inch at 40 °F and 75 °F respectively (ASTM C 518-98), and warranted by manufacturer to retain at least 90% of its original R-value for 15 years.

2. Thickness: As indicated on drawing details.

3. Compressive Strength: Comply with ASTM C 578-95, Type IV, density 1.6 lb/cu. ft. min. compressive resistance 25 psi (ASTM D 1621-94)

4. Water Absorption: Maximum 1% by volume, ASTM C 272-91 (96).

5. Edges: Square.

6. Maximum Flame Spread and Smoke Developed indexes: When tested in accordance with ASTM E84.

   a. Flame Spread: 75.
   b. Smoke Development: 450.

7. Surface Burning Characteristics: When tested in accordance with ASTM C 578-95.

   a. Flame Spread: 0.
   b. Smoke Development: 155.

8. Foam Blowing Agent: Shall provide at least a 90% reduction in ozone depletion potential as compared with CFC's and shall be certified by foam manufacturer.

9. NOTE: Molded "bead board" will not be acceptable.

B. Perimeter and Under Slab Insulation: *Dow "Styrofoam Square Edge"* with same performance characteristics as specified above for cavity wall insulation.

C. Adhesive: *Dow "GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant"*; capable of securely adhering to applicable surface(s) with

VOC content in accordance with Section 01352 *"LEED Requirements"*.

D. Batt / Blanket Insulation:

1. General Thermal Use Insulation: Preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type, 3-1/2" (89mm) thick, with a thermal resistance (R-value) of R-11, unless thickness and R value are noted otherwise.

2. Wall Insulation: Types as called for on the drawings, preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type or ASTM C665, Type II, Class C, with Kraft-faced integral vapor barrier, as indicated on drawings, 6 $^{1}/_{4}$" (159mm) thick, and a thermal resistance (R-value) of R-19, unless thickness and R value noted otherwise.

3. Ceiling Insulation: Preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type, 6 $^{1}/_{4}$" (159mm) thick with a thermal resistance (R-value) of 19; 12" (305mm) thick, and a thermal resistance (R-value) of R-38, unless thickness and R value noted otherwise.

4. Fire-Hazard Classification: When tested in accordance with ASTM E84.

   a. Concealed Installations:
      1. Flame Spread Rating: 25 maximum.
      2. Smoke Development Rating: 50 maximum.

   b. Exposed installations:
      1. Flame Spread Rating: 75 maximum.
      2. Smoke Development Rating: 450 maximum.

5. Cellulose Insulation:

   a. Cellulose Insulation by weight:

      1. Newsprint (Cellulose Fiber): Not less than 85 percent, with a minimum of 80 percent post-consumer recycled paper fiber.
      2. Boric Acid H_3BO_3: Not more than 10%.
      3. Ammonium Sulfate $(NH_4)H_4PO_4$: Not more than 11%.
      4. Guar Gum or Wheat Starch: Not more than 2%.
      5. Mono Ammonium Phosphate $NH_4H_2PO_4$: Not more than 2%.
      6. Zinc Sulfate ZnSO4-H2O: Not more than 2%.

   b. Physical and Chemical Properties:

      1. Bulk Density 9lb/ft^3 compressed.
      2. Appearance: Grey, odorless fiber.
      3. Vapor Pressure Negligible @ 20 degrees C (68 degrees F).
      4. Solubility in Water: Not soluble
      5. Boiling/melting point: Not Applicable
      6. Flash Point Not Applicable
      7. pH: <8.2 (2.0 percent suspension @ 25 degrees C (77 degrees F)
      8. Viscosity: Not Applicable.
      9. Self-supporting and adheres to typical wood, metal gypsum

board and concrete.
10. To contain no asbestos, formaldehyde, mineral wool or fiberglass.
11. Non-corrosive to metals.
12. Fungal Resistant.

E. Staples: Electroplated or galvanized steel wire, type and size as recommended for application.

F. Wire-Up: Utilize 16 or 18 gauge line wire run diagonally or perpendicular to insulation every 18 to 24 inches.

G. Impaling Pin: Utilize impaling pins welded or fastened with adhesive. Impale insulation on anchor and secure with washer.

H. Miscellaneous Batt Insulation: Preformed glass fiber, ASTM C665, Type I, un-faced without integral vapor barrier membrane, field cut to appropriate size and thickness as required or indicated on Contract Drawings.

I. Protective Board Covering: $^1/_8$" thick biodegradable hardboard, $^1/_4$" minimum thickness of wood fiberboard, or other protective covering as approved by the Architect.

2.03 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be as selected by the Contractor, subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 INSPECTION, SURFACE PREPARATION AND WORKMANSHIP

A. Carefully examine all the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Insure that work of all preceding trades is completed prior to starting work of this Section.

C. Insure surfaces are in uniform plane; true to dimensions; and free of waxes, oily films, grease, loose mortar chips, other items detrimental to installation.

3.02 INSTALLATION

A. Except as otherwise specifically directed by the Architect, install all building insulation in the size and thickness specified, in strict accordance with the manufacturer's instructions.

B. Install rigid insulation to maintain continuous and complete

thermal protection for building spaces and elements.

C. Cut and trim rigid insulation; by means of saw, knife or other sharp tool, to neatly fit spaces and around mechanical, electrical and other items which protrude through plane of insulation. Butt edges and ends tight. Use only rigid insulation free of broken or chipped edges.

D. Installation of Roof Insulation:

1. Verify that surfaces and site conditions are ready to receive work.

2. Verify that deck is supported and secured.

3. Verify that deck is clean and smooth, free of depressions, irregularities, or projections, properly sloped to drains.

4. Verify that deck surfaces are dry and free of dirt and debris. (Verify flutes of metal deck are clean and dry).

5. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set and [wood cant strips] [wood nailing strips] [and reglets] are in place.

6. Start of work means installer accepts existing [surfaces] [substrate].

7. Protect building surfaces against damage from roofing work.

8. Verify that metal deck units are properly secured in place.

E. Installation of Rigid Cavity Wall Insulation:

1. Install insulation horizontally and continuously to wall construction.

2. Secure rigid insulation in place with adhesive using spot or ribbon method in accordance with insulation manufacturer's written instructions.

3. Stagger vertical joints of insulation, except free ends over line or control joints.

4. Apply 2” diameter daubs of adhesive space approximately 12” o.c. vertically and horizontally on inside face of insulation board.

5. Butter all edge joints of insulation board with adhesive to provide continuous vapor barrier.

6. Fit insulation between wall ties and other obstructions with joints staggered and edges butted tightly.

   a. Press units firmly against inside wythe of masonry or other construction.
   b. Wedge insulation from outside wythe of construction with small fragments of masonry materials space 24” o.c. both ways.
   c. Make insulation continuous. Fill all voids.

7. Comply with insulation manufacturer’s written instructions applicable to products and applications indicated.

8. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

9. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

F. Installation of Perimeter Insulation:

1. Secure rigid insulation on perimeter foundation wall with adhesive, using "spot or ribbon method", in accordance with the insulation manufacturer's recommendations.

2. Place insulation horizontally and install continuously.

3. Stagger vertical joints of insulation, except free ends over line of control joints.

4. Extend insulation down below finish grade 48" or to top of footing, whichever is less, unless noted or indicated otherwise.

5. Do not allow insulation to be displaced during backfilling operation.

6. Immediately following application of insulation boards, place protective board covering over exposed insulation surfaces and adhesive secure boards in accordance with manufacturer's instructions. Install boards horizontally or vertically from base of insulation to top of insulation. Butt board joints tight, stagger from insulation joints.

G. Installation - Under Slab on Grade:

1. Place rigid insulation under slabs on grade after base for slab on grade has been compacted.

2. Extend insulation in 24" from the outside edge of slab unless noted or indicated otherwise.

3. Prevent insulation from being displaced or damaged while placing vapor barrier and pouring slabs.

H. Installation of Batt / Blanket Insulation:

1. Install unfaced batt/blanket insulation in accordance with manufacturers instructions, friction fitted between framing members in walls, ceilings and floors.

2. Install faced batt/blanket insulation in accordance with manufacturers instructions, with facing having formed flanges at the edges for either face or inset stapling at maximum 6" o.c. or taping to framing members. Install factory applied vapor-retarding membrane facing warm side of building spaces.

3. Install insulation without gaps or voids, lapping ends and side flanges. Do not compress insulation.

4. Trim insulation neatly to fit tight in spaces and tight to exterior side of mechanical and electrical services within the plane of the insulation.

5. Tape seal butt ends, lapped flanges, and punctures, tears and cuts in membrane.

I. Installation of Miscellaneous Batt Insulation:

1. Coordinate with other Sections and install fibrous insulation around exterior doorframes, window frames, roof expansion joints, roof and wall penetrations, and other voids to maintain continuity of building thermal barrier.

2. Insulate all miscellaneous gaps or voids to maintain thermal continuity of building.

3.03 CLEAN-UP

A. Do not permit insulation debris to accumulate in building or on job site.

B. Upon completion of work, leave premises clean, free from scraps and debris.

3.04 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.05 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all insulation is complete and properly installed.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07210 - FIREPROOFING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of fireproofing insulation and smoke-stop materials at voids around penetrations through fire-rated and smoke barrier wall and roof construction assemblies, and as indicated on the drawings and specified herein

B. Related Documents: Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

C. Related Sections include the following:

1. Division 4 Section "Unit Masonry" for concrete unit masonry.

2. Division 5 Section "Structural Steel", "Steel Joists and Girders" and "Metal Decking" for associated construction to which work of this Section shall be applied.

1.02 QUALITY ASSURANCE

A. Standards: Comply with standards specified in this section and as listed in Section 01085.

B. Reference Standards:

a. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

b. ASTM C518 - Steady-State Thermal Transmission Properties by Means of The Heat Flow Meter.

c. ASTM E84 - Surface Burning Characteristics of building Materials.

d. ASTM E119 - Fire Tests of Building Construction and Materials.

1.03 SUBMISSIONS

A. General: Comply with requirements of Section 01300: Submissions.

B. Product Data: Submit manufacturer's specifications and installation instructions for each type of insulation.

C. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values, densities, compression strengths, fire performance, perm ratings, water absorption ratings, and similar properties.

D. Samples for Verification:

a. Submit, to the job site, 6" x 6" samples of each type and thickness of fireproofing insulation.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in their original, unopened packages or containers with all labels intact and legible. Protect all materials from physical damage and from deterioration by moisture, soiling, and other sources.

B. Store all materials in a single location protected from weather, moisture, and open flame or sparks.

C. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.

D. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.01 FIREPROOFING INSULATION MATERIALS

A. Refractory mineral wool board fire protection: "THERMAFIBER" Fire safing insulation as manufactured by Thermafiber. Non-combustible, moisture resistant, non-corrosive, non-deteriorating, and mildew proof fire rated insulation in 4.0 pcf to 6.0 pcf nominal density, varying from 1" to 6" thickness, complying with ASTM C-612 and ASTM E84, or approved equal.

1. Thermal conductivity (R Value/Inch): 4.2 @ 75°F (23.9°C).

2. Flame spread: 0 (unfaced).

3. Smoke developed: 0 (unfaced).

4. Federal specification: HH-I-558B for Class 1, 2, 3, and 4 mineral

wood board fire protection.

2.02 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be as selected by the Contractor, subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Carefully examine all the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Except as otherwise specifically directed by the Architect, install all building insulation in the size and thickness specified, in strict accordance with the manufacturer's instructions.

3.03 CLEAN-UP

A. Do not permit insulation debris to accumulate in building or on job site.

B. Upon completion of work, leave premises clean, free from scraps and debris.

3.04 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.05 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all insulation is complete and properly installed.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07240 - EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 RELATED DOCUMENTS

A. Section 06100-ROUGH CARPENTRY

1.03 DESCRIPTION OF WORK

A. Provide all materials, labor, and equipment necessary to install field applied and/or Panelized Exterior Insulated Finish System (EIFS). EIFS system shall include, but not be limited to:

1. Provision and installation of EIFS manufacturers approved substrate.

2. Provision and installation of Molded Expanded Polystyrene (MEPS) Insulation Board

1.04 QUALITY ASSURANCE

A. Qualifications:

1. The applicator, the insulation board, the substrate, and the installation methods shall be approved by the EIFS manufacturer.

2. Prior to installation of the wall systems, erect sample wall mock-up using materials and joint details required for final work. Provide special features as directed for sealant and contiguous work. Build mock-up at the site where directed, of full thickness, indicating the proposed color, texture, and workmanship to be expected in the completed work. Obtain Architect's acceptance of the mock-up in regard to the aesthetic quality, before start of work. Retain mock-up during construction as a standard for judging completed work. Do not alter, move, or destroy mock-up until work is completed, and until final acceptance of the project by Architect.

1.05 DESIGN AND DETAILING:

A. General:

1. The EIFS system is and externally reinforced exterior insulation and finish system consisting of an adhesive, insulation board, fiberglass reinforced mesh fully embedded in a basecoat mixture

and an aesthetic finish.

2. The EIFS system shall be field applied to the substrate system in place.

3. a. At all termination locations, the MEPS shall be completely encapsulated by the base coat.

   b. The length and slope of inclined surfaces shall follow the guidelines listed as follows: (1) Minimum slope: 6" of rise in 12" of horizontal projection. (2) Maximum length of slope: 10". (3) Incline surfaces shall not be used for areas defined as roofs.

4. Corners shall be reinforced by wrapping with reinforcing mesh or installing corner mesh.

5. Openings shall be reinforced using a 9 ½" wide strip of detail reinforcing mesh laid at a 45° angle.

6. Dimensional Tolerances: All substrates shall be flat within ¼" within a 4' radius.

7. Substrate System:

   a. Maximum deflection under full flexural design loads of the substrate shall not exceed L/240 under wind load.

   b. It is the Applicators responsibility to ensure the substrate is acceptable for application of the EIFS system.

   c. Approved substrate shall include but not be limited to the following:

      1. Plywood having a minimum thickness of ½" and shall be a minimum of 4 ply, Exterior grade C-D or better complying with the latest edition of U.S. Product Standard PSI and APA performance standards.

      2. Exterior grade gypsum sheathing having a minimum thickness of ½" and shall conform to Federal specifications SS-L-30D, Type II, Grade W, Class 2 ASTM C-79.

      3. Exterior grade W/R or M/R gypsum backing board minimum thickness of ½" and shall conform to Federal Specification SS-L-30D and comply with ASTM C-630.

8. Expansion joints in the EIFS system are required at building expansion joints, if prefabricated, at panel joints, where substrates change and where significant structural movement occurs, control joints shall be where indicated on plans or where required.

B. Approvals, Listings, and Classifications:

1. The Coating and approved insulation board shall be classified by a nationally recognized testing agency and shall meet the smoke developed and flame spread ratings as set forth by ASTM E84.

1.06 SUBMITTALS

A. Submit one sample of each finish of EIFS Systems for approval. Color and texture shall be approved based on job site samples or specific submitted samples.

B. Applying contractor of the system shall submit complete shop drawings for the EIFS panels including erection drawings and details.

C. Applying contractor of the EIFS Systems will submit evidence **with the bid** that he is manufacturer's approved applicator of the system.

1.07 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be delivered to the site in the original, unopened packages with labels intact. Upon arrival, materials shall be inspected for physical damage, freezing, or overheating and the manufacturer shall be informed of any discrepancies. Questionable materials shall not be used.

B. All materials at the site shall be stored in a cool dry location, out of direct sunlight, protected from weather and other damage. Refer to manufacturer's product sheets for storage temperature requirements.

C. Stack insulation board flat, fully supported off the ground, and protected from direct exposure to the sun.

1.08 JOB CONDITIONS

A. Existing conditions: The Applicator shall have access to electric power, clean water, and a clean work area at the location where the EIFS materials are being stored.

B. Environmental conditions: The ambient air and wall temperature on both sides of the wall shall be a minimum 40°F (4°C) of 45°F (7°C) as applicable at the time of installation of the EIFS materials. Refer to the manufacturers product sheets for specific product temperature requirements. The temperature shall remain so for at least 24 hours thereafter or longer if necessary for the material to be sufficiently dried.

C. Protection:

1. Adjacent areas/materials shall be protected from damage, drops, and spills during the application of the EIFS system.

2. The EIFS materials shall be protected by permanent or temporary means from weather and other damage prior to, during and immediately after application. Care must be taken to prevent condensation and/or heat build-up when using tarp or plastic prevent damage to the EIFS system or products.

D. Sequencing and Scheduling:

1. Installation of the EIFS system shall be coordinated with the other construction trades.
2. Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

1.08 WARRANTY

A. The EIFS manufacturer shall provide a written Limited Materials Warranty upon receipt of Warranty Request and Complete project Form.

PART 2 - PRODUCTS

2.01 GENERAL

A. For the purposes of this specification the EIFS Systems has been based upon products as manufactured by Dryvit Systems, Inc., West Warwick, Rhode Island or approved equal. Terminology references this manufacturer's products as it related to their system.

B. All components of the EIFS system shall be supplied by and obtained from one manufacturer or its authorized distributors. No substitutions of, or additions, other material shall be utilized without prior written permission from the manufacturer.

2.02 MATERIALS

A. Adhesives:

1. Primus/Adhesive: An acrylic base, field mixed one to one by weight with Portland cement for use on substrates as outlined in this section.

2. ADEPS Adhesive: A fully formulated water based acrylic copolymer.

3. Mechanical Fasteners: Refer to Dryvit publication DS 135 for specifications and application instructions.

B. Insulation Board: Aged, molded expanded polystyrene board with a nominal density of 1.0 pcf meeting the current published specifications of Dryvit's DS 131. Insulation board thickness shall be minimum of ¾" and as indicated on the drawings.

C. Reinforcing Meshes:

1. Dryvit Standard Mesh: Glass fiber mesh used to reinforce wall areas, special shapes and irregular details.

2. Dryvit Intermediate Mesh: Glass fiber mesh used for moderate impact resistance, install from grade to 6’-0” above grade.

3. Dryvit Panzer Mesh: Glass fiber mesh used for high impact resistance, install on all field areas.

4. Dryvit Double Detail Mesh: Glass fiber mesh used for high impact resistance with recesses, contours and grooves.

5. Dryvit Corner Mesh: Provide at all corners for additional impact resistance.

D. Trim Accessories: Plaster Components, Inc., VinylTech Starter Strip, Casing Beads, Expansion Joints, Corner Beads, Drop Caps etc., where indicated on the drawings and as required.

E. Finish: Shall be factory-mixed, water based acrylic coating with integral color and texture and as selected be Architect from manufacturers full line of standard and custom colors and finishes.

F. Primers and Sealers:

1. Color Prime: A water based, pigmented, acrylic primer as manufactured by Dryvit Systems.

2. Prymit: A water based acrylic primer/adhesion promoter as manufactured by Dryvit Systems.

G. Coatings:

1. Demandit: A non-textured water based acrylic coating as manufactured by Dryvit Systems.

2.03 MATERIALS

A. Portland Cement: Type I, I-II, or II meeting ASTM C 150, white or gray in color, fresh and free of lumps.

B. Water: Clean and free of foreign matter.

2.04 EQUIPMENT

A. All mixing shall be done with a CLEAN Goldblatt Jiffler Mixer #1531 1 1H7 or equal, powered by a ½" drill or equal at 400-500 rpm.

B. A high speed wood router and proper bits.

C. Hand tools associated with the plastering trade.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examination of Substrate:

1. Prior to installation of the EIFS system, it is the Applicator's responsibility to ensure the substrate:

a. Is of a type and property as listed in this section.

b. Surface is free of foreign materials such as oil, dust, from release agents, paint, wax, water repellents, moisture,

frost, etc.

c. Is sound, connections ore tight, there are no surface voids or projections, etc.

d. Is in compliance with other Contract Documents.

2. The Architect shall be advised of all discrepancies in writing. Work shall not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. General: Refer to manufacturers product sheets for detailed preparation and application instructions.

B. Mixing and Preparation:

1. Primus/Adhesive:

a. Shall be stirred to a homogeneous consistence before mixing.

b. In clean container, thoroughly mix the Adhesive with Protland cement at a 1-to-1 ratio by weight. Allow the Mixture to set for 5 minutes, re-temper, adding a small amount of water to achieve desired workability. The Mixture shall be used immediately after tempering.

c. No additives shall be added under any circumstances.

2. ADEPS Adhesive: Use directly from the pail without mixing. No additives including water, shall be added.

C. Insulation Board:

1. General:

a. Shall be applied to the substrate starting from the bottom of the wall with its edge oriented horizontally, in a running bond pattern with joints offset with respect to substrate joints.

b. Shall be supported by temporary means.

c. Shall be staggered and interlocked at corners.

d. Shall be precut to fit openings, corners and projections prior to application of the adhesive. NOTE board edges shall not align with corners of wall openings.

e. Refer to Dryvit publication DS204 for further instructions.

2. Adhesive Application:

    a. Primus/Adhesive Mixture:

        1. Ribbon and Dab method: Ribbons of adhesive shall be applied to the perimeter of one face of the MEPS. The Adhesive shall not be applied to the edges of the MEPS. Eight dabs of adhesive shall be applied to the area within the ribbon. A minimum of 32% of the MEPS face shall be in contact with the adhesive.

        2. Notched Trowel Method: Adhesive shall be applied to one face of the MEPS face shall be in contact with the adhesive.

        3. Push Box Method: Application by this method shall be in accordance with Dryvit's latest Application Bulletin.

    b. ADEPS Adhesive: The adhesive shall be applied directly to one face of the MEPS using a notched trowel.

3. The prepared MEPS shall be immediately applied to the substrate as follows:

    a. Lightly affix the MEPS to the substrate with the lower horizontal edge and adjacent vertical edge ½" from adjacent boards or its final position on the substrate.

    b. Press down and slice diagonally into place or until it tightly abuts the edges of adjacent boards. Continue for all MEPS boards.

    c. The entire outside face of the MEPS shall be tamped with even pressure to ensure complete contract of the adhesive to the substrate and that all boards are in the same plane. A straight edge at least 6' long shall be used for this purpose.

    d. If gaps occur, slivers of MEPS shall be cut and shaped to fit the gaps and shall be inserted without using adhesive.

    e. A minimum of 24 hours shall be allowed for the adhesive to form a positive bond. The MEPS shall not be moved while the adhesive is curing. Low temperatures and/or high humidity conditions may require longer curing time for ADEPS.

C. Base Coat System:

1. Inspection Before Application:

    a. The face of the MEPS shall be inspected as follows:

        1. For flatness, using a minimum 6' straight edge, high areas and out-of-plane board joints shall be sanded flat; low areas shall not be built up with adhesive to form a

flat surface.

2. For damage and foreign materials, deficiencies shall be corrected.

3. For deterioration due to weathering or U/V, visible discoloration, affected areas shall be sanded to remove deterioration while maintaining the flatness of the surface.

b. The minimum remaining thickness of MEPS at any point behind a reveal (groove) or other feature shall be ¾".

c. Foam shapes, if used, shall be applied directly to the substrate of face of the MEPS.

2. Base Coat System: Standard Mesh and Intermediate Mesh.

a. Using a stainless steel trowel, the Primus/Adhesive Mixture shall be applied to the surface of the MEPS to a uniform thickness of approximately 1/16".

b. The Mesh shall be immediately embedded into the wet Primus/Adhesive Mixture with its concave surface to the wall to reduce its tendency to curl. The surface shall then be smoothed with a trowel, working from the center toward the edges, until the bare mesh is fully covered and not visible. NOTE: The final approximate thickness of be base coat shall be sufficient to fully embed the mesh but shall not exceed 3/32". A slight mesh pattern may be visible upon drying.

c. The mesh shall be lapped a minimum of 2 ½" on all sides.

d. A minimum of 24 hours shall be allowed for the base coat to cure. The base coat shall be protected from damage and weather while curing.

e. All MEPS edges at openings, penetrations, or other termination points, shall be backwrapped.

3. Double Mesh Base Coat System:

a. Double layers of Standard Plus Mesh shall be used for local reinforcing where required. The first mesh layer shall be installed as per this section.

b. The surface of the first mesh layer shall be examined after curing for projections, loose strands, etc. and corrected to produce a flat face.

c. The second mesh layer shall be applied in the same manner as the first layer. The lapped edges of the mesh in the two layers shall be offset.

D. Finish Application:

1. General:

   a. After stirring to a homogeneous consistency, the finish shall be applied to the entire wall surface in a continuous application.

   b. Finish shall be trowel applied as per manufacturer's application instructions.

   c. Finish shall be protected from airborne contamination such as dust, soot, etc. and from weather and other damage until fully dried.

   d. No additives shall be added under any circumstances. Refer to the appropriate Dryvit finish publication for further application instructions.

   e. Refer to the manufacturer's product instructions for specific finishes as indicated on the drawings.

3.03 FIELD QUALITY CONTROL

A. The Applicator shall be responsible for the proper application of the Dryvit materials and that they are being installed in strict accordance with the manufacturer's instructions.

3.04 CLEANING AND PROTECTION

A. The applicator shall promptly remove all temporary coverings and protection of adjacent work areas and will clean these areas of all foreign materials resulting from their work.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07542 – TPO ROOFING SYSTEM – Fully Adhered

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Related Documents:

1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Extent of Work:

1. Provide and install a Fully Adhered TPO System where shown on the drawings and specified herein. Work shall include, but not be limited to the following:

a. Furnish and install TPO roofing system with flashings and all other incidental and accessory items to comprise a complete roofing system.

b. Removal and legal disposal of all existing roofing, cover board, insulation, vapor barrier and membranes or plies down to the structural steel deck.

c. Re-Securement of the decking; where applicable.

d. Mechanically fasten the first layer of insulation to the steel deck. Attach subsequent layers of insulation and cover board to the mechanically attached first layer.

e. New wall and base flashing, expansion joints.

f. Cleaners, adhesives, sealants, seaming tapes, tape primers and fasteners.

g. Flashing of all new roof penetrations.

h. New gravel stops, wall copings and/or counter flashing and termination bars.

i. Miscellaneous sheet metal or metal flashing.

j. Provision and installation of new drains, connecting piping, and insulation where indicated.

k. Manufacturer's guarantee.

l. New wood blocking and anchor bolts around roof perimeter, roof penetrations, and similar locations, as required for the complete installation of the roofing system, and to meet new perimeter edge heights.

m. Installation of new equipment curbs where indicated.

n. Walkway pads where indicated.

o. Provision of new tapered cants as required to meet new blocking at perimeter edges.

p. Raising existing or installing new roof hatches as required to 8" above finish roof, as a result of the work required to raise finished roof surfaces.

q. Raising existing skylights or installing new as required to 8" above finish roof, as a result of the work required to raise finished roof surfaces.

r. Raising existing rooftop mechanical equipment curbs or installing new as required to 8" above finish roof, as a result of the work required to raise finished roof surfaces.

s. Plumbing, mechanical or electrical modifications as required for completion of the installation.

C. Related Work/Requirements Specified Elsewhere:

1. Section 01020 – Allowances (if incorporated)
2. Section 06100 - Rough Carpentry
3. Section 07600 - Flashing and Sheet Metal
4. Section 07900 - Caulking and Sealants

1.02 GENERAL

A. The intention of this specification is to outline the entire roofing project, describing materials, methods, job conditions, etc., so that during the entire construction period, a complete watertight condition is maintained, and at completion, a new roofing system shall be installed.

B. The Instructions to Bidders, the General Conditions of the Contract for the Construction for Buildings prepared by the American Institute of Architects, the Supplementary General Conditions, and the General Requirements are part of this specification whether bound herewith or not, and the Contractor shall refer to them for instruction pertaining to his work.

1.03 ALTERNATES

A. Where so indicated the Contractor shall consult the "Bid Proposal Form" and read all alternates and assure him/herself whether or not they will add to, deduct from, or in any way affect the cost of the

work under this section of the specifications. He/she shall include all such applicable alternates in his proposal.

1.04 REFERENCES

A. Factory Mutual (FM) Engineering Corporation - Roof Assembly Classifications.

B. Building Code of New York State

C. FS HH-I-526 - Insulation Board, Thermal (Mineral Fiber)

D. FS HH-I-529 - Insulation Board, Thermal (Mineral Aggregate)

E. FS HH-I-530 - Insulation Board, Thermal (Urethane)

F. FS HH-I-551 - Insulation Block and Boards, Thermal (Cellular Glass)

G. FS LLL-I-535 - Insulation Board, Thermal (Cellulosic Fiber)

H. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

I. Underwriters Laboratories (UL) - Fire Hazard Classifications

J. Sheet Metal and Air-Conditioning Contractors National Association, Inc. (SMACNA)

K. CGSB 37GP56M Classification: Type 2, Class C, Grade 1

1.05 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Jobsite Safety: Execute all operations and provide a safe work environment in accordance to OSHA standards and regulations. This requirement applies to all contractor personnel, associated subcontractors, workers in other trades, and jobsite visitors.

1. Follow all industry fire prevention guidelines for storage of materials, staging areas, roof access, and application means and methods.

2. Any applicable local fire codes supersede industry guidelines.

D. Wind Loads: Provide a roof system, including anchorage, capable of withstanding wind-load design pressures calculated according to

requirements of the 2015 International Building Code or the American Society of Building Engineers' ASCE7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever is more stringent. **Refer to drawings for Wind Design Data.**

E. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's "RoofNAV" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A-105.

2. Hail Resistance: MH.

1.06 SYSTEM DESCRIPTION

A. For the purposes of this specification, the roofing system has been based upon products manufactured by ***Johns Manville Roofing Systems Group, Denver CO.***, or *an approved equal* by the Architect.

B. System Description: Base ply insulation, tapered insulation, cover board, and a single ply TPO Fleeceback membrane system. All products must be from the membrane manufacturer. Include all membrane manufacturer's required pre-manufactured copings, gravel stops, and flashings and blocking as required, to provide complete roofing system warranty, whether detailed on the drawings or not.

1.07 SUBMITTALS

A. Comply with the requirements of Section 01300 – Submissions, and as modified below.

B. Manufacturer's product data sheets and installation instructions on all materials proposed for use.

C. Specimen copy of the manufacturer's standard 20-year NDL roofing warranty.

D. U.L. and F.M. compliance data: Contact roofing manufacturer for information.

E. Shop drawings indicating setting plan for tapered insulation. Exact locations of drains must be field verified prior to submittal.

F. Submit two 12-inch square samples of membrane illustrating the color and thickness to be used.

G. Submit a copy of the manufacturer's installation instructions.

H. Specified roof drain.

I. Shop drawings indicating proposed configuration of perimeter blocking and fastening, if different than that as shown on the Contract Documents.

1. Complete configuration of existing roof indicating layout of membrane sheets, seams between sheets, and location and type of all roof penetrations.

2. Complete details for attaching membrane at perimeter of roof, flashing of roof penetrations, blocking configurations, & other special details as required. This shall include, but not be limited to pre-manufactured gravel stops and copings. Note: Shop or Field-fabricated gravel stops & copings will not be permitted.

3. Complete layout of all tapered insulation indicating compliance with drainage patterns as shown on the drawings.

J. Submit list of at least five (5) successfully completed roofing projects using each of the TPO roofing systems proposed for use in this project. Include name, address, and telephone number of Owner's representatives. Identify square footage of total installation for each project listed.

1. If the above list of completed projects was not installed by the applicator, submit an additional list of at least four completed TPO roofing projects installed by the applicator. Include name, address, and telephone number of Owner's representative.

K. Certifications:

1. **All potential bidders shall submit notarized certification letters from the roofing manufacturer's main corporate offices indicating that the bidder has a minimum of five (5) years previous experience in the specific roofing system applications specified herein, and will provide a list of acknowledged projects to verify same. The contractor must be approved by the roofing system manufacturer for the installation of the primary roofing materials indicated, including membrane and flashing.**

2. Submit certification that roofing systems installed as part of this project comply with the specifications and installation instructions of the roofing system manufacturer.

3. Submit letter from roofing system manufacturer indicating that insulation has been approved by the roofing system manufacturer for use with the roofing system.

4. Submit letter of certification from roofing manufacturer that the specified TPO systems have been designed to satisfy the specified wind uplift criteria.

5. Submit letter of certification from the Contractor's NYS certified Structural Engineer that the proposed blocking and fastening systems have been designed to satisfy the specified wind uplift criteria necessary to carry the specified roofing system warranty.

6. Provide evidence of CERTA training for any installer of torch-applied modified bitumen membrane. Copies of certifications are required prior to award and must be maintained on the jobsite for inspection at any time.

1.08 QUALIFICATIONS

A. Applicator's Qualifications:

1. **Roofing applicator must be approved by the manufacturer prior to the bidding period and throughout the installation and able to present a copy of his certification as a part of the bid qualifications package required by this contract. This certification must be an original document as prepared directly by the manufacturer's corporate offices, specific for this contract. Submit certifications from manufacturer as per above.**

2. **Roofing applicator must have installed and successfully completed at least (5) five roofs of the same materials and methods specified for this project, completed over the last five years. Submit certifications from manufacturer pursuant to above section.**

3. **The selected bidder must be a single firm specializing in the types of roofing required, providing undivided responsibility for the performance of all component parts of the roofing system.**

4. **The contractor must be approved by the roofing system manufacturer for the installation of the primary roofing materials indicated, including membrane and flashing.**

5. **The contractor must have at least five (5) years of manufacturer-certified experience in installing commercial scale TPO roofing systems as required by this specification.**

6. **The contractor must employ roofing application foremen who have successfully completed all training offered by roofing systems manufacturer, including schools, seminars, etc.**

7. **Should the successful contractor opt to utilize the services of a subcontractor for any installations under this contract, the subcontractor shall also meet all requirements of experience and qualifications listed herein required for the Prime Contractor.** Note: No more than 25% of the required installations shall be made by manufacturer-certified subcontractors to the Prime Contractor, in conformance with the Instructions to Bidders section of the Project Manual.

B. Manufacturer's Qualifications:

1. The roofing system manufacturer must have a minimum of 10 years' experience in the marketing of TPO.

2. **For the work of this contract, the roofing system manufacturer must provide a factory-trained and factory-authorized field representative/technician, employed by the roofing system manufacturer, to supervise this project via a minimum of 10 on site visits, and to review installation procedures and advise applicator on procedures and precautions in use of roofing materials required for final inspection of the roofing system. The cost of this manufacturer's representative, and costs incurred for the supply of same, shall be considered inclusive within the contractor's Base Bid for this project. No exceptions will be made for this requirement. Work shall not begin on this project until this representative has arrived at the project, inspected it, and authorized for work to start. The manufacturer's representative shall sign-in upon each visit with the Construction Manager or designated owners' representative, so that accurate attendance records can be kept.**

   The intent of the site visits is that the manufacturer's representative will ensure the quality of the preparation and application of the roof system. The representative will inspect the project on a periodic basis to anticipate problems before they occur, answer questions quickly and look out for the best interest of the Owner.

   The manufacturer's representative will issue a written inspection report for each visit to be issued to the Owners Representative, Architect & Contractor.

3. The roofing system manufacturer must provide an NDL warranty (See paragraph 1.14 - "Warranty and Guarantees") upon satisfactory installation of the roofing system

4. All roofing work, including terminations and other work covered under the roofing manufacturer's NDL Guarantee shall be performed by the Prime Contractor. No subcontractors will be permitted on this portion of the work.

1.09 REGULATORY REQUIREMENTS

A. Conform to applicable codes for roof assembly fire hazard requirements.

B. Factory Mutual Engineering and Research Corporation (FM):

1. Roof assembly classification of Class 1 Construction, wind uplift requirements as listed below.

   a. Wind Uplift Certification: Submit a Letter from the manufacturer of the roofing system that all products manufactured by them including the specific insulation, adhesives and/or fasteners, are included in the specified Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure

calculated in accordance with ASCE 7 for a **120 MPH three (3) second wind gust.**

b. All products shall be listed as Factory Mutual-certified a minimum of one (1) year prior to the date of installation. Submit certifications for both base and top plies as a part of the submittals required for this project.

c. Material Certification: Written certification from the roofing manufacturer certifying that the insulation, insulation fasteners, flashings and accessory products provided by the roofing manufacturer are approved for use with the roofing system and are included in the 20-year No Dollar Limit warranty.

2. Contact roofing manufacturer's technical representative for additional information.

C. Underwriters Laboratories, Inc. (UL):

1. Class A Fire Hazard Classification.

D. Insulation Criteria:

1. Polyisocyanurate foam insulation shall bear a label certifying that a thermal value was determined in accordance with ASTM C-1289-01.

2. Insulation supplied shall be acceptable to the membrane manufacturer.

E. ANSI/SPRI Wind Design Standard for Edge Systems Used in Low Slope Roofs - All roof edge systems shall comply with the requirements of **ANSI/SPRI System Requirement ES1-98 Wind Design Standards Test RE-3.** The Contractor shall supply written confirmation of this compliance stating that the roof edge system materials:

1. Exceed 75 lbs./l.f. outward load in accordance with ANSI/SPRI ES1-98 Wind Design Standards Test Method RE-3; and

2. Exceed 120 lbs./l.f. upward load in accordance with ANSI/SPRI ES1-98 Wind Design Standards Test Method RE-3.

1.10 PRELIMINARY / PRE-INSTALLATION ROOFING CONFERENCE

A. Convene prior to commencing work of this section at a time and location to be determined by the Owner or Owner's Representative.

1. All parties responsible for work of this section are required to attend including the Architect, Owner, Contractor, and any other trades involved in the roofing work.

B. The agenda for the pre-roofing conference shall include:

1. Review of all systems and materials to be used in the installation of new roofing, installation procedures and coordination required with related work.

2. Review and coordination of all substrate preparation and related work, including installation of curbs or similar items by others.

3. Review and modify roofing applicators proposed sequencing of the work.

4. Inspect and make notes of job conditions prior to installation.

5. Supply to the Owner’s Representative, a letter from the corporate offices of the roofing manufacturer, which states the name, title, address and phone number of the factory-supplied representatives who will be assigned to this project. No exceptions will be made for this item.

C. Provide evidence of CERTA training for any installer of torch-applied modified bitumen membrane. Copies of certifications are required prior to award and must be maintained on the jobsite for inspection at any time.

1.11 DELIVERY, STORAGE, HANDLING AND DISPOSAL

A. Deliver all materials and store in their unopened original packaging and rolls with labels intact and legible, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.

B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle rolled goods as to prevent damage to edge or ends.

E. Select and operate material handling equipment so as not to damage existing construction or roofing.

F. Provide continuous protection of materials against wetting and moisture absorption.

G. Properly tie down insulation to prevent blow off. No material is to be stored on the roof at any time.

H. Protect materials against damage by construction traffic.

I. Comply with fire and safety regulations.

J. Protect membrane and flashing materials against coming in contact with coal tar pitch, petroleum, grease, oil, solvents, or other waste products. After exposure to pitch of other waste products, remove contaminated membrane and flashing material from site.

K. Protect materials during delivery to site. Keep materials in safe, dry storage at temperatures recommended by their manufacturers. Materials shall be labeled for ready identification; Label shall include name of manufacturer. Store all materials in a manner so as no direct contact is made with the ground.

Storage and Handling: Store materials in a dry, well-ventilated place protected from the weather

1. Do not store materials so as to overload the deck or structural assembly.

2. Store all materials on raised platforms cover with properly secured breathable water-resistant covers. Slit shrink wrapping to not permit condensation and cover with breathable tarp.

3. Remove all materials that become wet from the site.

4. Store volatile liquids in a separate storage building or trailer. Or remove from the site at the end of each workday.

   a. Store volatile liquids at temperatures recommended by the manufacturer.

5. Do not remove materials from factory packaging until ready for use.

6. Store adhesives and sealants at temperatures between 60°F and 80°F.

L. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

1.12 QUALITY ASSURANCE

A. Submit certification by the manufacturer of the system materials used that these specifications and drawing details are acceptable to them for the deck and surfacing to which they are to be applied.

1. If details for any manufacturer's system proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer's reasons for not accepting the conditions depicted in the specifications or drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the contract requirements.

2. No deviation is to be made from this specification without prior written approval by the manufacturer; submit such approval to the Architect.

B. TPO Roofing Applicator Requirements: refer to 1.08A of this Section.

C. TPO Roofing Manufacturer Requirements: refer to 1.08B of this Section.

D. Material Requirements / Source Limitations:

1. Obtain all membrane sheets, flashings, prefabricated gravel stops and copings, all temporary roof materials and all surface coatings from a single manufacturer.

E. UL Rating:

1. Provide TPO membrane and insulation that has been classified by Underwriters Laboratories as a component of Class A roofing system.

F. **Wind Uplift:**

1. **Design adhered roofing systems and blocking configurations and attachments are to meet Factory Mutual wind uplift criteria (Factory Mutual Systems Loss Prevention Data Sheet 1-28). Refer to Article 1.09 of this Section.**

G. Inspection: Prior to, during installation, and at completion of the installation, an inspection shall be made by a representative of the manufacturer in order to ascertain that the roofing system has been installed according to their published specifications, standards, and details.

1. Warranty will be issued upon approval of the installation by the roofing manufacturer.

H. **Test Reports:** Provide:

1. **Roof drain and leader test or submit plumber's verification.**

I. **Fire-Test-Response Characteristics:** Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-test Exposure: Class A, ASTM E108, for application and roof slopes indicated.

1.13 JOB CONDITIONS

A. Surfaces on which the roofing membrane system is to be applied shall be clean, smooth, dry, and free of fins, sharp edges, loose and foreign materials, oil and grease.

1. Before beginning work, the authorized representative of the manufacturer shall examine the roof surfaces in order to ensure that all substrates are acceptable and will ensure the Total System / No Dollar Limit Warranty requirements of this contract.

B. Examine the substrate and the conditions under which roofing work is to be performed and notify the Architect in writing of unsatisfactory

conditions. The Contractor will schedule a coordinated field meeting with the Architect and the authorized manufacturer's representative to review said conditions prior to proceeding with the work. Do not proceed with any work until all unsatisfactory conditions have been corrected.

1. All surface voids greater than 1/4-inch-wide (or limitations as recommended by the roofing manufacturer) shall be properly filled with an acceptable fill material.

C. Moisture Protection:

1. Cover, seal or otherwise protect the roof and flashings so that water cannot accumulate or flow under completed portions. When and where necessary to accomplish this, provide temporary water cut-offs in accordance with the membrane manufacturer's written specifications.

D. Environmental Conditions:

1. Do not smoke.
2. Do not apply insulation or roofing materials during rainstorms.
3. Do not apply roofing sheets when wind conditions are such that is difficult to handle the sheets.
4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.

E. Protection:

1. Take necessary precautions to prevent damage of any kind to adjacent material and work for other trades.

2. Provide protection to prevent damage or staining of building surfaces, paved areas and plantings.

3. Provide enclosed chutes for removing debris from roof level, to roof level and to vehicles below. Do not throw debris from roof level.

4. Protect areas of deck repair at the end of each working day. Protection shall be watertight.

5. Provide and maintain operating water pumps on each roof area to keep areas free of water accumulation. Pump water through hoses of sufficient size to functioning roof drains.

6. **Drain Verification:**

a. Prior to start of roofing removals, in the presence of the Owner's representative, verify that existing roof drains are operational and are not plugged.

b. Submit in writing that the verification of roof drains has been performed. Include listing and location of non-operational drains.

F. Limit removal of existing roofing to the amount (or areas) that can be replaced with the complete new roofing system (including insulation, membrane, flashing, gravel stops, and related work) in a single working day, maintaining a completely watertight covering on the roof.

1. At the end of each workday, or when weather conditions outside manufacturer's recommended limits are predicted, provide and install temporary water stops as recommended by the roofing manufacturer.

a. Permanent roof insulation shall not be installed as base for temporary water stops.

b. Remove temporary water stops completely before installing permanent roofing system.

1.14 WARRANTY AND GUARANTEES

A. Contractor’s Guarantee: Furnish contractor’s guarantee in accordance with Section 01700 for all materials and workmanship starting from date of Substantial Completion. Replace defective roofing at no expense to the Owner.

B. Manufacturer’s Guarantee: Furnish manufacturer’s twenty (20) year No Dollar Limit (NDL) guarantee and twenty-year membrane guarantee. Guarantee shall cover both labor and materials necessary to effect repairs, with No Dollar Limit as to effect roof repairs. Guarantee to cover membranes, flashings, insulation, expansion joints, adhesives, sealants, fasteners, fascia’s and all materials installed as part of the roofing installation.

1. **Guarantee shall include a wind rider for the repair of damages to the roofing system caused by winds up to and including three second gust of 120 MPH, 33 feet off the ground as defined by the 2015 International Building Code as adopted by New York State.**

C. These specifications may require more than what the manufacturer may require for providing a warranty for the roofing system. The specification where more stringent will take precedent.

D. The NDL Warranty shall be accompanied by a letter from the manufacturer’s corporate office, attesting that the entire roofing installation was inspected during the complete course of the project by the factory-authorized representative, who shall be named, and that the entire installation is certified compliant to the manufacturer, and worthy of the required warranty.

1. The NDL warranty shall include, but not be limited to the following conditions:

a. Cracking due to expansion or contraction of the membrane.

b. Deterioration due to exposure to the elements.

c. Decomposition of membrane due to ponding water.

d. Separation of factory and field fabricated seams and joints.

e. Cracking or deterioration of membrane materials from trapped water vapor under membrane.

f. Separation of or decomposition of membrane flashing.

2. Provide that in the event the roofing system fails to perform, the roofing systems manufacturer will, at its own expense, cause to be made the repairs or modifications to the roofing system necessary to affect water tightness and will re-inspect the roof and reissue the guarantee after reinspection.

3. In the event repairs are required due to natural disasters, unauthorized alterations, or other causes specifically excluded in the guarantee, the manufacturer will reinspect the roof and reissue the guarantee provided that the methods and materials used in the repair have received prior approval by the manufacturer and the repairs are accomplished by an approved applicator.

4. The manufacturer shall inspect the roof area under this contract every five (5) years of the duration of the warranty period and will provide written observation and associated specific maintenance recommendations, as applicable, to the Owner.

E. The Contractor is to cover damages to the building resulting from failure to prevent penetration of water during construction.

F. The Contractor is to guarantee all work against defects in materials and workmanship as per Section 01700 of this specification following final acceptance of the work.

1.15 LABORATORY TESTING

A. Upon request from the Owner or Architect, the roofing membrane manufacturers shall supply, at their expense, the results of mechanical and chemical testing performed on the materials supplied.

B. The tests shall be performed to certify compliance with the standards referenced under this section.

1.16 SITE PROTECTION

A. During roofing work, exposed surfaces of finished walls and ground shall be protected with tarps in order to prevent damage. Contractor shall assume full responsibility for any damage.

B. All work relative to this roof project shall include the use and installation of temporary partitions as necessary and required to adequately satisfy the needs for the separation of construction requirements of Section 01050.

PART 2 - PRODUCTS

2.01 GENERAL

A. For the purposes of this specification, and to identify a minimum level of quality, the design is based on the use of either:

1. *Johns Manville Roofing Systems Group*; Denver, Co.
2. Or an approved equal by the Architect.

B. **Such references shall be construed only as establishing the quality of materials and workmanship to be used under this section, and shall not, in any way, be construed as limiting competition by other manufacturers offering products of identical material composition. Products used shall be those upon which the design is based, or shall be equal products, approved by the Architect. Equal products from GenFlex Building Products or Mulehide Products.**

C. **Bidders / Applicators seeking approval for substitute materials shall submit their request in writing to the Architect in accordance with the requirements of the project manual.**

2.02 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. **Product: JM TPO**

1. Thickness: 60 mils (1.5 mm), nominal.
2. Color: White.

B. Typical Physical Properties

1. Energy and the Environment

a. ENERGY STAR® (White Membrane) Reflectivity: Pass
b. Reflectivity: 0.78
c. Title 24 (White Membrane) Reflectivity: Pass
d. Reflectivity: 0.77
e. ASTM C 1371, Emissivity: 0.87

f. LEED® (White Membrane) Reflectivity: Pass
g. Reflectivity: 0.78
h. ASTM E 408, Emissivity: 0.90
i. SRI of 101 as tested by ASTM E 1980

2. ASTM D 751, Weight: 0.290 lb/ sq ft
3. ASTM D 751, Thickness: 0.060 in. (1.52 mm)
4. ASTM D 751, Tolerance on Nominal Thickness: +/- 10%
5. ASTM D 6778 Annex A, Thickness over scrim, 0.025 in. (.0.64mm)
6. ASTM D 751 Breaking Strength Grab Method, Min

a. Machine Direction: 320 lbf (1,423.36 N)
b. Cross Machine Direction: 270 lbf (1,200.96 N)

7. ASTM D 751, Factory Seam Strength, Cross Machine Direction: 140 lbf (624 N)
8. ASTM D 751, Elongation at Break: 42.41% MD and 34.93% XMD
9. ASTM D 751, Tearing Strength, Min

a. Machine Direction: 89.9 lbf (339.45 N)
b. Cross Machine Direction: 184 lbf (821.14 N)

10. ASTM D 2137, Brittleness Point, Max.: Pass @ -40 C
11. ASTM D 1149, Ozone Resistance, No visible cracks: Pass
12. ASTM D 573, Heat Aging, 90% Retention of Breaking Strength and Elongation at Break: Pass
13. ASTM D 471, Water Absorption, Max: 0.7 Mass %
14. ASTM E 96, Water Vapor Permeance: 0.01 Perms
15. ASTM D 751 Hydrostatic Resistance: 430 psi
16. ASTM D 1204, Linear Dimensional Change, Max: 0.4%
17. FTM 101C Method 2031, Puncture Resistance: 380 lb.

2.03 MEMBRANE SPRAYABLE BONDING ADHESIVES

A. Bonding Adhesive: Manufacturer's standard low VOC Spray bonding adhesive for membrane, and solvent-based bonding adhesive for Flashings. Product: **JM TPO All Season Sprayable Bonding Adhesive**

1. Install when ambient temperature is 25°F and rising and with the adhesive canister temperature at a minimum 70°F
2. Ensure all surfaces are dry, clean and free of debris prior to application
3. Two-sided sprayable aerosol adhesive for hot or cold applications with fast drying properties in a pressurized canister.

2.04 FLASHING

A. JM TPO membrane flashing.

2.05 FASTENING STRIP

A. Aluminum Bar, 1-1/2 inches by 1/8 inch. Pre-punched for fasteners, spacing maximum 12 inches on center.

2.06 TERMINATION STRIP

A. Polyester reinforced termination strip, 5 inches wide with a 3-inch self-adhering seam tape.

B. Tensile strength; 75 psi, peel strength; 8-10 psi.

2.07 LAP SEALANT

A. Lap sealant for sealing exposed edges of splices. Trowel or gun consistency.

2.08 WATER CUTOFF MASTIC

A. One-component, low viscosity, self-wetting butyl blend that has been designed for compatibility with TPO membrane.

2.09 Miscellaneous Accessories: Provide pourable sealers, primers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, cover strips, and other accessories required for full installation. Basis of Design: JM TPO Pourable Sealer A & B, JM TPO Membrane Cleaner, JM TPO Membrane Primer (Low VOC), JM TPO Sealing Mastic, JM TPO Cover Tape, JM TPO Detail Membrane, JM TPO Peel & Stick 10" RPS, JM TPO Peel & Stick 6" RTS, JM TPO-Coated Metal, JM TPO Curb Flashing and JM Single Ply Caulk

2.10 PREFABRICATED ACCESSORIES

A. Two-piece molded TPO (thermoplastic polyolefin) pocket with a rigid vertical wall and preformed flange.

1. Product: ***JM TPO Penetration Pans***

B. A conically stepped pre-molded TPO membrane with a pressure sensitive tape on the flange.

1. Product: **JM TPO Peel & Stick Pipe Boot**

C. A conically stepped pre-molded TPO membrane.

1. Product: ***JM TPO Pipe Boot***

D. A pre-molded inside corner manufactured with a non-reinforced TPO membrane.

1. Product: ***JM TPO inside Corner***

E. A pre-molded outside corner manufactured with a non-reinforced TPO membrane.

1. Product: ***JM TPO outside Corner***

2.11 WOOD BLOCKING, PLYWOOD AND CANTS

A. Blocking Thickness: Size as indicated or required to bring blocking flush with top surface of insulation and tapered edge strips.

B. Plywood Thickness: As required to bring wood blocking flush with top surface of insulation and tapered edge strips.

C. Install plywood on all masonry surfaces contaminated with asphalt or coal tar.

D. Species: Southern yellow pine.

E. Treated on all surfaces including field cuts.

F. All nailers and blocking material to be free of wane, shake, decay or checks, and pressure treated with water-borne preservatives for above ground use, AWPA LP-2. Standard and kiln dried to a maximum of 19% moisture content. Wood shall be dressed on all sides.

1. Shall be #2 or better lumber and conform to the current JM and NRCA recommendations on wood nailers as well as conform to the FM Global Loss Prevention Data Sheet 1-49. Creosote and asphaltic preservatives are not acceptable.

G. In order for to provide minimum tapered insulation profiles as necessary, the contractor may need to provide additional perimeter blocking (and fastening) details, based on verified field conditions. The cost of any field modifications required shall be at no additional cost to the Owner. **All blocking attachments shall be certified by a NYS licensed Professional Engineer (who is retained by the Contractor on a consultant basis) certifying that the connections as designed meet or exceed the wind uplift requirements of the roofing system.**

2.12 INSULATION

A. Tapered: ***JM Energy 3 Tapered and Tapered Crickets with a minimum R 30.***

1. Polyisocyanurate foam with fiberglass facer on both sides. Manufactured using Pentane as a blowing agent.

2. ASTM C1289-01, Type II, Class I, Grade II

3. Maximum Panel Size: 4 feet x 4 feet. R value: 5.7 per inch.

4. Tapered Insulation: 1/8 inch per foot slope with 1/4 inch per foot crickets (Existing Buildings)

5. Compressive Strength: 20 psi minimum at any point. ASTM D1621-73.

6. Flame Spread: 25 or less, ASTM E-81-81.

7. Moisture vapor transmission: ASTM C355, less than 1 perm.

8. Water absorption: ASTM C209, less than 1%.

9. Dimensioned stability: ASTM D2126, 2% maximum 24 hours.

10. Factory Mutual approved and Underwriter's Laboratories listed.

B. Flat Stock: Base Layer – ***Energy 3- 20 psi with a minimum R Value of 30.*** (**Two (2) layers of 2.6 inch in Structurally Sloped areas).**

1. Polyisocyanurate foam, fiberglass facer on both sides, manufactured using Pentane as the blowing agent.

2. ASTM C-1289-01. Type II, Class I, Grade II

3. Maximum Panel Size: 4 feet x 4 feet. R value: 5.7 per inch

4. Compressive Strength: 20 psi minimum at any point, ASTM D1621-73

5. Flame Spread: 25 or less, ASTM E-81 81.

6. Moisture vapor transmission: ASTM C355, less than 1 perm.

7. Water Absorption: ASTM C209, less than 1%.

8. Dimensioned stability: ASTM D2126, 2% maximum 24 hours.

9. Factory Mutual approved and Underwriter's Laboratories listed.

C. All insulation shall meet or exceed the following requirements when tested in accordance with ASTM E-84:

1. Flame spread less than 25.

2. Smoke developed less than 450.

3. Fuel contributed less than 100.

2.13 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of Design: UltraFast Fasteners and Plates

B. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of Design: **Roofing Systems Urethane Adhesive (RSUA)**

2.14 ROOF COVER BOARDS

A. Cover Boards

1. Top Layer: ***Johns Manville's ProtectoR HD Cover Board.*** Product shall conform to the requirements of ASTM C 1289, Type II, Class 4, Grade 1;

   a. Cover Board: ½-Inch-thick factory laminated to the polyisocyanurate board to the sizes required to meet the minimum R-value.

   b. High Density closed cell polyisocyanurate foam board with clay-coated fiber glass facer factory attached to the polyisocyanurate at sizes necessary to make two layers of insulation.

   c. Minimum Compressive strength: Grade 1 - 109 psi (751 kPa).

   d. Flexural Strength: 675 psi (4654 kPa), ASTM D 1037; 40 lbf (0.18 kN) ASTM 1037

   e. Dimensional Stability: >0.5%, ASTM 2126

   f. Moisture Vapor Permeance: <1 perm, 57.5 ng/(Pa•s•m^2) ASTM E 96

   g. R-Value: 2.5 (hr•ft2•˚F)/Btu, ASTM C 518

   h. Water Absorption (max) 1.5%, ASTM C 209

   i. Surface Water Absorption: <1 gram, ASTM C473

   j. Mold Resistance: Pass, ASTM D 3273

   k. Weight per 4 x 8 Sheet: 12 lbs. (5.4 kg)

2.15 FASTENERS

A. Wood Blocking

1. No. 14 screws with fluorocarbon coating that penetrate the nailers below 1 ¼ inches. Set in two rows staggered at 12 inches on center. Designed for securing wood to wood.

2. Spiral shanked galvanized nails that penetrate the nailers below 1 ¼ inch. Set in two rows staggered at 12 inches on center.

2.16 ROOF CURBS

A. Provide a minimum of one row of wood blocking to top of existing curbs to raise the flashing a minimum of 8 inches.

2.17 EXPANSION JOINTS (Where indicated on drawings)

A. Provide new expansion joint cover; ***JM Expand-O-Flash***, curb to wall and/or curb formed, 4" wide and 4" vertical.

2.18 ROOF DRAINS

A. ***For Existing Construction Roofs,*** The Contractor shall remove the existing Roof Drain Dome Strainers and Flashing Clamp Rings and discard, clean and prep remaining drain bowl assembly for new roofing. Contractor to Install New Cast Iron Dome Strainers, Flashing Clamp rings and 2" Cast Iron Static Extension Ring, replace all missing or damaged components with new to match existing as manufactured by Zurn, or approved equal by Architect.

2.19 EDGE METAL

A. Coping System: Manufacturer's factory fabricated coping consisting of a base piece and a Snap-On cap. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee. Product: ***Presto-Lock Coping***

B. Fascia System: Manufacturer's factory fabricated fascia consisting of a base piece and a Snap-On cover. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee. Product: ***Presto-Tite Fascia.***

PART 3 – EXECUTION

3.01 REMOVAL

A. Removal of existing roofing, cover board, insulation, vapor barrier and the existing roofs down to the deck, along with all fasteners and plates, removing only that portion that can be made watertight at the completion of the workday or before any inclement weather.

B. Verify deck is clean and smooth, free of depressions, waves, or projections. All surfaces must be clean, smooth, dry, compatible and free of dirt, debris, oil/grease and gravel. Damaged or missing decking material must have new like materials installed so as to meet the requirements of the manufacture's written instructions for application of the new roofing.

C. Do not apply roofing materials to damp, frozen, dirty, dusty, or deck surfaces unacceptable to the manufacturer.

D. Remove and Replace all deteriorated or broken decking. Report this to the Owners Representative prior to installing new decking.

3.02 CONDITION OF SURFACE

A. Surfaces that will receive roofing shall be in a condition ready to receive the required roofing per the manufacturer's requirements.

B. Clean the substrate of projections and substances detrimental to the work.

C. Install cant strips and similar accessories as shown and as recommended by the roofing systems manufacturer even though not shown.

1. Install wood nailers at the perimeter of the entire roof and around penetrations as indicated.

a. Anchor nailers roof deck in accordance with Article 3.05, G, H and I.

2. Wood nailers will be installed at all perimeters to be able to receive the height of the new tapered insulation whether indicated on the drawings or not at no addition cost to the owner.

D. Coordinate roofing with flashings and other adjoining work to insure proper sequencing of the entire work.

3.03 PREPARATION

A. No trace of surface water shall be present. Materials under roofing shall be completely dry. Sweep surface clean of dust, debris, and loose and foreign materials.

B. Start of application of roofing signifies acceptance of existing conditions.

3.04 WOOD BLOCKING, CANTS AND PLYWOOD

A. Wood Blocking is required, as indicated in the details and drawings.

B. Provide new treated wood blocking where existing wood blocking, that is not indicated to be removed, is deteriorated.

C. Provide treated wood blocking at perimeter of roofing membrane, all sides of penetrations by roof accessories, mechanical curbs, and other areas where blocking is required by membrane manufacturer to nail membrane and flashing in place.

D. Blocking Thickness: Equal to total thickness of insulation and cover boards.

E. Provide wood blocking to raise existing equipment curbs flashing heights. Maintain 8 inches minimum height above membrane.

F. Provide treated wood blocking, and plywood at locations indicated.

G. In all areas where nailers are required, they shall be firmly anchored to the deck to resist a minimum force of 200 lbs./lineal foot (2.9 kN/m) in any direction. A 1/2 inch (15 mm) of each end.

Spacing and fastener embedment shall conform to FM Global Loss Prevention Data Sheet 1-49.

H. Secure wood blocking to wood blocking with 16 p nails at 6 inches on center. Stagger nails on each side of blocking.

I. All woodwork to be reused shall resist a minimum force of 200 lbs. / lineal foot (2.9 kN/m) in any direction and shall be free of rot. If any existing woodwork is questionable, it shall be removed and replaced with suitable new materials.

3.05 FIRST LAYER OF INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Starting at the low edge of the roof, mechanical fasten thermal layer of insulation to the deck.

C. Install boards with long joints continuous.

1. Install with long joints running parallel to the decking.

D. Stagger short joints.

E. Butt joints tightly.

1. "Occasional" joint widths up to 1/8” will be allowed. Fill all any widths greater than 1/8” with scrap thermal layer to achieve consistent surface.

F. Install only that amount that can be completed in one day or when rain is imminent.

G. Preliminarily Fastened Insulation: Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.

1. Fasten first layer to resist uplift pressure at corners, perimeter, and field of roof but not less then:

a. Field:8 fasteners per 4’x 4’ board

b. Perimeter: 12 fasteners per 4’x4’ board

c. Corners: 16 fasteners per 4’x4’ board

3.06 INSULATION AND COMPOSITE COVER BOARD INSTALLATION

A. Adhered Insulation: Install each layer of maximum 4’x4’ insulation and composite cover board and adhere to substrate as follows:

B. Starting at the low edge of the roof, install thermal layer and thermal protective layer in specified urethane adhesive.

C. Install boards with long joints continuous.

D. Stagger all joints from the board below.

E. Butt joints tightly.

F. "Occasional" joint widths up to 1/8” will be allowed. Fill all any widths greater than 1/8” with scrap thermal layer to achieve consistent surface.

G. Set thermal layer in a serpentine fashion using 2-part urethane insulation adhesive applied in 3/4-inch-wide beads at the following minimum rates:

1. Field: Beads at **4** inches on center

2. Perimeter: Beads at **4** inches on center

3. Corner: Beads at **4** inches on center

H. Place board into the adhesive while it is still tacky.

1. If adhesive reaches its tack-free state, remove and re-apply adhesive.

I. Press the thermal layer into the adhesive to a firm and uniform bearing.

1. Use ballast (sandbags or bagged rocks) on all four corners of the board for a minimum of 30 minutes to ensure contact of material and adhesive, if necessary.

J. Keep insulation absolutely dry at all times. Discard insulation that contains moisture.

K. Install only as much insulation as can be covered with roofing membrane the same day.

L. Repair any defects or installation errors prior to next phase of roof system installation.

3.07 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install Johns Manville roofing membrane specification **ST6A S-P** in the areas over the composite board. Install roofing according to membrane roofing system manufacturer's written instructions or these specifications whichever are more stringent. Unroll roofing membrane and allow to-relax before installing.

B. Start installation of roofing membrane in the presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Once the membrane has been properly positioned, fold the sheet back half of the sheet's length

E. Bonding Adhesive: Apply solvent-based sprayable bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

F. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

G. Apply a heavy smooth surface roller over the entire roof as soon as the membrane is set in place.

H. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

I. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity.
2. Apply lap sealant to seal cut edges of roofing membrane.
3. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   a. Remove and repair any unsatisfactory sections before proceeding with Work.
4. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.

J. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

3.08 MEMBRANE FLASHING

A. General: TPO membrane shall be used for flashing of all straight walls, large curbs, and all large, straight sided penetrations. TPO Flashing or TPO Peel & Stick Flashing shall be used for flashing of all pourable sealer penetration pockets, vent pipes, scuppers, curbs, T-Joints, inside/outside corners of wall flashings, etc.

B. All pipe penetrations are to be flashed with TPO Flashing, TPO peel & Stick Flashing or TPO Pre-Molded Pipe Boots. Refer to all applicable TPO Detail Drawings.

C. Straight run wall and curb flashing shall be flashed with TPO. **Note: All flashings are to extend a minimum height of 8″ (200 mm) above the roof level.**

D. On all re-roofing applications, loose flashing materials must be removed down to a sound substrate and replaced with new flashing. To ensure proper drainage of the existing structure, weep holes must never be covered by new flashings.

E. Terminations utilizing aluminum compression bars or surface-mounted counter flashings must be secured directly to a smooth and sealed wall surface.

F. TPO wall flashings terminated with metal copings must be fully extended under the coping and mechanically fastened a minimum 1-1/2" (40 mm) down the face of the wall.

G. TPO Flashing Membrane shall be adhered to the substrate using TPO Bonding Cement. Follow the TPO instructions for correct application of this cement. The flashing membrane shall be rolled carefully into the substrate. Care must be taken to ensure that the flashing does not bridge at any change of direction, such as from the base of a parapet wall to the roof deck.

3.09 INSTALLATION OF ROOF EDGING SYSTEMS

A. Verify that the roof edging installation will not disrupt other trades.

B. Verify that the substrate is dry, clean and free of foreign matter.

C. Report and correct defects prior to any installation.

D. Submit product design drawings for review and approval to Architect or Specifier before fabrication.

E. Check as-built conditions and verify the manufacturer's roof edge details for accuracy to fit the wall assembly prior to fabrication.

F. Comply with the roof edging manufacturer's installation guide when setting edging.

G. Use provided fasteners consistent with manufacturer's instructions, suitable for the substrate to which it is being installed.

H. Install water cut-off, as recommended by the membrane manufacturer, under the anchor bar.

I. Roof Edge Flashing Strips

1. Install flashing strips in longest lengths possible to minimize laps under anchor bar

J. Follow manufacturer's application method for installing flashing strips.

1. Minimum 8 inches into the field of the roof.

2. Down outside face of the wall, 1/2-inch past wood nailers.

3. Miter and Scupper Bar.

K. Splice Plates

1. Apply 3/8-inch bead of non-curing sealant to both sides of spacer and on deck flange.

L. Anchor Bars

1. Remove all dirt, dust and debris from anchor bar.

2. Apply a 3/8-inch-wide and 1/4-inch-thick band of mastic to the back of the anchor bar.

3. Position 12-foot sections of anchor bar with applied mastic overlapping splice plate and butting securely to EPDM gasket.

4. Allow 1/2-inch space between anchor bars.

5. Install splice plate at opposite end of 12-foot anchor bar.

6. Fasten anchor bar at 12 inches on center intervals through out.

7. Use 2” stainless steel fasteners provided by manufacturer.

8. Field cut sections as necessary.

M. Fascia Panels

1. Install panels left to right.

2. Position 12’ fascia panels on top of anchor bar.

3. Overlap preceding panel by 1 inch at notches provided.

4. With panels in correct position snap each section into anchor panel.

3.10 FLASHING

A. Follow same procedures as described for cleaning, adhesive application, and lap sealant application.

B. Install field sheet up and over wood blocking at all fascia or coping areas fastening the sheet on the outside face of the wood blocking.

C. At vertical surfaces apply TPO flashing over polyester reinforced termination strip.

D. Extend flashing 4 inch minimum onto the roof surface and full height of curbs and vertically up walls a minimum of 12 inches unless indicated otherwise. Remove roof top equipment to extend flashing over the top of the curbs. Provide deck overlayment on vertical surfaces.

E. Remove roof top power ventilators, extend top of curb to minimum 12 inches above roof line. Extend flashing over top of curb. Reset equipment.

F. Provide termination strip and continuous bead of sealant under counter flashing.

G. Straight run wall and curb flashings shall be flashed with TPO membrane. **Note: All flashings are to extend a minimum height of 8″ (200mm) above the roof level.**

H. On all re-roofing applications, loose flashing materials must be removed down to a sound substrate and replaced with new flashing. To ensure proper drainage of the existing structure, weep holes must never be covered by new flashings.

I. Terminations utilizing aluminum compression bars are surface-mounted counter-flashings must be secured directly to a smooth and sealed wall surface.

J. TPO wall flashings terminated with metal copings must be fully extended under the coping and mechanically fastened to the face of the outside wall covering all wood blocking a minimum 1 ½″ past where wood terminates(40mm).

K. TPO Flashing Membrane shall be adhered to substrate using TPO bonding cement. Follow the TPO adhered instructions for correct application of this cement. The flashing membrane shall be rolled carefully into the substrate. Care must be taken to ensure that the flashing does not bridge at any change of direction, such as from the base of a parapet wall to the roof deck.

3.11 WALKWAY PADS

A. Provide manufacturer's standard TPO walkway pads at each roof ladder (Top and Bottom), at each roof hatch and completely around each HVAC unit and any other areas designated on the drawings. Install in accordance with manufacturers requirements with lap cement or seam tape.

3.12 EXPANSION JOINT

A. Install a new expansion joint cover, curb to wall, curbed formed as per the manufacturers' specifications.

3.13 WATERSTOPS

A. Install temporary cutoffs around incomplete edges of roofing assembly at the end of each workday and when work must be postponed due to inclement weather. Straighten the insulation line using loosely laid pieces of insulation. Seal the JM TPO membrane to the deck or existing membrane by performing the following procedure: Fold the edge of the roofing membrane back a minimum of 12″ (300mm). Clean the surface of the folded-back membrane with JM TPO Primer/Wash or other approved cleaning method. Apply a 1/4-inch (8mm) bead of JM Lap Caulk or Pourable

Sealer on the cleaned area of the sheet. If the roofing membrane installation is to be delayed for 14 days or more, of if the substrate surface is rough, apply two 1/4-inch (8mm) beads of sealant.

B. Remove the temporary seams completely when work resumes, cutting out the contaminated membrane. Remove all sealant, contaminated membrane, insulation fillers, etc. from the work area and properly dispose off-site.

3.14 INSPECTIONS

A. All work shall be subject to inspection by Architect and Owner. Work found to be in violation of specifications or not in accordance with established workmanship practices and standards will be subject to complete removal and proper replacement with new materials at contractor's expense.

3.15 CLEANING

A. Clean up and remove daily from the site all wrappings, empty containers, paper, loose particles, and other debris resulting from these operations.

B. Remove markings from finished surfaces.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.16 PROTECTION

A. Provide traffic ways, erect barriers, temporary interior partitions and enclosures, fences, guards, rails, enclosures, chutes, and the like to protect personnel, roofs, and structures, vehicles and utilities.

B. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8" thick.

C. In addition to the plywood listed above, an underlayment of minimum 1/2-inch recovery board is required on new roofing.

1. Special permission must be obtained from the manufacturer before any traffic will be permitted over new roofing.

D. Provide reinforced polyethylene membrane over the finished roof area and held in place with a removable double-sided tape installed at the completion of each day.

1. Provide tape in such a manner that the wind will not blow the 6-mil poly off the competed roof area. Area of complete roofing must be kept clean at all times.

3.17 FIELD CONTROL

A. Field inspection will be performed as outlined under 1.08B of this section.

3.18 ROOF DRAINS

A. Existing Roofs:

1. The Contractor shall remove the existing Roof Drain Dome Strainers and Flashing Clamp Rings, Roof flashings and discard.

2. Clean and prep remaining drain bowl assembly for new roofing.

3. Drill and tap broken drain bolts and replace if necessary.

4. Repair or replace broken drain components.

5. Contractor to Install New Cast Iron Dome Strainers, Flashing Clamp rings and 2” Cast Iron Static Extension Ring, replace all missing or damaged components with new to match as manufactured by Zurn, or approved equal by Architect

B. Provide a smooth transition from drain bowl to deck surface.

1. Taper insulation back from drain a minimum of 24” to provide for positive drainage.

2. Prime all metal surfaces.

C. Install TPO membrane at drain bowl.

1. Proceed with installations only after unsatisfactory conditions have been corrected.

2. Extend membrane 1" beyond the inside edge of the drain bowl.

3. **Position membrane so as to avoid the occurrence of any seams at roof drain locations.**

D. Install clamping ring and drain covers supplied with drain.

E. Test all drains for proper flow and water-tightness. Correct any and all defects.

3.19 VENT STACKS AND PENETRATIONS

A. Use pre-molded pipe boot for vent stacks.

B. Use peel and stick pipe boots for all hot pipe penetrations.

C. Use roof penetration pocket flashing with nailers and pourable sealer for all angles and unusual penetrations.

3.20 POSITIVE DRAINAGE

A. The General Construction Contractor or the roofing contractor (if separate prime contract) shall be responsible for installing the roof slope and drainage in accordance with N.R.C.A. standards. Additionally, the Contractor shall be responsible for the installation of structural steel, roof decking, roof drains, tapered insulation, perlite, crickets, roof plies, etc. in accordance with and to the tolerances indicated in the contract documents.

There should be no standing water on any portion of the entire roof surface 48 hours after a rainfall, during ambient drying conditions.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Provide and install new gravel stops, reglets, copings, and counter flashings as required for installation of new roof cover as specified in the roofing section and as shown on Drawings.

1.02 SYSTEM DESCRIPTION

A. Performance requirements:

1. Flashing and sheet metal work shall be permanently watertight and shall not deteriorate in excess of manufacturer's published limitations.

1.03 SUBMITTALS

A. Comply with requirements of Section 01300 - Submissions and as modified below.

B. Product Data:

1. Submit manufacturer's product specifications, installation instructions, and general recommendations for each specified sheet metal material and fabricated product.

C. Samples:

1. Submit two 8" square samples of specified sheet materials to be exposed as finished surfaces.

2. Submit two 12" long completely finished units of specified fabricated products exposed as finished work.

D. Shop Drawings:

1. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including major counter flashings, trim/fascia units, gutters and downspouts.

E. Edge Securement and Design Criteria:

1. ANSI/SPRI Wind Design Standard for Edge Systems used in Low Slope Roofs – all roof edge systems shall comply with the requirements of ANSI/SPRI System Requirements ES1-98 Wind Design Standards Test RE-3.

2. The Contractor shall supply written confirmation of this

compliance stating that the roof edge system materials:

a. Exceed 75 lbs./lf outward load in conformance with ANSI/SPRI ES1-98 Wind Design Standards Test Method RE-3; and

b. Exceed 120 lbs./lf outward load in conformance with ANSI/SPRI ES1-98 Wind Design Standards Test Method RE-3.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum Sheet:

1. Aluminum sheet or strip of alloy and temper recommended by producer for the indicated use.

a. Unless otherwise indicated or recommended by manufacturer, provide aluminum sheet meeting ASTM B209 for fabricated products.

2. Provide minimum gauge of aluminum sheet as recommended in SMACNA "Architectural Sheet Metal Manual" for profiles indicated.

3. Finishes:

a. Finishes shall be either: SAF Class I, clear anodized or SAF 70% PVDF or Kynar 500 fluorocarbon where painted finish is required by and approved by the Architect, as manufactured by Southern Aluminum Finishing Company, Inc., as noted on the drawings.

B. Accessories:

1. For metal work, provide the type solder recommended by the producer of the metal sheets for fabrication and installation. All fastenings shall be done with stainless steel screws (type as approved by the Architect).

2. Roofing cement: ASTM D-2822, asphaltic.

3. Bituminous coating: FS TT-C-494, or SSPC Paint 12, solvent-type bituminous mastic, compounded for 15 mil dry film thickness coating.

4. Reglets: Metal or plastic units of the type and profile indicated; compatible with flashing indicated; non-corrosive.

5. Metal accessories: Provide sheet metal clips, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.

2.02 MANUFACTURED UNITS

A. Extruded Gravel Stops:

1. Manufacturers:

a. For convenience, details have been based on the following products:

1. "Perimeter Systems Division" by Southern Aluminum Finishing Company, Sanford, North Carolina.

b. Other manufacturers offering products complying with these requirements include:

1. Metal Era (Anchor-Tite) Waukesha, Wisconsin.

2. W.P. Hickman Company, Asheville, North Carolina.

2. Components:

a. Gravel stops: minimum 10'-0" lengths with 6" concealed splice plates, .063 gauge.

1. Profile shall be: GS1 as manufactured by Southern Aluminum Finishing Co.

2. Install continuous 2" galvanized cleat with 1 1/2" stainless steel nails at 12" o.c. Cleat must be installed true and straight, properly aligned to seat into gravel stop's lower hemmed edge.

b. Coping: minimum 10'-0" lengths with continuous galvanized steel cleats, .063 gauge.

1. Profile shall be: PLC Pressloc as manufactured by Southern Aluminum Finishing Co.

c. Prefabricated corner units: each leg minimum 4'-0" long, with miters welded in factory prior to finishing, for inside and outside corners.

d. Extruded wall caps of profile and size indicated. Finish to match accompanying gravel stop; minimum .063" thick.

e. Extruded fascia extenders of profile and size indicated. Finish to match gravel stop; minimum .063" thick.

f. Soffit closure clips.

g. Spill out scupper with prefabricated core (where indicated).

B. Reglets and Counter Flashing:

1. Surface mounted reglets: 26 gauge galvanized steel, 10'-0" lengths with end lap, mitered corners and expansion slots 16" o.c. to receive stainless steel 1" pins and 7/8" diameter washers with neoprene facing, similar to "Type SM" by Fry Reglet

Corporation, Glendale, California.

2. Counter Flashing: 26 gauge galvanized steel with end caps similar to "Springlock Flashing" by Fry Reglet Corporation, Glendale, California.

2.03 FABRICATED METAL WORK

A. Fabricate metal flashings, trim, expansion joints, formed metal copings, and similar items to comply with profiles and sizes shown, and to comply with standard industry details as shown by SMACNA in the "Architectural Sheet Metal Manual." Comply with metal producer's recommendations for tinning, soldering, and cleaning flux from metal. Except as otherwise indicated, fabricate work from the following material:

1. Aluminum sheet.

B. Form section true to shape, accurate in size, square, and free from distortion. Form in largest practical lengths.

1. Form seams as recommended by metal producer for applications shown on drawings.

2. Fabricate corners from one piece with minimum 18-inch long legs; seam and seal.

3. Fabricate vertical faces with bottom edge formed outward and hemmed to form drip.

C. Fastenings shall be done with stainless steel screws (type as approved by the Architect).

PART 3 - EXECUTION

3.01 EXAMINATION

A. The installer shall examine the substrate and the conditions under which flashing and sheet metal work is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.02 PREPARATION

A. Coordination:

1. Coordinate flashing and sheet metal work with other work for correct sequencing of items making up entire system of waterproofing and rain drainage.

2. Do not proceed with the installation of flashing and sheet metal work until curb and substrate construction, cant strips, blocking, reglets, and other construction to receive the work are

complete.

3.03 INSTALLATION

A. Comply with manufacturer's instructions for handling and installation of flashing and sheet metal work including extruded and formed items.

1. Unless otherwise recommended by manufacturer, comply with recommendation of SMACNA "Architectural Sheet Metal Manual" for items shown on drawings.

2. Comply with details and profiles shown on drawings.

B. For non-moving seams, provide soldered flat lock seams, except as otherwise indicated. Comply with metal producer's recommendations for tinning, soldering, and cleaning the joints.

C. Provide for thermal expansion of all exposed sheet metal work exceeding 15'-0" running length.

1. Flashing and trim: 10'-0" maximum spacing, and 2'-0" from corners and intersections.

2. Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges to form a hem.

3. Insert flashings into reglets as shown. Anchor by mechanical means, including driven wedges of lead or other compatible metal, space 2'-0". Seal the joint with sealant as indicated.

a. Refer to Section 07900.

4. Separate copper work from dissimilar metals by a 15-mil dry film thickness bituminous coating or by a heavy tinning of solder at spot contacts.

5. Fabricate, support, and anchor rain drainage in a manner which will withstand thermal expansion stresses and full loading by water or ice, without damage, deterioration, or leakage.

6. On bituminous membranes, provide not less than 4" embedment of flashing in membrane, and cover edge with tape or stripping set in roofing cement.

3.04 GUARANTEE/WARRANTY

A. In addition to the Contractor's guarantee, the Contractor shall furnish the Owner a twenty (20) year limited warranty from the manufacturer against failure of finish for all metal copings and gravel stops.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07800 – ROOF ACCESSORIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 – Specification Sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work included: Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of gutters and downspouts as indicated on the drawings and specified herein.

1.03 QUALITY ASSURANCE

A. Installing Contractor shall be responsible for installing gutter system in accordance with manufacturer's printed instructions. Follow primary roofing material manufacturer's printed instruction for installation of eave trims.

1.04 SUBMITTALS

A. Prior to start of installation, the installing Contractor shall furnish details or catalog cuts indicating products to be used to conform to these specifications.

1.05 DELIVERY AND PRECAUTIONS

A. All products delivered shall be stored in a clean, dry location prior to installation.

B. Products furnished with strippable protective plastic film should have film removed prior to installation. Such film-coated products shall not be exposed to sunlight for more than 30 minutes without removing film.

C. Workmen shall use diligent care to avoid damage, scars, and abrasions to product when handling.

PART 2 – PRODUCTS

2.01 GENERAL

A. Design is based on use of gutters as manufactured by Perimeter Systems, division of Southern Aluminum Finishing Company, and the terminology used may include reference to that manufacturer's proprietary products. Such reference shall be construed only as establishing the quality of materials and workmanship to be used under this section and shall not, in any way, be construed as limiting competition.

B. Products used shall be those upon which design is based or shall be equal products approved in advance by the architect.

2.02 MATERIALS

A. Gutters:

1. Gutter system with accessories, manufactured of aluminum, .040" thickness.

2. Gutters shall be manufactured in 10'-0" lengths, of .040" mil finish aluminum tapered and notched to provide a 1" telescoping lap joint. Gutters shall be prepunched at 12" o.c. to provide for thermal movement after installation and be provided with alternating bracket slots to interconnect associated brackets.

3. Snap-over fascia shall be Colonial Series press formed in 10' lengths with true and repeated shapes. Fascia joints shall receive 6" concealed splice plates with finish to match fascia.

4. Provide manufacturer's standard support brackets and interior straps for installation at 30" o.c. Brackets shall be 1/8" x 1", of compatible material to gutter, with matching finish and color.

B. Downspouts:

1. Downspouts to be .050" gauge bronze anodized aluminum.

2. Downspouts shall be manufactured 10'-0" lengths, factory offset on one end to provide a ¾" telescope joint. Downspout shall contain a factory mounted back, which is non-sealed to allow seepage of water in overflow conditions.

3. Elbows for downspouts shall be welded construction, with matching finish applied after welding. Such finish shall be of quality equal to finish for non-welded parts. Grinding and spray painting of parts to match will not be permitted. Elbows will be provided with a factory offset on its lower end to allow a ¾" telescope joint.

4. Provide manufacturer's wall brackets of compatible material to downspout to facilitate both interior and exposed downspouts, with matching finish and color.

PART 3 – INSTALLATION

3.01 SUBSTRATE PENETRATION

A. Wood Plates: All horizontal plates to receive gutters shall be installed true and straight and free of splinters, knots, or other irregularities. Minimum plate thickness shall be ¾-inch plywood. Follow local building codes or Factory Mutual Loss

Prevention Data 1-49 (whichever is greater) for proper attachment of plates.

B. Fascia boards shall be installed in a vertical fashion, true and straight and free of knots, splinters, or other irregularities. Soffits, extenders, or cladding to be applied to fascias shall be installed prior to gutter installation.

C. Wall Conditions: Wall surfaces that shall

3.02 INSTALLATION PROCEDURES

A. Review carefully and follow primary roof materials manufacturer's general recommendations as to installing waterproof membranes to this gutter system.

B. Support Bracket Installation: Locate low and high points of gutter installation and chalk a guide line to allow a maximum ¼"/40' slope. Install support brackets at 30" on center aligned with the chalk or other type of guideline. Take care to avoid locating bracket directly over downspout outlet locations. Attach brackets with 16d coated nail or 2" x #10 wood screw.

C. Gutter Installation: Install gutter sections from left to right (roof side) into support brackets. Insert each telescoping section into previous section for a distance of 1", seal and rivet at 2' o.c. Provide sealants and fasteners as provided by manufacturer. Nail rear upper portion of gutter with 1 ½" nails through prepunched elongated holes at 12" o.c.

D. Inside Strap/Snap-Over Fascia Installation: Position snap-over fascia on gutter assembly by hooking the fascia's lower hemmed edge onto the support bracket's retainer. Insert inside straps at 30" o.c. alternating with support brackets with hook portion of strip positioned to lock snap-over fascia into place. Strap shall be hooked into slotted holes at leading edge (bead) of gutter and riveted at its rear side. In no case shall strap be nailed, screwed, or otherwise fastened which would restrain thermal movement of product.

E. Expansion Joints: At 40'-0" intervals, or as shown on the plans, install manufacturer's standard elastomeric expansion joint assembly. At snap-over fascia joints, insert concealed splice plate and allow a 3/8" gap between adjoining sections.

F. Miter Corners: Install manufacturer's welded miter units at locations shown on plans. Gutter corners shall have 30" legs, prepunched, notched, and telescoping to match gutter. Fascia corners shall have 30" legs and shall be finished after fabrication, grinding and touch-up painting will not allowed.

G. End Caps/Terminations: Install manufacturer's end caps at all end terminations. End caps shall be riveted at 2" o.c. and sealed.

H. Outlets: Locate all outlet locations and field cut hole in a neat workmanlike manner. Hole shall be located at a distance of 1" from backside of gutter. Insert manufacturer's outlet, fasten in

place with 4 rivets (one being located on each flange), and seal. Field cut snap-over fascia in a neat workmanlike manner to accommodate downspouts.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07910 - JOINT SEALERS

PART 1 - GENERAL

1.01 GENERAL

A. Joint sealant to be as per the schedule at the end of this section.

B. Submissions: In addition to product data, submit the following:

1. Samples of each type and color of joint sealer required.

2. Certified test reports for joint sealers evidencing compliance with requirements.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Compatibility: Provide joint sealers, joint, fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions, as demonstrated by testing and field experience.

B. Colors: Provide color of exposed joint sealers indicated, or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

C. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated, complying with ASTM C 920-11 requirements.

1. Two part pourable Polysulfide Sealant: Type M; Grade P; Class 12-1/2'; Uses T, M, G, A, and O.

2. One part non-acid curing Silicone Sealant: Type S, Grade NS, Class 25, and as follows:

a. Uses NT, M, G, A, and O.

b. Additional capability, when tested per ASTM C 719, to withstand the following percentage changes in joint width as measured at time of application and still comply with other requirements of ASTM C 920-11.

c. 40 percent movement in both extension and compression for a total of 80 percent movement.

3. One part acid-curing Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and O.

4. One part mildew resistant Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and O; formulated with fungicide; intended for sealing interior joints with nonporous substrates exposed to high humidity and temperature extremes.

D. Acrylic Sealant: Manufacturer's standard one-part non-sag, solvent-release-curing, acrylic polymer sealant complying with ASTM C 920-11 for Type S, Grade NS; Uses NT, M, G, A, and O; except for selected test properties which are revised as follows:

Heat-aged hardness: 40-50.
Weight loss: 15 percent.
Max. cyclic movement capability: ±7.5 percent.

E. Acrylic-Emulsion Sealant: Manufacturer's standard, one-part, non-sag, acrylic, mildew-resistant, paintable, acrylic-emulsion sealant complying with ASTM C 834.

F. Foamed-in-place Fire-Stopping Sealant: Two-part, foamed-in-place silicone sealant for use as part of a through-penetration fire-stop system for filling openings around cables, conduit, pipes, and similar penetrations through walls and floors, with fire-resistance rating indicated, per ASTM E 814; listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

G. One-part Fire-Stopping Sealant: One part elastomeric sealant formulated for use as part of a through-penetration fire-stop system for sealing openings around cables, conduit, pipes, and similar penetrations through walls and floors, listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

H. Sealant Backings, General: Non-staining, compatible with joint substrates, sealants, primers, and other joint fillers; approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

a. Either flexible, open-cell polyurethane foam or non-gassing, closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer.

2. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, capable of remaining resilient at temperatures down to -26°F (-15°C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

3. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back of joint.

I. Primer: As recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated.

J. Accessory Materials for Fire-Stopping Sealants: Forming, joint fillers, packing, and other accessory materials as required for installation of fire-stopping sealants.

PART 3 - EXECUTION

3.03 EXECUTION

A. General: Comply with joint sealer manufacturer's instructions applicable to products and applications indicated.

B. Elastomeric Sealant Installation Standard: Comply with ASTM C 1193-16 Standard Guide for use of Joint Sealants.

C. Solvent-Release Curing Sealant Installation Standard: Comply with ASTM C 804.

D. Latex Sealant Installation Standard: Comply with ASTM C 790.

E. Acoustical Sealant Application Standard: Comply with ASTM C 919-12(2017) for use of joint sealants in acoustical applications.

F. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated.

JOINT SEALER SCHEDULE

JOINT SEALERS	DESCRIPTION OF JOINT CONSTRUCTION AND LOCATION WHERE SEALANT IS TYPICALLY APPLIED (SEE NOTE BELOW)
Two-part Pourable Urethane	Exterior and interior joints in Sealant horizontal surfaces of concrete; between metal and concrete, mortar, stone and masonry.
One-part Non-acid Curing	Exterior and interior joints in Silicone Sealant vertical surfaces of concrete and masonry; between concrete masonry or stone; between metal and concrete, mortar or stone; perimeters of metal frames in exterior walls; overhead or ceiling joints; and on interior of glazed curtain wall.
One-Part Acid-Curing Silicone	Exposed joints within glazed Sealant curtain wall framing system, skylight framing system and aluminum entrance framing system.
One-Part Mildew-Resistant	Interior joints in vertical Silicone Sealant surfaces of ceramic tile in toilet rooms, showers, and kitchens.
Acrylic Sealant	Exterior expansion joints in vertical surfaces of brick.
Acrylic-Emulsion Sealant	Interior joints in field-painted vertical and overhead surfaces at perimeter of elevator door frames, hollow metal door frames, gypsum drywall, plaster and concrete or concrete masonry; and all other interior locations not indicated otherwise.
Foamed-in-Place Fire-Stopping	Through penetrations in fire-Sealant resistance-rated floor and wall

assemblies involving multiple pipes, conduits, etc.

One-part Fire-Stopping Sealant
Through penetrations in fire-resistance-rated floor and wall assemblies involving single pipes, conduits where joint widths are narrow and of uniform width.

Note: Install sealant indicated in joints fitting descriptions and locations listed as well as in locations identified by drawing designations in Column One above.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07950 - EXPANSION JOINT COVERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract including General conditions, Supplementary Conditions, and Division 1 – General Requirements apply to work of this section.

1.02 WORK INCLUDED

A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Interior wall expansion joint covers.
2. Interior floor expansion joint covers.
3. Interior ceiling expansion joint covers.

1.03 RELATED WORK

A. Related work specified under other specification sections of the specification:

1. Section 03300 – Cast-in-Place Concrete.
2. Section 04200 – Unit Masonry.
3. Section 05120 – Structural Steel.
4. Section 05400 – Cold Formed Metal Framing.
5. Section 09102 – Plaster.
6. Section 09250 - Gypsum Wallboard.
7. Section 09510 – Acoustic Ceiling Systems
8. Section 09650 – Resilient Flooring
9. Section 09680 - Carpeting

1.04 QUALITY ASSURANCE

A. Standards:

1. Provide prefabricated expansion joint covers by a single firm specializing in the production of the type of work required, so that there will be undivided responsibility for the specified performance of all component parts.

2. Materials criteria shall comply with ASTM B 221, *Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.*

3. Fire rated joint covers shall have been tested by an independent, nationally recognized testing and listing entity in accordance with ANSI/UL No. 263, ASTM E119, UL 2079, or ASTM

E1966, including hose stream test, where applicable, at the full rated period. Covers shall be listed with an independent, nationally recognized testing and listing entity. Fire rating shall be required when covers are applied to fire rated construction, and shall be not less than the fire rating of adjacent construction.

B. Manufacturer:

1. Obtain joint cover assemblies through one source from a single manufacturer.
2. Manufacturer shall be ISO 9001:2000 Certified.
3. The Manufacturer shall have documented management and control of the processes that influence the quality of its products and customer services.
4. Manufacturer shall have a minimum of ten (10) years of experience in the fabrication of expansion joint cover assemblies.

C. Installer:

1. Firm with not less than three (3) years of successful experience in the installation of systems similar to those required by this project and acceptable to the manufacturer of the system.

1.05 SYSTEM DESCRIPTION

A. Joint covers shall permit unrestrained movement of the joint, without disengagement of the cover. Joint movement to be as follows:

1. Floor Expansion Joints: Approx. 50% overall movement.
2. Flush Wall & Ceiling Expansion Joints: Approx. 25% overall movement.
3. Surface Mount Wall & Ceiling Expansion Joints: Approx. 100% overall movement.
4. Acoustical Ceiling: Approx. 100% overall movement.

1.06 SUBMISSIONS

A. Submissions shall be in accordance with Section 01300 – Submissions and as modified below.

B. Manufacturer's Data - Prefabricated Joint Covers:

1. Submit manufacturer’s specifications and technical data, including Material Safety Data Sheets, installation instructions, and, as required, catalog cuts and templates to explain construction and to provide for incorporation of the product into the project.
2. Submit certificates, copies of independent test reports, or research reports showing compliance with fire resistance rating and other specified performance requirements.

C. Shop Drawings:

1. Submit detailed shop drawings showing complete fabrication details for all joint covers, including required anchorage to surrounding construction, recesses, blocking, backing and connections between similar and dissimilar joint cover assemblies.

D. Samples:

1. Submit three (3) 6" samples of the specified system.
2. Submit color samples of insert options.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in their original, unopened packages or containers with all labels intact and legible.

B. Store all materials in a single location protected from weather, moisture, and open flame or sparks.

C. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.

D. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

1.08 MANUFACTURER'S INSTRUCTIONS

A. In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for all phases of the work, including preparation of substrate, applying materials and protection of installed units.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. To establish a level of quality, details and specifications have been based on the following products by Balco Metalines, Inc., P.O. Box 17249, Wichita, Kansas, 67217; phone" 800-767-0082 or (316) 945-9328; fax: (316) 945-0789, or architect approved equivalent.

1. Floor Joint Covers:

No-Bump Floor-to-Floor System (Models *NBAF-.5-1* and *NBAF-2*) at locations as indicated on the Contract Drawings.

No-Bump Floor-to-Wall System (Models *NBAFL-.5-1* and *NBAFL-1-2*) at locations as indicated on the Contract Drawings.

Surface Floor-to-Floor System (Models *75FPE-1 and* Model *75FPE-2*) at locations as indicated on the Contract Drawings.

Surface Floor-to-Wall System (Models *75FVPE-1 and* Model *75FVPE-2*) at locations as indicated on the Contract Drawings.

Surface Floor-to-Floor System for Tile Flooring (Models *75FTE-1 and* Model *75FTE-2*) at locations as indicated on the Contract Drawings.

Surface Floor-to-Wall System for Tile Flooring (Models *75FVTE-1 and* Model *75FVTE-2*) at locations as indicated on the Contract Drawings.

2. Wall and Ceiling Joint Covers:

Surface Mounted Gypsum Board Walls and Ceiling Systems (Models *75FWG-1, 75FWG-2, 75FWGC-1* and *75FWGC-2*) at locations as indicated on the Contract Drawings.

Flush Mounted Gypsum Board Walls and Ceiling Systems (Models 6GW-1, *6GW-2, 6GWC-1* and 6GWC-2) at locations as indicated on the Contract Drawings.

3. Wall Joint Covers:

Surface Mounted Masonry Wall Systems (Models *75FWPE-1, 75FWPE-2, 75FWVPE-1* and *75FWVPE-2*) at locations as indicated on the Contract Drawings.

4. Ceiling Joint Covers:

Vinylines Series for Acoustical Ceilings (Models *AC-1, AC-2, ACL-1* and *ACL-2*) at locations as indicated on the Contract Drawings.

2.02 MATERIALS AND COMPONENTS

A. Expansion joint cover systems:

1. Aluminum:
   a. ASTM B221, alloy 6063-T5 for extrusions
   b. ASTM B209, alloy 6061-T6 for plate
   c. ASTM B209, alloy 5052-H32 for sheet

2. Stainless Steel: ASTM A 666, Type 304.

3. PVC Vinyl: Extruded flexible wall and ceiling joint cover.

4. Silicone: ASTM D 2000 extruded elastomeric flat seal.

5. Santoprene:
   a. Face Seals to be installed in exterior conditions shall be UV resistant.
   b. Colorable extruded wall and ceiling joint cover system face seals.
   c. Neutral extruded wall and ceiling joint cover system back seals.

6. Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.

B. Fasteners, accessories and other materials required for complete installation in accordance with the manufacturer's instructions.

2.03 FABRICATION

A. Fabricate expansion/ seismic joint cover assemblies as detailed. Provide centering bars, sealing washers, gaskets, splice covers, and closures as necessary for complete installation.

1. Fabricate special transitions and corner fittings as required.
2. Fabricate fire barrier and provide fire-resistant sealant as required for fire-resistant installations.
3. Miter and weld joint systems as applicable.
4. Provide necessary and related parts, devices, anchors, form clips and other items required for water-resistant and fire-resistant installation.
5. Provide corners, tees, transitions, curb risers, etc. assembled with connection mitered and secured to ensure proper fit and alignment as applicable.
6. Special conditions shall be shop fabricated.
7. Cover plates shall have a smooth surface for walls and v-grooved for floors or as indicated on the drawings.

B. Shop assemble components and package with anchors and fittings. Provide components in single lengths where possible; minimize site splicing.

2.04 FINISHES

A. Aluminum:

1. Anodized finish: Manufacturer's clear anodized finish, Class II, AA-M12 C22 A31; 204-R1, unless otherwise indicated.

2. Fluorocarbon coating: Two-step "Kynar" fluorocarbon coating: 0.2 – 0.4 mil. prime coat, min. 1.0 mil baked finish coat as selected by the Architect.

B. Stainless Steel: Satin finish.

C. Vinyl: Gray (color for floor and walls) and white (color for ceilings).

D. Santoprene: Color as selected by Architect.

E. Abrasive: Black or as selected by Architect.

F. Filler Strips: Gray or as selected by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field measurements [and blockout dimensions] are as shown on shop drawings prior to releasing materials for fabrication by the manufacturer.

B. Installer shall examine conditions under which work is to be performed and shall notify the contractor in writing of unsatisfactory conditions. Installer shall not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION

A. Install joint covers to manufacturer's recommendations and true alignment. Set floor covers flush with adjacent finished floor materials. Locate wall and ceiling covers in continuous contact with adjacent surfaces. Securely attach in place with all required accessories. Locate anchors approximately 3" from each end 12" o.c. between ends for set screws, and 18" o.c. between ends for other fasteners, unless closer spacing is recommended by the manufacturer. Make allowances for change in joint size due to difference between installation and building operating temperatures.

B. Set centering bars diagonally at 20 inches on center maximum. Centering bars shall be fully engaged with the base members.

C. Hold end joints to the minimum, make end joints with strong rigid mechanical splice plate in the alignment with hairline joints.

D. Remove strippable protective coating; leave all exposed metal surfaces clean.

3.03 ADJUSTING AND PROTECTION

A. Adjust joint cover to freely accommodate joint movement.

B. Protect installation from damage by work of other Sections. Where required, remove and store cover plate and install temporary protection over joints; reinstall cover plate before completion of work.

3.04 WARRANTY

A. The Contractor shall guarantee all workmanship and material in accordance with the General Conditions and Section 01700.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of standard steel doors and frames is indicated and scheduled on drawings.

B. Finish hardware is specified elsewhere in Division 8.

C. Building in of anchors and grouting of frames in masonry construction is specified in Division 4.

1.03 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows," and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

1. Oversize Fire-Rated Door Assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide certificate or label from an approved independent testing and inspection agency, indicating that door and frame assembly conforms to the requirements of design, materials, and construction as established by individual listings for tested assemblies.

2. Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 450°F (232°C) maximum in 30 minutes of fire exposure.

1.04 SUBMISSIONS

A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

B. Shop Drawings: Submit for fabrication and installation of steel

doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.
Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

2. Indicate coordination of glazing frames and stops with glass and glazing requirements.

C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square minimum, of each color and texture selected for factory finished doors and frames.

D. Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames by one of the following:

1. Steel Doors and Frames, (General):

Allied Steel Products, Inc.
Amweld/Div. American Welding & Manufacturing Co.
Ceco Corporation.
Copco Door Company.
Curries Manufacturing, Inc.
Dittco Products, Inc.
Fenestra Corporation.

Kewanee Corporation.
Mesker Industries, Inc.
Pioneer Builders Products Corporation/Div. CORE Industries, Inc.
Steelcraft/Div. American Standard Company.
Trussbilt, Inc.
Republic Builders Products Corporation/Subs. Republic Steel.

2.02 MATERIALS

A. Hot-rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18 gauge galvanized sheet steel.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

G. Finish: For all doors indicated as prefinish, provide manufacturer's standard baking epoxy or enamel paint. All other doors to be finished as described in Division 9 - Section 09900.

2.03 FABRICATION, GENERAL

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at project site. Comply with SDI-100 requirements as follows:

1. Interior Doors: SDI-109, Grade II, heavy-duty, Model 1, minimum 18-gauge faces, and Model 5, minimum 16 gauge steel. Refer to door schedule for locations.

2. Exterior Doors: SDI-100, Grade III, extra heavy-duty, Model 2, minimum 16-gauge faces, and Model 5, 16 gauge steel. Refer to door schedule for locations.

B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels,

louvers, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gauge inverted steel channels. Edge seams shall be welded, filled, and ground smooth.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

F. At exterior locations and elsewhere as shown or scheduled, provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236.

1. Unless otherwise indicated, provide thermal-rated assemblies with U-factor of 0.24 BTU /(hr*ft sq deg F) or better.

G. Finished Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

I. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

J. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

K. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

L. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

M. Apply finish coat to doors indicated as prefinished by electrostatically spraying and baking, to produce a paint thickness of 1.25 mils.

2.04 STANDARD STEEL DOORS

A. Provide metal doors of types and styles indicated on drawings or schedules.

B. Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24-gauge cold-rolled steel set into 20-gauge steel frame.

2.05 STANDARD STEEL FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gauge cold-rolled furniture steel.

B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

C. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.

1. Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

2. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.

3. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

4. Install fire-rated frames in accordance with NFPA Std. No. 80.

5. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

C. Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

D. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.02 ADJUST AND CLEAN

A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

C. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and incomplete and proper operating conditions.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The extent and location of each type of wood door is shown on drawings and schedules.

B. The types of doors required include the following:

1. Solid core flush wood doors, with wood-veneer faces.

2. Fire rated flush wood doors.

3. Factory-finished flush wood doors.

C. Related Sections:

1. Section 08110 - Steel Doors and Frames.
2. Section 08710 - Finish Hardware.
3. Section 08800 - Glass and Glazing.
4. Section 09900 - Painting.

D. Related Documents: Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 QUALITY ASSURANCE

A. In addition to the requirements shown on the drawings and specified in this section, comply with the following standards:

1. AWI "Quality Standards illustrated", Section 01300 and Brochure No. 5 "Flush Doors" of the Architectural Woodwork Institute.

2. NWMA "Industry Standard I.S. 1-73 "Wood Flush Doors" of the National Woodwork Manufacturer's Association.

3. NFPA 80 "Standard for Fire Doors and Windows' of the National Fire Protection Association.

4. NWWDA “Guide to Door Face Veneers”.

B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

1. Provide AWI Quality Certification Labels, or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows," and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" & NFPA 252 "Standard Methods of Fire Tests of Door Assemblies" of the National Fire Protection Association by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

1. Test Pressure: After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.

2. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg. F maximum in 30 minutes of fire exposure.

D. ASTM E119 "Standard Test Methods for Fire Tests of Building Construction Materials".

1.03 SUBMITTALS

A. Comply with the requirements of Section 01300 and as modified below.

B. Manufacturer's Data:

1. Submit six (6) copies of manufacturer's product data, specifications, and installation instructions for each type of wood door required. Data shall include details of core and edge construction and trim for openings. Include factory-finishing specifications.

2. Submit six (6) copies of manufacturer's certificate indicating that doors and louvers meet, or exceed, requirements of indicated fire rating.

C. Shop Drawings: Submit three samples, minimum 12" x 12", showing veneer, core, and edge construction for each type of wood door required. Indicate location, size, and hand of each door, elevation of each kind of door, construction details not covered in Product Data; location and extent of hardware blocking and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.

2. Indicate dimensions and locations of cutouts.

3. Indicate requirements for veneer matching.

4. Indicate doors to be factory finished and finish requirements.

5. Indicate fire ratings for fire doors.

D. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:

1. Faces of Factory-Finished Doors: Show the full range of options available for stained and transparent finishes.

E. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

1. Frames for light openings, 6 inches long, for each material, type and finish required.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheet. Mark each door on top and bottom rail with opening number used in shop drawings.

C. Protect wood doors during transit, handling, and storage to prevent damage, soiling, and deterioration. Store in a dry location and stack in accordance with manufacturer's instructions.

D. Provide protective coverings for shop finished doors at the factory prior to shipping. Use heavy paper cartons and mark with identification required for proper installation.

1.05 QUALITY STANDARD

A. Comply with NWWDA I.S. 1-A "Architectural Wood Flush Doors, and AWI's "Architectural Woodwork Quality Standards Illustrated".

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.07 WARRANTY

A. Submit three copies of written agreement in door manufacturer's standard form signed by the manufacturer, installer, and Contractor agreeing to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup or twist) more whan ¼ inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

B. The warranty shall include refinishing and reinstallation which may be required due to repair or replacement of defective doors.

C. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

D. Warranty shall be in effect during the following period of time from date of Substantial Completion.

a. Solid-Core Interior Doors: Life of Installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design: The design for flush wood doors is based on Mohawk Flush Doors, Inc. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Eggers Industries, Two Rivers, Wisconsin.

2. Algoma Hardwoods, Inc., Algoma, Wisconsin.

3. Marshfield Door Systems, Inc., Marshfield, Wisconsin.

2.02 INTERIOR FLUSH DOORS

A. Comply with applicable requirements of AWI 1300.

B. Face Veneer: Match existing veneer and finish, unless otherwise specified. Provide "*Mohawk Platinum Series 7-ply Architectural Flush Doors*."

1. AWI quality grade: Grade A, plain sliced white oak or maple, book match (match for color and grain) at veneer joints. Provide exposed edges or other exposed solid wood components of the same species as face veneer. Veneers are to be white only (color contract heartwood/sapwood) will not be acceptable).

2. Faces for transparent finish: AWI Specification System 1 filled finish; match veneer of existing doors.

C. Door Construction: Solid core, AWI Type Solid Composite Lumber Core (SCLC) for non-rated doors and 20 minute rated doors and/or Mineral Core (MC) for 45 minute, 60 minute and 90 minute rated doors. Five (5) plies with stiles and rails bonded to core; then entire unit to be abrasive-planed before veneering.

1. Special edge construction (for Mineral Core [MC] fire rated doors): 5" top rail; 5" bottom rail, and 5" x 18" lock blocks both sides. At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding

capability and split resistance and with outer stile matching face veneer. At pairs, furnish formed-steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated. Provide finish steel edges and astragals with baked enamel same color as doors.

2. Wood fire doors (similar or equal to Mohawk Platinum Series 7-ply Architectural Flush Doors) must be installed in a rated hollow metal (h.m.) frame (i.e., 3/4 hour – C labeled; 1-1/2 hour – B labeled). Door construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.

    a. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated:

        1. 5-inch top-rail blocking.
        2. 5-inch bottom-rail blocking.
        3. 5-inch mid-rail blocking with 5-by-10-inch lock blocks.

    b. At pairs of fire-rated doors, provide fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.

3. In accordance with NFPA-80, Section 1-7, Glazing Material, Fire protection rated glazing (vision panels) must be installed in approved steel frames.

    a. Glazing for openings through doors, such as ceramic fire rated safety glass, shall be fitted into trim openings and well embedded in putty.

D. Louvers:

1. Wood louvers: Provide door manufacturer's standard solid wood louvers, unless otherwise indicated; size indicated on drawings or in schedule.

2. Metal louvers: Unless otherwise specified provide minimum 20 gauge steel with prime and finish coats of enamel; color to match sample furnished by Architect; size as indicated on drawings or in schedule. Blade type to be vision-proof, inverted V. Metal and finish to be galvanized steel, 0.0396 inch thick, hot-dip zinc – coated and factory-primed for paint finish.

3. For fire-rated doors, louver must be fire rated with U.L. label and equipped with a (stainless steel) spring operated 160° fusible link and closing device, listed and labeled for use in doors with fire rating of one and one-half hours and less. Metal and finish to be galvanized steel, 0.0396 inch thick, hot-dip zinc coated and factory-primed for paint finish.

4. Where indicated to be lightproof, provide lightproof overlapping channel blade louvers, similar to the following:

    a. "Model 1000 Lightproof Overlapping Channel Blade Louver" by Air Louvers, Inc.

    b. "Model 619 Lightproof Formed Metal Stationary Louver" by AiroLite Co., Marietta, Ohio.

    c. "Model LP-1 Lightproof Louver" by Wonder Metals Corp., Redding, Ca.

E. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same as species as door faces.

2. Profile: Flush rectangular beads.

3. At 20-minute, fire-rated, wood-core doors, provide wood beads and metal glazing clips approved for such use.

F. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered non-combustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

G. Adhesives: Do not use adhesives containing urea formaldehyde.

H. Doors for Transparent Finish:

1. Grade: Premium, with Grade A faces.

2. Species and Cut: Birch, plain sliced.

3. Match between Veneer Leaves: Book match.

4. Assembly of Veneer Leaves on Door Faces: Center balance match.

5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

    a. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 20 feet or more.

    b. Stiles: Same species as faces.

2.03 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting.

2. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) for door(s) required.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Louvers: Factory install louvers in prepared openings.

2.04 FACTORY FINISHING

A. General: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.

B. Finish all door surfaces at factory.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI System, TR-6 catalyzed polyurethane.
3. Staining: As selected by the Architect from the entire series of colors.
4. Effect: Open-grain finish.
5. Sheen: Semi-gloss.

D. Restore finish on all edges of shop-finished doors before installation.

E. Drips and runs of paint, stain, primer, or sealer are not acceptable.

2.05 FIRE RATED DOORS

A. Comply with applicable requirements of AWI 1300 and NFPA 80 "Standard for Fire Doors and Windows" for fire ratings indicated on drawings and in schedule.

B. Provide doors which have been tested and rated by Underwriter's Laboratories, Inc. (UL) for the fire ratings and class indicated in the schedule using single-point hardware.

1. Attach UL classification Marking label indicating door type, rating, class, and temperature rise to edge of each fire-rated door.

C. Provide veneer and finish to match non-fire-rated doors in the same area of building, unless otherwise indicated.

D. Door assemblies in corridors and smoke barriers shall be tested in accordance with NFPA 252 or UL 10C

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames prior to hanging doors.

1. Verify that framed comply with indicated requirements for type, size, location and swing characteristics and have been installed with level heads and plumb jambs.

B. Proceed with installation, only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Condition doors to average prevailing humidity in installation area prior to hanging.

B. Fit doors to frames and machine for hardware.

3.03 INSTALLATION

A. Install wood doors in accordance with manufacturer's instructions. Adjust for proper fit, uniform clearance at each edge, and smooth balanced door movement. For installation of finish hardware, refer to Section 08710.

B. Provide clearance for doors of 3/32" at jambs and heads and 3/8" at bottom, unless otherwise indicated.

1. For fire rated doors, provide clearances complying with the limitation of the authority having jurisdiction. Install fire-rated doors into corresponding fire-rated frames, according to NFPA 80.

2. Allow extra clearance as required for thresholds, carpet, and similar materials.

C. Job-fitted use: Align and fit doors in frames with a uniform clearances and bevels as indicated below. Do not trim stiles and rails in excess of limits set by the manufacturer or permitted for fire-rated doors. Machine doors for hardware; seal cut surfaces

after fitting and machining.

D. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.

E. Comply with NFPA 80 for fire-rated doors.

F. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

G. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

H. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.04 ADJUSTING

A. Operation: Re-hang or replace doors what do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with the requirements and shows no evidence of repair or refinishing.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08330 - ROLL-UP DOOR COILING FIRE DOORS

PART 1 - GENERAL

1.01 GENERAL

A. Applicable provisions of the General and Special Conditions of the Contract shall govern all work under this Section.

1.02 SCOPE

A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Roll-up coiling overhead fire doors (1 1/2-hour [B labeled] – UL listed) in location indicated on drawings.

2. All operators, controls, hardware, weatherstripping, etc., required for a complete installation.

B. Related work to be performed under other sections or contracts:

1. All electrical connections, wiring, etc.--see Division 16 - Electrical.

1.02 SHOP DRAWINGS

A. Submit shop drawings for approval in compliance with the applicable provisions of the General and Special Conditions of the Contract.

1. Drawings shall indicate details of fabrication and installation.

2. Include dimensions, gauges, material, method of anchoring in relation to adjacent construction.

3. Electrical diagrams of operators and controls showing installation instructions.

PART 2 - MATERIALS

2.01 CHAIN OPERATED ROLL-UP COILING FIRE DOORS

A. Doors shall be of sizes in locations as indicated on drawings and be Model No. CLF-5F with M58 Releasing Device and M105A Annunciator as manufactured by the Cornell Iron Works or other approved equal doors will be accepted, provided they meet the following specifications:

1. Curtain: Consisting of No. 5F interlocked flat faced slats. Slat shall be stainless steel (18 gauge) in accordance with ASTM standards. Slats shall be 3/4-inch having a flame spread rating of 0-25 in accordance with ASTM E-84 applied to the inside face of the exterior curtain slats and closed on the inside face with a 22 gauge galvanized steel facer sheet. Bottom of curtain shall be reinforced with two (2) galvanized steel angles (2" x 2" x 1/8" min.) with polyester (gray) enamel coated stainless steel. Bottom bar shall also have UL listed nylon pile smoke seals. End locks shall be riveted to ends of slats per UL procedure.

2. Brackets: Minimum 1/4-inch thick steel plate, having stiffening rib around contour. Brackets shall have ball or roller bearings at rotating support points, bolted to extension guide wall angles to support counterbalance shaft assembly and form end closures.

3. Guides: Fabricated from 3/16-inch minimum thick angles with continuous neoprene UL listed nylon pile smoke seals. Provide windlock bars. Attach guides to jambs with not less than 3/8-inch diameter steel bolts spaced not less than 18 inches o.c. per Underwriters Laboratory Factory Mutual (FM) procedures.

4. Barrel: Steel housing with counterbalancing springs and supporting curtain. Under load, it will not exceed .03 inch per linear foot deflection.

5. Counterbalance: Oil tempered steel helical torsion counterbalance springs. Cast iron spring anchors, steel torsion shaft, and spring tension wheel. All springs shall act on a single torsion shaft and receive equal, simultaneous angular adjustment from the tension wheel outside one bracket. Torsion spring assembly shall be designed to insure that maximum door operation effort shall not exceed 35 pounds. Provide wheel outside of end bracket for applying spring torque and for future adjustment.

6. Hood: 24 gauge minimum hot dipped galvanized sheet metal. Internally reinforced to maintain rigidity and shape with stiffening beads or flanges. Lintel shall be equipped with UL listed nylon pile smoke seals.

7. Bearings: Permanently grease-sealed and support the pipe and curtain.

8. All ferrous surfaces, except working parts of machinery, shall be chemically treated and receive a factory coat of rust inhibitive primer.

B. Operation: All roll-up fire doors shall be hand chain operated for 35 pound maximum pull.

1. All roll-up fire doors shall be equipped with automatic closure and "Saf-T-Gard" speed governor and shall be activated

by melting of fusible link and the operation UL listed Electro-magnetic Releasing Device Model No. M58. Doors shall close at an average speed of not less than 6 inches per second and not more than 24 inches per second.

2. Furnish all roll-up fire doors with an audible and visual warning annunciator Model No. M105A, which warns occupants that the overhead coiling door is about to close.

C. Finishes:

1. Galvanized steel curtain slat and hoods shall be finished with baked-on light gray polyester enamel curtain slats galvanized and phosphate treated for paint adhesion. Bottom bar and guides to be plain steel with a gray ASA 61 fusion bonded polyester powder coating. Powder coating is applied to a minimum of 2-1/2 mils cured film thickness. Other exposed plain steel parts primed gray with a powder coated finish. All stainless steel to be provided with a No. 4 satin finish. All exposed finishes shall be stainless steel as selected by the Architect.

PART 3 - EXECUTION

3.01 ERECTION

A. Furnish and install all doors and necessary support angles as indicated on the drawings. Installation shall be performed by qualified personnel in strict accordance with the manufacturer's instructions and approved shop drawings.

B. Installation shall be in accordance with the National Fire Protection Association standard for fire doors and windows – NFPA 80.

C. Doors shall be tested and witnessed for normal and automatic operation after installation is complete.

END OF SECTION

DIVISION 8 – DOORS & WINDOWS

SECTION 08412- FIRE RATED ALUMINUM FRAMED ENTRANCES AND STOREFRONTS-FIREFRAMES® ALUMINUM SERIES

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Fire rated glazing and framing systems for installation as vision lights in fire rated doors, sidelights, borrowed lights, windows, and Transoms or wall sections in interior openings as indicated on the Construction Documents.

B. Related Sections include the following:

1. 05120 – Structural Steel
2. 05500 – Miscellaneous Metal
3. 06100 – Rough Carpentry
4. 07231 – Air / Vapor Barrier System
5. 07271 – Self-Adhered Non-Permeable Air Barrier Membrane
6. 07900 – Caulking
7. 07910 – Joint Sealers
8. 08110 - Steel Doors and Frames
9. 08520 – Aluminum Windows
10. 08710 – Finish Hardware
11. 08806 – Fire Rated Glazing

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. Fire safety related:
   a. ASTM E119: Methods for Fire Tests of Building Construction and Materials.

   b. ASTM E2074-00: Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
   c. ASTM E2010-01: Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.

2. Material related

   a. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.

   b. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.

B. American Welding Society (AWS)

1. AWS D1.3 - Structural Welding Code - Sheet Steel; 2007

C. Builders Hardware Manufacturers Association, Inc.

1. BHMA A156 - American National Standards for door hardware; 2006 (ANSI/BHMA A156).

D. Canadian Standards

1. CAN4-S104-M, "Fire Tests of Door Assemblies
2. CAN4-S106-M, "Standard Method for Fire Tests of Window and Glass Block Assemblies"

E. National Fire Protection Association (NFPA):

1. NFPA 80: Fire Doors and Windows.
2. NFPA 251: Fire Tests of Building Construction & Materials
3. NFPA 252: Fire Tests of Door Assemblies
4. NFPA 257: Fire Test of Window Assemblies

F. Underwriters Laboratories, Inc. (UL):

1. UL 9: Fire Tests of Door Assemblies
2. UL 10 B: Fire Tests of Door Assemblies
3. UL 10 C: Positive Pressure Fire Tests of Window & Door Assemblies
4. UL 263: Fire tests of Building Construction and Materials
5. UL-752 Ratings of Bullet-Resistant Materials

G. Uniform Building Code

1. UBC 7-2 (1997) -- Fire Tests of Door Assemblies, Parts I and II
2. UBC 7-4 (1997) -- Fire Tests of Window Assemblies

H. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

I. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 120: Safety Standard for Architectural Glazing Materials

J. American Society of Civil Engineers (ASCE)

1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures; 2005

1.03 PERFORMANCE REQUIREMENTS

A. Fire Rating Requirements

1. Duration – Doors: Capable of providing a fire rating for either 20, 45, 60, 90 minutes as indicated on the drawings.

2. Duration – Windows Capable of providing a fire rating for either 45, 60, 120 minutes as indicated on the drawings.

3. Duration – Walls: Capable of providing a fire rating for either 60, 120 minutes as indicated on the drawings.

B. Delegated design: For the performance requirements listed below requiring structural design provide data, calculations and drawings signed and sealed by an engineer licensed in the state where the project is located.

Structural Performance

1. Design and size the system to withstand structural forces placed upon it without damage or permanent set when tested in accordance with ASTM E330 using load 1.5 times the design wind loads and of 10 seconds in duration.

2. Positive wind Load: as indicated on the drawings
3. Negative wind Load: as indicated on the drawings

4. Member deflection: Limit deflection of the edge of the glass normal to the plane of the glass to flexure limit of glass or 1/175 of the glass edge length or ¾ inch, whichever is less of any framing member.

5. Accommodate movement between storefront and adjoining systems

6. Accommodate anticipated story drift

D. Story Drift provide systems that accommodate the design displacement of adjacent stories as indicated on structural drawings as measured per AAMA 501.4

1.04 SUBMITTALS

A. Submit in accordance with Section 01300.

B. Product Data: include laboratory test data.

C. Shop Drawings:

1. Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure.

2. Provide templates for the location of embeds and anchor locations required for any adjoining work.

D. Design Data (if engineered)

E. Powder coat finish systems offered and provided by Technical Glass Products are manufactured by Tiger Drylac only.

F. Hardware schedule: List of manufacture supplied hardware and verification of cylinder size complying with Section 08 71 00.

G. Samples for Initial Color Selection: For aluminum frames with factory-applied powder coat color finishes.

1. Triplicate copies of manufacturer's powder coating color charts showing the full range of colors available.

H. Verification Sample of selected finish on aluminum sample piece.

I. Samples: For following products:
1. Two 8-inch by 10-inch Samples for glass.

J. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

K. Technical Information: Submit latest edition of manufacturer’s product data providing product descriptions, technical data and installation instructions. Including blank warranty form.

L. Installer Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

M. Manufacturer’s Certificate

N. Field Quality-control reports:

O. Maintenance Data

P. Warranties: Submit manufacturer’s warranty and ensure that forms have been completed in the Owner’s name and registered with the manufacturer.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications:

B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

D. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

E. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252. Door assembly must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

F. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E119.

G. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. Door assemblies shall be tested to the acceptance criteria of ASTM E2074-00, NFPA 252, UL 9, UL 10-C Standard Methods of Fire Tests of Door Assemblies.

2. Window assemblies shall be tested to the acceptance criteria of ASTM E2010-01, NFPA 257, UL 10-B, UL 10-C Standard methods for Fire Tests of Window Assemblies.

3. Wall assemblies shall be tested to the acceptance criteria of ASTM E119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.

4. Underwriters Laboratories (UL) shall conduct fire test.

H. Listings and Labels - Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer’s listing.

I. Door assemblies shall be marked with the hourly rating followed by the letter "S". The letter "S" indicates air leakage resistance testing conformance to UBC 7-2 Parts I and II.

J. Window assemblies with ratings of less than 60 minutes may be tested in accordance with ASTM E2010-01, NFPA 257, UBC 7-4, UL 9, CAN4-S106 Standard Test Methods.

K. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities ANSI A117.1, as follows:

a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

b. Door Closers: Comply with the following maximum opening-force requirements indicated:

1. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

2. NFPA 101: Comply with the following for means of egress doors:

a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

b. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.

1.08 PRE-INSTALLATION MEETING

A. Conduct a pre-installation conference at least one week prior to the work of this section.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle under provisions specified by manufacturer.

1. At delivery inspect all containers for damage.
2. Examine glass and frame units for damage.
3. List all damage to containers on the shipping company's Bill of Lading
4. Report damage to manufacturer immediately.
5. Store glazing materials and frame units in original packing containers
6. Do not expose glazing material of frame units to sunlight and weather.
7. Do not store horizontally.
8. Place glass and frames upright, no less than 6 degrees from vertical.
9. Store all materials in dry conditions, off the ground.
10. Protect from construction activities.
11. Fully support Glass units along entire length
12. Non-abrasive pads such as cloth or cork must separate glass and frame units.
13. Do not stack containers

1.09 PROJECT CONDITIONS

A. Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner coordinate planned measurements with the work of other sections.

1. Note whether field or planned dimensions were used in the creation of the shop drawings.

B. Coordinate the work of this section with others effected including but not limited to: other exterior envelope components and door hardware beyond that provided by this section

1.10 WARRANTY

A. Provide the Pilkington Pyrostop® and Frame supplier's limited five-year warranty dated from substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURERS - FIRE RATED WALL ASSEMBLY

A. Manufacturer Glazing Material: "Pilkington Pyrostop®" fire-rated glazing as manufactured by the Pilkington Group and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065 (800-426-0279) fax (800-451-9857) e-mail sales@fireglass.com, web site http://www.fireglass.com

B. Frame System: "Fireframes® Aluminum Series" fire-rated frame system as manufactured and supplied by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065 (800-426-0279) fax (800-451-9857) e-mail sales@fireglass.com web site http://www.fireglass.com

2.02 MATERIALS – GLASS

A. Fire Rated Glazing: ASTM C 1036 and ASTM C 1048; composed of multiple sheets of Pilkington Optiwhite™ high visible light transmission glass laminated with an intumescent interlayer.

B. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

C. Thickness of Glazing Material: As indicated on the drawings.

D. Approximate Visible Transmission: Varies with thickness (approximate range 75 to 88 percent).

E. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacture, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.

F. Glazing Accessories: Manufacturer's standard compression gaskets, standoff, spacers, setting blocks and other accessories necessary for a complete installation.

2.03 MATERIALS –ALUMINUM FRAMING

A. Aluminum Framing System 45 min. 60 min. 120 min. as indicated on the drawings

1. Steel Frame — The steel framing members are made of two halves, nom. 1.9 in. wide (48.3 mm) with a nom. minimum depth of 1.38 in. (35 mm) with lengths cut according to glazing size.

2. Aluminum Trim — Supplied with the steel framing members. Nom. 2 in. (50.8 mm) wide with a nom. depth of 1.54 in. (39 mm) with lengths cut according to glazing size.

3. Stainless Steel Standoffs — Supplied with the steel framing members. Nom 5/16 in. (8 mm) diameter with a nom. minimum depth of 1 in. (25 mm) with depth adjusted to match Pilkington Pyrostop® Panel thickness.

4. Stainless Steel Moment and Connecting Braces: — Supplied with the steel framing members. Nom 5/16 in. (8 mm) diameter with a nom. minimum depth of 1 in. (25 mm) with depth adjusted to match Pilkington Pyrostop® Panel thickness.

5. Framing Member Fasteners — Supplied with the steel framing members. Screws are M6 x16mm Button Head Socket Cap Screws for frame assembly and #6 x 3/4" Pan Head Sheet Metal Screws for door installation.

6. Glazing Gasket — Supplied with the steel framing members. Nom. 3/4 in. (19 mm) by 3/16 in. (4.5 mm) black applied to the steel framing members to cushion and seal the glazing material when installed.

2.04 MATERIALS – DOORS

A. Manufacturer's standard single leaf and double leaf doors with manufacture's standard hardware; where indicated on the drawings.

B. Coordinate door hardware with cylinder specified in Section 08710 Finish Hardware.

2.05 FABRICATION

A. Field glaze door and frame assemblies.

B. Factory prepare steel door assemblies field mounting of hardware.

C. Fabrication Dimensions: Fabricate fire rated assembly to field dimensions.

D. Obtain reviewed Shop Drawings prior to fabrication.

2.06 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish frames after assembly.

C. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

2.07 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

1. Apply the specified finish to visible aluminum surfaces of all aluminum entrance assemblies. Apply a compatible and durable matching finish to visible fasteners or hardware.

2. Prepare the surfaces for finishing in accordance with recommendations of the aluminum producer and the finisher or processor for the specified finish.

3. Three coat process finish on doors and immediate or adjacent frames. Class I, Color Kynar Finish: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA2605. Color as selected by Architect from the full range of industry colors and color densities.

a. Primer coat: Kynar.
b. Kynar finish color coat:

1. Provide Fluoropolymer finish (Kynar 500) based laminated coating similar to "Duranar" (70% PVDF) by PPG Industries.

2. Color as indicated on the drawings or as selected and approved by Architect.

2.08 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for **30-mil** thickness per coat.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and members to which the work of this section attaches or adjoins prior to frame installation.

B. Provide openings plumb, square and within allowable tolerances.

1. The manufacturer recommends 3/8 inch shim space at all walls.

C. Notify Architect of any conditions which jeopardize the integrity of the proposed fire wall / door system.

D. Do not proceed until such conditions are corrected.

3.02 INSTALLATION

A. Follow manufacturer's written instructions and reviewed shop drawings.

B. Install fully fire [window] [wall] [door] in strict accordance with the approved shop drawings.

C. Set continuous sill members and flashing in full sealant bed to produce a watertight installation.

D. Install fire safing / fire stopping at edges of system.

E. Install glazing in strict accordance with fire resistant glazing material manufacturer's specifications. Field cutting or tampering is not permissible.

F. Do not install damaged frames or chipped glassing units.

G. Install plumb and true. Limit out of plumb or true to 1/8 inch in 10'-0" in any dimension.

3.03 REPAIR AND TOUCH UP

A. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged.

3.04 FIELD QUALITY CONTROL

A. Owner or will engage a qualified independent testing agency to perform field tests and inspections of entrance system.

3.05 PROTECTION AND CLEANING

A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface`. Remove nonpermanent labels, and clean surfaces.

1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
2. Bullet resistant glazing materials employing PVB layer on exterior surface.

3. Protect surface applied film. Do not use any of the following:
   a. Steam jets
   b. Abrasives

c. Strong acidic or alkaline detergents, or surface-reactive agents
d. Detergents not recommended in writing by the manufacturer
e. Do not use any detergent above 77 degrees F
f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
g. Metal or hard parts of cleaning equipment must not touch the glass surface

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

DIVISION 8 – DOORS & WINDOWS

SECTION 08525 - TSS BULLET RESISTANT ALUMINUM VOICE AROUND TRANSACTION WINDOW ASSEMBLY

PART 1 – GENERAL

1.01 REFERENCE

A. Underwriters Laboratory UL 752-Standard for Bullet Resisting Equipment & ASTM E119-98- Standard Test Methods for Fire Tests of Building Construction and Materials, NIJ Standard 0108.01- (National Institute of Justice) Standard for Ballistic Resistant Protective Materials, ASTM B 209/B 209M- Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate, ASTM A 666- Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar..

1.02 SUBMITTALS

A. The following shall be submitted by the manufacturer in accordance with Sections 13070 and any Special Contract Requirements and coordinate with Sections 01340: Submit for approval prior to fabrication: samples, product data (including preparation, storage and installation methods), cuts & anchor spacing, reinforcement & location , product specifications, shop drawings, test reports (current UL Listing Verification & UL 752 Test Results as provided by Underwriters Laboratories), and printed data in sufficient detail to indicate compliance with the contract documents.

B. Manufacturer’s Instructions for installation and cleaning of TSS Bullet Transaction Window Assemblies. All required submittals shall be approved prior to installation.

1.03 DESIGN PERFORMANCE

A. Through the design, manufacturing techniques and material application the TSS Aluminum Voice Around Transaction Window shall be of the “non-ricochet” type. This design is intended to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration. This assembly shall provide single transaction positions utilizing the “natural voice rail” configuration. This design shall employ mounting blocks in vertical framing tubes to complete the “natural voice rail” design. Each transaction position shall have a stainless steel dip tray as shown on the drawings. Components must be manufactured in strict accordance with the specifications, design and details. All vision panels

shall be cut to size with all exposed edges polished. Necessary holes shall be pre drilled and tapped where required. Stainless Steel assembly screws and acrylic spacers shall be provided. Clear anodized angles and channels shall be provided. Anchor screws shall be provided by the installer.

B. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by the manufacturer and the architect. Standard manufacturing tolerances shall be +/- 1/16".

C. Materials shall meet or exceed UL 752 requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer shall be a Company that specializes in manufacturing products of the specified type with a minimum of five years experience. Installer shall be a Company that specializes in product type specified and Certified for the installation by the manufacturer. Manufacturer shall provide a Mock-up, if required, for evaluation of surface preparation and application workmanship and color/finish to the Architect for approval prior to start of work.

1.05 DELIVERY, STORAGE & HANDLING

A. Delivery the materials to the project with the manufacturer's UL Listed Labels intact and legible. Handle the materials with care to prevent damage. Store materials inside and under cover, stack flat and off floor. Project conditions (temperature, humidity, and ventilation) shall be within the maximum limit recommendations set by manufacturer. Do not install products that are under conditions outside these limits.

1.06 WARRANTY

A. All materials shall be warranted against defects for a period of 1 year for the date of receipt at the project site. Certificates of manufacturer's standard limited warranty shall be provided at project completion.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall be manufactured by: Total Security Solutions, Inc, 170 National Park Drive, Fowlerville, MI 48836, 866-930-7807. Jim Richards, info@demandtss.com . Web: www.tssbulletproof.com . No substitutions shall be accepted.

2.02 BULLET RESISTANT ALUMINUM VOICE AROUND TRANSACTION WINDOW

A. Product shall be: TSS AVA Aluminum Voice Around Transaction Window:. All aluminum transaction window allows for natural voice communication without a breach of security. Available in a clear or bronze aluminum finish, incorporates either a plastic laminate or stainless steel counter.

B. Glazing Panels shall be *Bullet Resistant Level 3,* 1 1/4" LP 1250 Laminated as shown on the drawings.

C. Aluminum sections to be manufactured in accordance with ASTM B209, Extruded aluminum alloy 6063 T5 Anodized or powder coated finish to match the existing décor and be free of sharp edges or burrs when in place. Glazing Channel: U-Channel specifically designed for securing transparencies tightly in place. Angles and stops are only acceptable for top attachment.

1. Frame to be anodized aluminum 18 ga. stainless steel. The bottom of the glazing to be capped with corresponding material on the frame (ie: stainless steel on stainless steel). Provide a shelf 2" thick with a recessed deal tray. The shelf to be full width of window, 12" deep, centered under the glazing and covered with a stainless steel 18 ga. #4 finish).

2. Deal tray to be 18 ga. stainless steel, # 4 finish 16" x 10" from the outside edge of flanges with a clear opening with a stainless steel counter.

D. Product size shall be: TSS AVA Aluminum Voice Around Transaction Window

1. Size shall be custom 27¾″x 51½″.

2. Color shall be clear.

PART 3 – EXECUTION

3.01 PREPARATION

A. Prior to installing the bullet resistive material, the contractor shall verify that all supports have been installed as required by the contract documents, architectural drawings, and approved shop/CAD drawings, if required. Installer shall notify architect of any unsatisfactory preparation that is responsibility of another installer.

B. Clean and prepare all surfaces per manufacturers recommendations for achieving the best results for the substrate under the project conditions.

3.02 INSTALLATION

A. Do not begin installation until openings have been verified and surfaces properly prepared in accordance with Drawings. Install in accordance with manufacturer's instructions and UL 752. Set all equipment plumb. All products shall be installed per installation instructions provided by Total Security Solutions, if warranty is to be issued.

B. TSS AVA Aluminum Voice Around Transaction Window: shall arrive on site as a completed unit. Unit shall be installed in provided opening (wall/door), secured to structure (anchors by others).

3.03 POST APPLICATION

A. TSS AVA Aluminum Voice Around Transaction Window shall be installed in accordance with manufacturer's printed recommendations, including adhering to anchoring and finishing details.

B. Inspection and Cleaning: Verify installation is complete and complies with manufacturer's requirements. Clean product and accessories, removing excess sealant, labels and protective covers.

C. Touch-up, repair or replace damaged products before Substantial Completion.

D. Product Warranty: Applicable warranty shall be issued to owner upon final release of completed project.

END OF SECTION

DIVISION 8 – DOORS AND WINDOWS

SECTION 08630 METAL FRAMED SKYLIGHTS - PINNACLE 900

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Metal Framed Structural Skylights.
B. Related Sections may include, but are not limited to the following:
   1. Division 5 Section "Structural Steel" for steel framing.
   2. Division 8 Section "Glass and Glazing"
   3. Division 7 Section "Joint Sealants" for sealants installed at metal-framed skylight perimeters.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide metal-framed skylights capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:

   1. Deflection exceeding specified limits.
   2. Thermal stresses transferred to the building structure.
   3. Skylight framing members transferring stresses, including those caused by thermal and structural movement, to glazing.
   4. Weakening of fasteners, attachments, and other components.

B. Deflection Limits: As follows:
   1. Deflection Normal to Glazing Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite] [1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans more than 13 feet 6 inches (4.1 m)] <Insert deflection limit> or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.

C. Structural Loads: Provide metal-framed skylights, including anchorage, capable of withstanding the effects the following design loads when supporting full dead loads:

1. Roof Loads

   a. Concentrated Load: 250lbs applied to framing members at location that produces the most severe stress or deflection.

   b. Snow Loads: Refer to Structural Drawings for design Loads

   c. Roof Loads: Refer to Structural Drawings for design Loads

   d. Wind Loads: Refer to Structural Drawings for design Loads

2. Seismic Loads: Refer to Structural Drawings for design Loads

D. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.

E. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.23 scfm/sq. ft. (1.15 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.20lbs/sq. ft. (300 Pa).

F. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 12 lbs/sq. ft. (718 Pa).

G. Thermal Movement: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient temperatures by preventing buckling, sealant failure, and other detrimental effects.

   1. Temperature Change (Range): 100 degrees F.

H. Thermal Performance: Provide metal-framed skylights that meet current State Energy Code requirements (2015 IECC), including:
   1. NFRC 100 rated U-factor of [.50] or less.
   2. NFRC 200 rated SHGC of [.40] or less.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions and profiles of components, and finishes for metal-framed skylights.
B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work as required.
C. Samples for Initial Selection: Manufacturer’s color charts consisting of sections of units showing the full range of colors available for factory-finished aluminum.
D. Samples for Verification: Provide color sample of selected finish on 2"x3" aluminum sheet.

E. Installer Certificates: If required, signed by manufacturer certifying that installers comply with requirements.
F. Product Test Reports: From a qualified testing agency indicating skylights comply with requirements, based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing metal-framed skylights similar to those indicated for this Project and who is acceptable to manufacturer.
B. Professional Engineer Qualifications: A professional engineer who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of skylights that are similar to those indicated for this Project in material, design, and extent.
C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

1.7 PROJECT CONDITIONS

A. Field Measurements: Where metal-framed skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
    1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating skylights without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

A. Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
    1. Structural failures.
    2. Failure of systems to meet performance requirements.
    3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

4. Water leakage; defined as uncontrolled water appearing on normally exposed interior surfaces of skylights from sources other than condensation, resulting from defects in skylight materials or workmanship. (Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage). Water leakage resulting from improper installations not part of this warranty.

B. System Warranty Period: 5 years from date of shipment from the manufacturer.

C. Finish Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. "Defects" is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
   1. Warranty Period for 2605 Powder Finish: 20 years from the date of shipment from the manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Basis of design: Provide Pinnacle 900 system by Wasco Part of the VELUX Group, Wells, ME (800-388-0293)
Or approved equal.

B. Substitutions: Manufacturers shall not be considered without prior approval in writing no later than ten (10) calendar days prior to bid. Substitute manufacturers must have been in the custom skylight business for not less than a period of 15 years and must submit to the Architect the following:
   1. List of similar projects successfully completed within the last five years.
   2. Proof of financial capability.
   3. Complete details of proposed skylight.
   4. Complete specifications for Architect's review.

2.2 FRAMING MATERIALS

A. Framing Members: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.109 inches.

B. Exterior Pressure Caps: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.090 inches.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing; compatible with adjacent materials.

D. Exposed Flashing and Closures: Aluminum sheet alloy and temper of 1100-H14, thickness as require for proper performance.

1. Minimum Thickness: 0.032 inch Apron Flashing.
2. Minimum Thickness: 0.062 inch Closures.

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories; compatible with adjacent materials.
   1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
   2. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.

F. Framing-System Sealants: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
   1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
   2. Sealant conforms to USDA approval standards.

G. Bituminous Paint: Cold-applied asphalt mastic paint complying with SSPC-Paint 12, except containing no asbestos, and formulated for 30-mil thickness per coat.

2.3 GLAZING MATERIALS

A. Sloped Glass: Refer to specification Section 08801 Okalux plus light diffusing insulated glass.
   1. Glass must meet the requirements of the AAMA Glass Design for Sloped Glazing for the project.

B. Glazing Gaskets: Manufacturer's proprietary pressure-glazing gaskets of elastomer type and hardness selected by the skylight manufacturer to comply with requirements. Glazing gaskets to be extruded thermoplastic elastomer by the skylight manufacturer.

C. Spacers, Edge Blocks, and Setting Blocks: Manufacturer's standard permanent non-migrating type of elastomer type and hardness selected to comply with requirements. Spacers, Edge Blocks, and Setting Blocks to be extruded thermoplastic elastomer by the skylight manufacturer.

D. Glazing Weatherseal Sealant: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer.
   1. Sealant is capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.

2. Sealant complies with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to substrates including other sealants with which it comes in contact, O.
3. Color: Black.

E. Flashing Sealant: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
2. Sealant conforms to USDA approval standards.

2.4 FABRICATION

A. Framing Components: As follows:
1. Factory fit and assemble components, where practical.
2. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
3. Fabricate components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
4. Fabricate components to accommodate expansion, contraction, and field adjustment, and to provide for minimum clearance and shimming at skylight perimeter.
5. Fabricate components to ensure that glazing is thermally and physically isolated from framing members.
6. Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
7. Fit and assemble components to greatest extent practicable before finishing.
8. Reinforce members as required to retain fastener threads.
9. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.
10. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.
11. Before shipping, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.

B. Provide continuous aluminum frame with weatherproof splice joints and locked and sealed or fully welded corners. Locate weep holes in the frame at each rafter connection to drain condensation.

C. Prepare framing to receive anchor and connection devices and fasteners.

D. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners.

2.5 ALUMINUM FINISHES (EDIT AS REQUIRED)

A. General: Comply with NAAMM "Metal Finishes Manual" recommendations for application and designations of finishes.
B. Finish designations prefixed by AA conform to the system for designations of aluminum finishes established by the Aluminum Association.
   1. 2605 Powder: Powder Coat High-Performance Architectural Coating complying with AAMA 2605. Color: 'Bone White'

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting skylight performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Metal Protection: As follows:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
   3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing skylight components.
   1. Fit frame joints to produce hairline joints free of burrs and distortion.
   2. Rigidly secure non-movement joints.
   3. Accommodate thermal and mechanical movements.

4. Install framing components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
5. Coordinate installation of flashings at skylight perimeters to maintain continuity of water barriers.
6. Set continuous curbs and flashings in a full sealant bed, unless otherwise indicated. Comply with requirements in Division 7 Section "Joint Sealants."

B. Erection Tolerances: Install skylight components true in plane, accurately aligned, and without warp or rack. Adjust framing to comply with the following tolerances:
   1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 10 feet; 1/4 inch over total length.
   2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 3 inches, limit offset from true alignment to less than 1/32 inch; otherwise, limit offset from true alignment to 1/8 inch.

C. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners

D. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

3.4 CLEANING

A. Clean skylights inside and outside, immediately after installation and after sealants have cured, according to manufacturer's written recommendations.
   1. Remove temporary protective coverings and strippable coatings from pre-finished metal surfaces. Remove labels and markings from all components.

B. Remove excess sealant according to sealant manufacturer's written recommendations.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Furnish and install glass and glazing work as shown on the drawings and as specified herein.

1. Sheet Glazing:

a. Annealed (float) glass.
b. Annealed laminated safety glass.
c. Tempered laminated safety glass.
d. Tempered (heat treated) glass.
e. Insulated glass.
f. Insulated reflective glass.
g. Insulated spandrel glass.
h. Skylight insulated glass.
i. Security glazing.
j. Polycarbonate glazing.

B. The required applications of glass and glazing include (but are not necessarily limited to) the following:

1. Window units (fixed and operable sash).
2. Aluminum, steel, FRP, and wood doors (door lights, sidelights, and transoms).
3. Interior (borrowed light) windows.
4. Storefront and curtainwall framing systems.
5. Skylights.
6. Ballistic framing systems.

C. Related Documents:

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

D. Related Sections include the following:

1. Division 7 Section *"Joint Sealants"*.
2. Division 7 Section *"Building Insulation"*
3. Division 8 Section *"Steel Doors and Frames"*.
4. Division 8 Section *"Aluminum Doors and Frames"*.
5. Division 8 Section *"FRP Doors and Frames"*.
6. Division 8 Section *"Flush Wood Doors"*.
7. Division 8 Section *"Aluminum Entrances & Storefronts"*.
8. Division 8 Section *"Aluminum Windows"*.
9. Division 8 Section *"Vinyl Clad Wood Windows"*.
10. Division 8 Section *"Vinyl Clad Wood Doors"*.
11. Division 8 Section *"Glazed Aluminum Curtain Walls"*

E. Insulated metal panels glazed into exterior aluminum window frames are specified in Section 08520, Aluminum Windows.

1.02 REFERENCE STANDARDS:

A. American Architectural Manufacturers Association:

1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants.

B. Federal Regulations:

1. 16FR 1201 – Safety Standards for Architectural Glazing Materials.

C. American Society for Testing and Materials (ASTM):

1. ASTM C 509 - Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.

2. ASTM C 864 - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

3. ASTM C 920 - Specification for Elastomeric Joint Sealants.

4. ASTM C 1036 - Specification for Flat Glass.

5. ASTM C 1048 - Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

6. ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.

7. ASTM C 1115 - Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.

8. ASTM C 1172 - Specification for Laminated Architectural Flat Glass.

9. ASTM C 1281 - Specification for Preformed Tape Sealants for Glazing Applications.

10. ASTM C 1330 - Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

11. ASTM C 1376 - Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.

12. ASTM E 774 - Specification for the Classification of the Durability of Sealed Insulating Glass Units.

13. ASTM E 1300 - Practice for Determining Load Resistance of Glass in Buildings.

14. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

15. ASTM C1036 – Flat Glass.

16. ASTM E838 – Cracking, Blistering, Crazing and Color Change.

17. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction & Materials.

D. Glass Association of North America (GANA):

1. Glazing Manual.

2. Laminated Glass Design Guide.

3. Engineering Standards Manual.

E. The Insulating Glass Manufacturers Alliance (IGMA):

1. IGMA TB-3001 - Sloped Glazing Guidelines.

2. IGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.

F. Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; Building Technologies Department; Windows & Daylighting Group, windows.lbl.gov/software:

1. "LBNL Window 5.0 (or higher) - A PC Program for Analyzing Window Thermal and Optical Performance.

G. National Fenestration Rating Council (NFRC):

1. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties.

2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence.

3. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products.

H. National Fire Protection Association (NFPA):

1. NFPA 80 - Fire Doors and Windows.

2. NFPA 252 - Fire Tests of Door Assemblies.

3. NFPA 257 - Fire Test for Window and Glass Block Assemblies.

I. Safety Glazing Certifications Council (SGCC):

1. SGCC – Certified Products Directory for Safety Glazing Material Used in Buildings.

J. Associated Laboratories, Inc. (ALI):

1. ALI – Certified Products Directory – Fenestration Products.

K. National Association of Architectural Metal Manufacturers (NAAMM):

1. NAAMM SS-1B-68 – Non-Skinning Resilient Preformed Compounds – Tapes, Ribbons, Beads with Release Paper.

L. Federal Specifications (FS):

1. FS TT-S-230A – Sealing Compound, Synthetic Rubber Base, Single Component, Chemically Curing for Caulking, Sealing and Glazing in Building Construction.

2. FS TT-S-002303 – Sealing Compound, Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).

1.03 SUBMISSIONS:

A. Submissions shall be in accordance with Section 01300 – "Submissions" and as modified below.

B. Product Data - Glazing Materials:

1. Submit manufacturer's product data, specifications, and installation instructions for each type glass, glazing material and associated/ related products. Include test data substantiating that glass complies with specified requirements. Include documentation of compatibility of sealants with glazing products, and instructions for handling, storing, installation and recommended procedures for cleaning of each type of glass and glazing material.

C. Samples: Prior to the delivery of materials, submit to the Architect samples of each of the following:

1. Submit three (3) 12" square samples of each type of glass required. Architect's review of samples will be for color, texture, and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

2. Submit three (3) beads, approximately ¼-inch wide by 3 inches long, of each sealant to be employed, indicating color of set or cured material.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

E. Shop Drawings: Prior to placement of glass order or glass fabrication, the Contractor shall submit six (6) copies of pertinent shop drawings (i.e. – windows, doors, borrowed light frames, etc.) which have been:

1. Checked and approved by the General Contractor, stamped and dated.

2. Reviewed by the Architect, with stamp affixed.

1.04 DEFINITIONS:

A. Glass: Includes both primary and fabricated glass products as described in FGMA *"Glazing Manual".*

B. Glazing: Include glass installation and materials used to install glass.

C. Sealed Insulating Glass Unit Surfaces:

1. Surface 1: Exterior surface of outer lite.
2. Surface 2: Interspace-facing surface of outer lite.
3. Surface 3: Interspace-facing surface of inner lite.
4. Surface 4: Interior surface of inner lite.

D. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

E. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

F. Manufacturing defects are defined as edge separation, seal failure, delamination, core cracking, loss of visibility/clarity due dusting or misting, or UV exposure, or chemical reaction to glass cleaners.

1.05 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Company specializing in the manufacture of glass products, types as specified, with minimum documented five years experience.

B. Glazer's Qualifications: Company specializing in the installation of glass products, similar types as specified, with minimum documented five years experience.

C. Single Source Responsibility: Obtain materials from one source for each type of glass and glazing.

D. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.

1. Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing

channel substrates.

a. Perform tests under normal environmental conditions replicating those that will exist during installation.

2. Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

E. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

F. Glazing Industry Publications: Comply with glass product manufacturers' recommendations and the follow: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

1. GANA Publications: GANA Laminated Division's 'Laminated Glass Design Guide' and GANA's 'Glazing Manual.'
2. IGMA Publication for Insulating Glass: IGMA TM-3000, 'Glazing Guidelines for Sealed Insulating Glass Units.'

1.06 REGULATORY REQUIREMENTS:

A. Comply with applicable provisions of all codes and standards acceptable to local, state and federal agencies having jurisdiction.

B. Perform Work in accordance with the following Glazing Standards:

1. Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual".

2. Safety Glazing: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and

II glazing products, and requirements of authorities having jurisdiction.

3. Insulating Glass: Provide insulating glass units permanently marked either on spacers or on at least one pane with appropriate certification label of Insulating Glass Certification Council (IGCC) or Associated Laboratories, Inc. (ALI).

1.07 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Specified Design Wind Loads: Provide glazing capable of withstanding wind-load design pressures calculated according to requirements of the 2015 International Building Code or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent. Refer to drawings for Wind Design Data.

b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for a load duration of 60 seconds.

c. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow loads for a duration of 30 days.

d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in

ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. Center-of-Glass U-Values: NFRC 100 methodology using LBL Window 5.0 analysis, expressed as Btu/ sq. ft. x h x deg F.

2. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200

3. Solar Optical Properties: NFRC 300.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Delivery:

1. Deliver glass with manufacturer’s labels intact.

2. Deliver glazing components and sealants in manufacturer’s unopened, labeled containers.

B. Storage and Handling:

1. Store glass in designated areas, away from traffics and construction.

2. Do not remove labels until glass has been installed.

3. Keep glass free from contamination by materials capable of staining or damaging glass.

1.09 ENVIRONMENTAL REQUIREMENTS:

A. Perform glazing only when ambient temperature is above 40 degrees

B. When circumstances require glazing below 45 degrees F, steps shall be taken to assure dry and frost-free surfaces, as approved by the Architect.

1.10 WARRANTY:

A. Provide manufacturer's written warranty for a period of not less than five years, under provisions of Division 1.

B. Warranty: Provide a published and written warranty signed by manufacturer agreeing to furnish F.O.B. point of manufacture,

freight allowed to project site, within 45 working days after receipt of notice from Owner for replacement of those units which develop manufacturing defects.

C. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

Subject to compliance with requirements, provide products by one of the following:

A. Glass Products:

1. Manufacturers producing glass complying with the requirements include the following:

a. Vitro Architectural Glass, Cheswick, PA, 1-855-887-6457, Email:archservices@vitro.com, http://www.vitroglazings.com

b. Libbey-Owens-Ford Co. (LOF), Toledo, OH.

c. Hordis Brothers, Inc., Pennsauken, NJ.

d. AFG Industries, Inc., Kingsport, TN.

e. Guardian Industries Corp., Carleton, MI.

f. Custom Glass Co., Kittanning, PA.

B. Polycarbonate Glazing Products:

1. Manufacturers producing glass complying with the requirements include, but are not necessarily limited to, the following:

a. General Electric Co., GE Plastics Structured Products, Pittsfield, MA 01201, www.structuredproducts.ge.com (800) 451-3147.
b. Cadillac Plastic and Chemical Company.
c. Commercial Plastic and Supply Company.
d. Insulgard Corporation.

2.02 MATERIALS

A. General:

1. Of domestic manufacture – Federal Spec. DD-G-451c. Thickness tolerances shall conform to published standards of approved manufacturer.

2. All glass, whether specifically shown or specified, shall conform to manufacturer's standards as to maximum size for each type of glass.

3. If a speak hole is required, provide Nissen #425 S/S Speak Hole or equal as approved by the Architect.

2.03 PROCESSED GLASS PRODUCTS:

A. **One-quarter inch (1/4″) Annealed Float Glass:**

1. General:

a. Float glass is glass which has been floated on molten tin and annealed slowly to produce a transparent flat glass which eliminates grinding or polishing.

b. ASTM C 1036, Type I, Quality-Q3, class 1.

c. CPSC 16 CFR 1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick.

B. **One-quarter inch (1/4″) Heat-Treated Safety Glass:**

1. General:

a. ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I (transparent flat), Class 1 (clear), Quality q3 (glazing select).

b. ANSI Z97.1 and CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick.

C. **Laminated Safety Glass:**

1. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:

a. ASTM C1172, Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

2. **One-quarter inch (1/4″) Safety Laminated, Polished Plate Glass:**

a. A 0.015″ thick plastic (interlayer) film sandwiched between two layers of 1/8″ annealed float glass.

b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick. Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified.

c. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.

1. Interlayer Material: Polyvinyl butyral sheets or cured resin.

3. **One-half inch (1/2″) Tempered Laminated Safety Glass:**

a. Formed of two pieces of ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I (transparent), Class 1 (tinted grey), Quality q3 (glazing select), glass 1/4-inch thick laminated together with a clear 0.015 inch thick PVB interlayer, for a 1/2-inch total nominal thickness.

b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations.

D. **One-quarter inch (1/4″) Tempered Glass:**

1. General:

a. Float glass which has been heat treated and rapidly cooled to produce compressively stressed surface layer resulting in a strength of at least four to five times that of annealed glass and complying with strength requirements of FS-DD-G-1403B for Grade B, Tempered Glass.

b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; when used in a dual glazed unit 1/4″ thick.

E. **One Inch (1″) Insulated Glass**:

1. General:

   a. Factory-assembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, with manufacturer's standard spacer material and construction, per ASTM E 2190.

   b. All insulating glass units, whether specifically shown or specified, shall conform to the manufacturer's standards as to maximum size for each type of glass.

   c. Fabricate glazing units in dimensions required, with edge and face clearances, edge and surface conditions, and bite in accordance with glazing product manufacturer/fabricator's instructions and referenced glazing publications.

2. **High Performance Insulating Glass**: Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:

   a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.

      1. Kind FT (Full Tempered)
      2. 1/4-inch thick glass.
      3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
      4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).

   b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.

      1. Kind FT (Full Tempered)
      2. 1/4-inch thick glass.

   c. Performance Requirements: (minimum requirements based on non-tinted clear glass)

      1. Visible Light Transmittance: 64 percent minimum.
      2. Winter Nighttime U-Factor: 0.24 ($Btu/hr*ft^2*°F$) maximum.
      3. Summer daytime U-Factor: 0.21 ($Btu/hr*ft^2*°F$) maximum.
      4. Shading Coefficient: 0.31 maximum.
      5. Solar Heat Gain Coefficient: 0.27 maximum.
      6. Outdoor Visible Light Reflectance: 13 percent maximum.

3. **High Performance Reflective Insulating Glass**: Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:

   a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.

      1. Kind FT (Full Tempered)
      2. 1/4-inch thick glass.
      3. Coating: "Solarcool" by Vitro Architectural Glass on first surface (1).
      4. Pyrolytic coating on the second surface (2)

   b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.

      1. Kind FT (Full Tempered)
      2. 1/4-inch thick glass.
      3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376
      4. Coating: "Solarban" 60 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the third surface (3).

   c. Performance Requirements: (minimum requirements based on Solarbronze glass)

      1. Visible Light Transmittance: 16 percent minimum.
      2. Winter Nighttime U-Factor: 0.24 ($Btu/hr*ft^2*°F$) maximum.
      3. Summer daytime U-Factor: 0.22 ($Btu/hr*ft^2*°F$) maximum.
      4. Shading Coefficient: 0.18 maximum.
      5. Solar Heat Gain Coefficient: 0.16 maximum.
      6. Outdoor Visible Light Reflectance: 37 percent maximum.

4. **High Performance Spandrel Insulating Glass**: Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:

   a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.

      1. Kind FT (Full Tempered)
      2. 1/4-inch thick glass.
      3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
      4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).

b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.

1. Kind FT (Full Tempered)
2. 1/4-inch thick glass.
3. Monolithic coating on the fourth surface (4)
4. Coating: "OPACI-COAT 300" by ICD High Performance Coatings, 7350 South Union Ridge Parkway, Ridgefield WA 98642. 360.546.2286 phone - 360.546.2287 fax; ***icd@icdcoatings.com;*** http://www.icdcoatings.com/

c. Performance Requirements: (minimum requirements based on non-tinted clear glass)

1. Visible Light Transmittance: 64 percent minimum.
2. Winter Nighttime U-Factor: 0.24 ($Btu/hr*ft^2*°F$) maximum.
3. Summer daytime U-Factor: 0.21 ($Btu/hr*ft^2*°F$) maximum.
4. Shading Coefficient: 0.31 maximum.
5. Solar Heat Gain Coefficient: 0.27 maximum.
6. Outdoor Visible Light Reflectance: 13 percent maximum.

5. **High Performance Insulating Skylight Glass**: (to be used at all glass skylights and horizontal glass applications) Formed of one 1/4-inch lite of tempered glass and one 5/16-inch inch lite of laminated glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1-3/16 inch nominal thickness, consisting of:

a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.

1. Kind FT (Full Tempered)
2. 1/4-inch thick glass.
3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).

b. Indoor Lite: Laminate: ASTM C1172 and complying with testing requirements.

I. Laminate Outboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.

1. Kind FT (Full Tempered)
2. 1/4-inch thick glass.

II. Interlayer: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.

1. Type: PVB
2. Thickness: 0.015” (0.38mm)”
3. Color: White

III. Laminate Inboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.

1. Kind FT (Full Tempered)
2. 1/4-inch thick glass.

c. Performance Requirements: (minimum requirements based on non-tinted clear glass)

1. Visible Light Transmittance: 58 percent minimum.
2. Winter Nighttime U-Factor: 0.22 (Btu/hr*ft^2*°F) maximum.
3. Summer daytime U-Factor: 0.14 (Btu/hr*ft^2*°F) maximum.
4. Shading Coefficient: 0.30 maximum.
5. Solar Heat Gain Coefficient: 0.26 maximum.
6. Outdoor Visible Light Reflectance: 13 percent maximum.

6. **Security Glazing:**

a. 5/16” thick Laminated Shooter/Attack Certified Security Glass

1. AOTSG516L Security Glass, as manufactured by Armoured One, or approved equal.

b. One Inch (1”) Insulated Shooter/Attack Certified Tactical Security Glass

1. AOTSG1 Security Glass, as manufactured by Armoured One, or approved equal

2.05 GLAZING MATERIALS AND ACCESSORIES:

A. General:

1. Provide black exposed glazing materials, unless another color is indicated, or unless another color is selected by the Architect from manufacturer's standard colors. Provide hardness of materials as recommended for the required application and condition of installation in each case. Provide only compounds, which are known (proven) to be fully compatible with surface contacted.

B. Glazing Sealants:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.

4. For Glazing Interior Openings:

   a. Acrylic latex one-part terpolymer (FS TT-00230) or acrylic latex emulsion (ASTM C-834), compounded specifically as glazing sealant with permanent flexibility (non-hardening), non-staining, and non-bleeding.

   b. Products complying with these requirements include:

      1. "AC-20" by Pecora Corp., Harleysville, Pennsylvania.

      2. "MONO" by Tremco, Inc., Cleveland, Ohio.

      3. "Krylflex" by Chem-Masters Corp., Chagrin Falls, Ohio.

5. For Glazing Exterior Openings, except where gasket is used:

   a. Silicone sealant, complying with FS TT-S-001543, Class A, non-sag, compounded for glazing applications.
   b. Products complying with these requirements include:

      1. "Dow Corning 999 Silicone Building and Glazing Sealant" by Dow Corning Corp., Midland, Michigan.

      2. "Silicone Construction Sealant 1200" by General Electric Co., Silicone Products Div., Waterford, New York.

6. For Glazing Glass to Glass:

   a. Structural Silicone sealant, complying with ASTM

C1401-09a, Standard Guide for Structural Sealant Glazing.

b. Products complying with these requirements include:

1. "Dow Corning 993 Structural Glazing Silicone Sealant" by Dow Corning Corp., Midland, Michigan.

2. "Dow Corning 3362 Insulating Glass Silicone Sealant" by Dow Corning Corp., Midland, Michigan.

C. Glazing Tape: Preformed macro polyisobutylene; NAAMM #55-1B-68, with integral spacing device, paper release; "Polyskim Tape", color as later selected by Architect.

D. Setting Blocks: Neoprene, Shore A durometer hardness of 85,plus or minus 5, 4 inches long by 3/8-inch thick by 1/4-inch high.

E. Glazing Gaskets:

1. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

a. Neoprene, ASTM C 864.
b. EPDM, ASTM C 864.
c. Silicone, ASTM C 1115.
d. Thermoplastic polyolefin rubber, ASTM C 1115.
e. Any material indicated above.

2. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene(not compatible with silicone glazing sealants)
2. EPDM.
3. Silicone.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

F. Primers, Sealers & Cleaners: Recommended by sealant manufacturer.

G. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

H. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

I. Compressible Filler Rod:

1. Closed cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION

A. Check that glazing channels are free of burrs, irregularities, and debris.

B. Do not proceed with installation until any unsatisfactory conditions are corrected and placed in satisfactory condition.

3.02 PREPARATION

A. Field Measurements:

1. Cut glass accurately to sizes obtained from actual verified field measurements of frames to receive glass.

2. Allow for proper edge clearances.

B. Preparation of Surfaces:

1. Remove any protective coatings or covering from surfaces to be glazed.

2. Clean glass and glazing surfaces to remove dust, oil and contaminants, and wipe dry.

3. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.03 DELIVERY AND STORAGE:

A. Delivered materials shall match the approved samples. Packaged materials shall be delivered in the original unopened labeled containers of the manufacturer, clearly marked with their name and brand.

B. Each panel of glass shall be factory labeled. Store glass, while awaiting installation, in a dry, well-ventilated location at a constant temperature maintained above dew point.

C. Glass that is cracked, broken, chipped, or otherwise damaged during transportation, storage, and erection (including natural causes, accidents, and vandalism) and unfit for use shall be removed from the job site and replaced with acceptable materials at the Contractor’s expense.

3.04 GENERAL PROVISIONS:

A. Exterior Glazing Only:

1. Watertight and airtight installation of each piece of glass is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss of breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

2. Weather conditions:

a. Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer’s recommended limitations for installation.

B. Interior and Exterior glazing:

1. Protect glass from edge damage at all times during handling, installation, and operation of the building.

2. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thickness, with reasonable tolerances. The installer is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.

3. The installer must examine the framing or glazing channel surfaces, backing, stop design, and the conditions under which the glazing is to be performed, and notify the Prime Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the glazing until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.05 INSTALLATION:

A. Verify by measurements at the job site all dimensions affecting this work.

B. Comply with combined recommendations of glass manufacturer and manufacturer of sealants, gaskets, and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturers' technical representatives direct otherwise.

C. Install polysulfide sealants as recommended by Thiokol Chemical Corp., except as otherwise recommended by the sealant manufacturer.

D. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation. Clean the glazing channel, or other framing members to receive glass, immediately before glazing. Remove coating which are not firmly bonded to the substrate. Remove lacquer from metal surfaces wherever elastomeric sealants are used.

E. Apply primer or sealer to joint surfaces wherever recommended by sealant manufacturer.

F. Do not attempt to cut, seam, nip, or abrade glass that is tempered, heat strengthened, or coated.

G. Inspect each piece of glass immediately before installation, and eliminate any which have observable edge damage or face imperfections. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

H. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

I. Glass shall be set without springing or forcing and carefully centered laterally and vertically so as to provide uniform clearance. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

J. Install setting blocks of proper sizes at quarter points of sill rabbet. Set blocks in thin course of heelbead compound / sealant, if any.

K. Provide spacers inside and out, and of proper size and spacing, for all glass sizes where the length plus width is larger than 50 united inches, except where gaskets are used for glazing.

    1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

    2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

L. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set

with pattern, drawn, and bow oriented in the same direction as other pieces.

M. Clearance Requirements: Allow the following minimum nominal clearances, in accordance with glass manufacturer's recommendations; glass face to channel face, glass edge to frame member, and glass bite:

Glass Thickness	Face Clearance	Edge Clearance	Bite
Up to 1/4-inch	1/8-inch	1/4-inch	1/4- to 3/8-inch
5/16- to 3/8-inch	3/16-inch	5/16-inch	5/16- to 7/16-inch
1/2- to 13/16-inch	1/4-inch	3/8-inch	1/2- to 5/8-inch
7/8-inch and over	1/4-inch	1/2-inch	1/2- to 7/8-inch

3.06 GLASS TO GLASS JOINTS:

A. Where glass panels join without mullion, bed joint with clear silicone sealing compound. For exterior applications a structural silicone bond joint is required. All materials to be joined must be compatible and meet the sealant manufacturer’s requirements for adhesion & design loading.

B. Edgework requirements for butt joint glazing applications shall be reviewed and approved by the architect prior to field installation due to a variation in edge quality based on the size, shape and thickness of the glass.

C. Factory clean cut edges shall meet the following recommendations for butt joint glazing applications:

1. 3/8” glass is acceptable for use with factory clean cut edges.
2. 1/2” glass up to a maximum length of 100” on the butt joint edge can be used with factory clean cut edges.
3. 1/2” glass over 100” in length and 5/8” and thicker glass in any length should not be used with a factory clean cut edge.

3.07 SEALANT APPLICATION:

A. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

B. Tool exposed surfaces of glazing liquids and compounds to provide a

substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

C. Clean and trim excess glazing materials from the glass and stops or frames promptly after installation, and eliminate stains and discolorations.

D. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

3.08 GASKET GLAZING (DRY):

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.09 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT):

A. Cut glazing tape to proper lengths prior to application, install against permanent stop, 3/16-inch to 1/4-inch below sightline.

B. Do not lap the adjoining lengths of tape or rubber shim, as this will prevent full contact around perimeter of glass:

1. Strips must be installed in four separate sections, not run continuously around corners.

C. Place setting blocks at 1/4 points.

D. Rest glass on setting blocks and press against tape with sufficient pressure to ensure full contact and adhesion at perimeter.

E. Install removable stops; insert continuous spacer strips between glass and applied stop to keep glass in compression against the tape.

1. Install in four separate sections.

F. Sealant cavity pocket, formed by setting of the applied stop, shall then be filled to the sight line with sealant.

G. Cap bead shall not exceed 1/16 inch above sight line onto glass surface.

H. Tool or wipe cap bead with solvent for smooth appearance.

3.10 INTERIOR DRY METHOD (TAPE AND TAPE):

A. Cut glazing tape to length and install against permanent stop, projecting 1/16-inch above sightline.

B. Place setting blocks at 1/4 points.

C. Rest glass on setting blocks and push against stop for full contact and adhesion at perimeter.

D. Place glazing tape on free perimeter of glass in same manner described above.

E. Install removable stop, avoid displacement of tape, exert pressure on tape for full continuous contact.

F. Knife trim excess or protruding tape.

3.11 CLEAN-UP AND PROTECTION:

A. Protect exterior glass from breakage immediately upon installation by attachment of crossed streamers to framing held away from glass. DO NOT APPLY MARKERS OF ANY TYPE TO SURFACES OF GLASS. Remove nonpermanent labels, and clean surfaces.

B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents, and vandalism. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Remove all excess glazing material from all installed glass. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other surfaces. Any soiling occurring on the glass shall be promptly and completely washed off.

D. Carefully and completely remove all markings and labels from glass surfaces. Do not apply markers to glass surfaces.

E. Wash and polish glass on both faces with a mild neutral or slightly acidic solution as recommended by the glass manufacturer not more than four days prior to Owner's acceptance of the work in each area. Attach crossed streamers away from glass face.

F. Care shall be taken during cleaning to avoid scratching of glass surfaces by grit particles.

G. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08801 - OKALUX PLUS LIGHT DIFFUSING INSULATED GLASS

PART 1 – GENERAL

1.01 SUMMARY

A. Okalux Plus light diffusing insulated glass with capillary slab and glass fiber tissue is provided by Okalux North America LLC. Provide glazing at skylight.

1.02 SUBMITTALS

A. Product Data: Manufacturer's catalogs and technical literature showing performance properties and recommended installation procedures.

B. Submit minimum 12" x 12" samples of Okalux Plus light diffusing insulating glass as required.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver Okalux Plus light diffusing glass in manufacturer's original packaging.

1.04 WARRANTY

A. Provide a 10 year warranty to include the provision of replacement insulated glass units which exhibit moisture or other substances on either of the inner glass surfaces caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation or cleaning and maintenance contrary to the manufacturer's written instructions.

PART 2 - PRODUCT

2.01 MANUFACTURER

A. Syracuse Glass/Okalux North America
Syracuse, New York

North American Distribution:
Okalux North America, Inc.
180 S. Broadway, suite 408
White Plains, NY 10605
Tel: 914 999-0332
Fax: 914 607-7797
Peter.stattler@okaluxna.com

2.01 MATERIALS

A. Description of Product

1. Okalux Plus light diffusing insulating glass with capillary slab and glass fiber tissue.

B. Glass make up:

1. Outer pane: 1/4" tempered float glass with Guardian SNX 62-27 low e coating on surface #2 (or other coating as agreed). Tinted glass as selected by Architect.

2. Cavity: 9/16" argon filled cavity – 1/4" capillary slab, 2 x SAB 30 + 1 X SAB 45 fiber tissue, and 5/16" free argon gas) Capillaries are not to exceed 3 mm diameter to assure proper diffusion.

3. Inner pane: 11/32" laminated float glass with 30 mil PVB interlayer. Clear glass as required.

4. Sealant: Dual sealed units:
Primary sealant: Polyisobutylene
Secondary sealant: Silicone

5. Calculations: Glass make-up and thickness to be confirmed by glazing contractor and façade engineer to meet project load and local code requirements.

6. Size: Okalux Plus, when supplied without a white inner mullion, has a maximum smaller dimension of 48" (1220mm) Maximum larger dimension is 137" (3500mm). When both of the dimensions exceed 48", a white inner mullion is required to stabilize the capillary slab within the insulated unit. Maximum dimension with the white inner mullion is 78" x 137" (2000mm x 3500mm).

C. Performance Values

1. Okalux light diffusing glass insulating glass shall perform optically and thermally based upon the following:

2. Light Transmission - 29% maximum
3. SHGC (TSET)- .15% maximum
4. U-value - .24 argon (btu/hr/sf/°F)

PART 3 – EXECUTION

3.01 EXAMINATION

A. The glazing contractor shall examine the framing and glazing channel surfaces and backing as well as the conditions under which the glazing is to be performed. The glazing contractor shall also inspect each Okalux unit prior to installation. Any units deemed to be damaged or of questionable quality should be brought to the attention of the supplier, Okalux North America, LLC, immediately and prior to installation.

3.02 GLAZING

1. Okalux Plus should be installed in accordance with the general rules applicable for insulating glass. The glazing plane support system must be free of any internal obstructions and structurally adequate for the application.

3.03 INSTALLATION

A. As with any insulated glass, the dimensions of units used are limited by the type, thickness of glass and project load requirements.

PART 4 – WARRANTY

The warranty extends 10 years from date of delivery under the conditions of normal usage and approved installation. Okalux's instructions for ordering and installation must be followed.

Okalux Plus insulated solar control glass will not fail with respect to the perimeter sealing. The warranty includes thermal breakage due to climatic influence if the glass is installed in accordance with approved installation drawings. Okalux's liability under this warranty is limited solely to the delivery of a replacement unit to the site of installation. Written notice of warranty claim must be provided to the supplier within 90 days of noticing unit failure. Okalux reserves the right to inspect the unit to verify justification of warranty claim. Replacement units are warrantied for the remainder of the original warranty period. The above warranty does not apply to or cover materials that have not been paid for in full.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08806 - FIRE RATED GLAZING (FIRELITE PLUS, FIREGLASS 20 & PYROSTOP)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

A. Furnish and install appropriate fire-rated glazing materials in all fire rated assemblies including door vision lights, transoms, borrowed lites and/or window units.

1. For non-rated assemblies, see Specification Section 08800.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Division 1 Section 01352 - *"LEED Requirements"* for recycled content and regional materials requirements, submittals, and additional LEED requirements.
B. Division 1 Section 01524 - *"Construction Waste Management"* for recycling construction waste.
C. Division 7 Section *07910 - "Joint Sealants"*.
D. Division 8 Section 08110 - *"Steel Doors and Frames".*
E. Division 8 Section 08211 - *"Flush Wood Doors".*

1.04 REFERENCE STANDARDS:

A. Consumer Product Safety Commission (CPSC):

1. CPSC 16FR 1201 – Safety Standards for Architectural Glazing Materials.

B. American Society for Testing and Materials (ASTM):

1. ASTM E2010-01 – Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.
2. ASTM E2074-00 – Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
3. ASTM E163 – Methods for Fire Tests of Window Assemblies.
4. ASTM E773 – Test Method for Seal Durability of Sealed Insulating Glass Units.
5. ASTM E838 – Cracking, Blistering, Crazing and Color Change.
6. ASTM E 119: Fire Tests of Building Construction and Materials.

C. National Fire Protection Association (NFPA):

1. NFPA 80 – Fire Doors and Windows.
2. NFPA 252 – Fire Tests of Door Assemblies.
3. NFPA 257 – Fire Tests of Window Assemblies.

D. Underwriters Laboratories, Inc. (UL):

1. UL 9 – Fire Tests of Window Assemblies.
2. UL 10B – Fire Tests of Door Assemblies.
3. UL 10C – Positive Pressure Fire Tests of Door Assemblies.

E. Glass Association of North America (GANA):

1. GANA – Glazing Manual.
2. FGMA – Sealant Manual.

F. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings FGMA – Sealant Manual.

1.05 PERFORMANCE REQUIREMENTS

A. ***FireLite Plus***® - Fire-rated glass ceramic laminated clear and wireless glazing material for use in impact safety-rated locations such as doors, transoms and borrowed lites with fire rating requirements ranging from 20 minutes to 3 hours with hose stream test.

B. ***Fireglass20***® - Fire-rated tempered glass clear and wireless glazing material for use in impact safety-rated locations with fire rating requirements of 20 minutes without hose stream test; for use in interior and exterior applications.

C. ***Pyrostop***® - Fire-rated, clear and wireless glazing material for use in locations such as doors, sidelites, transoms, borrowed lites, and wall applications with fire rating requirements ranging from 45 minutes to 2 hours with required hose stream test; for use in interior and exterior applications.

D. Product shall pass positive pressure tests standards: UL 10C, UBC 7-2 and UBC 7-4.

E. Safety Glazing: Comply with testing requirements of CPSC 16 CFR 1201, safety regulation for architectural glazing in hazardous locations for Category I & II materials.

1.06 SUBMISSIONS

A. Submissions shall be in accordance with Section 01300 – *Submissions* and as modified below.

B. Product Data – Glass:

1. Submit manufacturer's technical data, specifications, and installation and maintenance instructions for each type of

glass required. Include test data substantiating that glass complies with specified requirements. Include Certificates of Compliance from glass manufacturers attesting that glass materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

C. Samples:

1. Submit three (3) 12" square samples of each type of glass required. Architect's review of samples will be for color, texture, and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

D. Shop Drawings: Prior to placement of glass order or glass fabrication, the Contractor shall pertinent shop drawings (i.e. – windows, doors, borrowed light frames, etc.) which have been:

1. Checked and approved by the General Contractor, stamped and dated.
2. Reviewed by the Architect, with stamp affixed.

E. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

F. LEED Submittals: (For LEED Projects only)

1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 *"LEED Requirements"*.

2. Credit EQ 4.1: Manufacturers' product data for interior field-applied adhesive and sealant products included in this section, including printed statement of VOC content in accordance with Section 01352 *"LEED Requirements"*.

1.07 QUALITY ASSURANCE

A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.

B. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL and/or WHI certifying it for use in tested and rated fire protective assemblies.

C. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152 and UL 10B, labeled and listed by UL and/or WHI or other certification agency acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Deliver all materials to project site in manufacturer's original packaging, undamaged, complete with installation instructions.

C. Store off ground, under cover, protected from weather and construction activities

1.09 PROJECT CONDITIONS:

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY:

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. ***FireLite Plus***® as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857,
e-mail sales@fireglass.com, web site www.fireglass.com

1. FireLite Plus® glazing sizes shall be as shown on the drawings:

2. Properties: All fire rated ceramic glass designated on the drawings shall carry the following properties:

   a. Thickness: 5/16 inch.
   b. Weight: 4.0 lbs. / sq.ft.
   c. Approximate Visible Transmission: 85 percent.
   d. Approximate Visible Reflection: 9.0 percent.
   e. Fire-Rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications – refer to Contract Drawings for ratings.
   f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1.
   g. STC Rating: Approximately 38 dB.

h. Surface Finish: Standard Grade-Comparable surface finish to alternative fire-rated ceramic products marketed as "Premium"
i. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.

3. Maximum sheet sizes based on surface finish: Standard 48 inches by 96 inches.

4. Labeling: Each piece of FireLite Plus® shall be permanently labeled with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing. FireLite Plus® shall be glazed into the appropriate fire-rated frame(s) with an approved glazing compound (Silicone or Closed Cell PVC Tape) as supplied by the Installer.

5. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00 and ASTM E2010-01; NFPA 252 and NFPA 257; and UL 9, UL 10B, and UL 10C.

B. ***Fireglass20®*** as manufactured by J.R. Four Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com

1. Fireglass20® glazing sizes shall be as shown on the drawings:

2. Properties: All 20 minute fire rated glass designated on the drawings shall carry the following properties:

a. Thickness: 1/4 inch.
b. Weight: 3.0 lbs. / sq.ft.
c. Approximate Visible Transmission: 89 percent.
d. Approximate Visible Reflection: 8.0 percent.
e. Fire-Rating: 20 minutes (WITHOUT HOSE STREAM TEST)- refer to Contract Drawings.
f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1

3. Labeling: Each piece of Fireglass20® shall be permanently labeled fireglass 20™ with the fireglass 20™ logo, UL logo and fire rating in sizes up to 6,396 sq. in.

4. Fire Rating: Fire rating listed & labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00; NFPA 252; & UL 9, UL 10B, & UL 10C.

C. ***Pyrostop®*** as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com

1. Pyrostop® glazing sizes shall be as shown on the drawings:

2. Properties: All fire rated ceramic glass designated on the drawings shall carry the following properties:

   a. Thickness: 3/4" (45 min.), 7/8" (60 min.), 1-7/16" (90 min.) & 2-1/8" (120 min.)
   b. Weight: Varies with thickness (approximate range 9 to 22 lbs./sq. ft.)
   c. Approximate Visible Transmission: Varies with thickness (approximate range 88 to 75 percent).
   e. Fire-Rating: Up to 2 hours – refer to Contract Drawings for ratings.
   f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1.
   g. STC Rating: Up to 46 dB.

3. Labeling: Each piece of Pilkington Pyrostop® shall be permanently labeled with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing. FireLite Plus® shall be glazed into the appropriate fire-rated frame(s) with an approved glazing compound (Silicone or Closed Cell PVC Tape) as supplied by the Installer.

4. Fire Rating: 60 Minutes and Greater: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E 119 and UL 263.

D. Glazing Compound for Fire-Rated Glazing Materials:

1. VOC content of all interior field-applied sealants must be less than 250 g/L.

2. VOC content of interior structural glazing adhesive must be less than 100 g/L.

3. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.

4. Glazing Compound: DAP 33 putty.

5. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.

   Available Products:

   a. Dow Corning 795 - Dow Corning Corp.
   b. Silglaze-II 2800 - General Electric Co.
   c. Spectrem 2 - Tremco Inc.]

E. Setting Blocks: Neoprene, EPDM or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

F. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.

G. Cleaners, Primers and Sealers: Type recommended by manufacturer of glass and gaskets.

2.02 FABRICATION

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

2.03 DELIVERY AND STORAGE

A. Delivered materials shall match the approved samples. Packaged materials shall be delivered in the original unopened labeled containers of the manufacturer, clearly marked with their name and brand.

B. Each pane of glass shall be factory labeled; removed only at the time specified hereinafter. Store glass, while awaiting installation, in a dry, well-ventilated location at a constant temperature maintained above dew point.

C. Glass that is cracked, broken, chipped, or otherwise damaged during transportation, storage, and erection, and all glazing and sealing materials unfit for use shall be removed from the job site and replaced with acceptable materials at the Contractor's expense.

C. All Glazing broken or damaged during construction up to the date of substantial completion shall be removed from the job site and replaced with acceptable materials at the Contractor's expense.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.
3. Observable edge damage or face imperfections.

B. Do not proceed with glazing until unsatisfactory conditions have

been corrected.

C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.02 INSTALLATION

A. General:

1. Verify, by measurements at the job site, all dimensions affecting this work.
2. Comply with FGMA or GANA (For Pyrostop) standards and instructions of manufacturers of glass, glazing, sealants and glazing compounds.
3. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
4. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
5. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
6. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.
7. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit. Glass shall be set without springing or forcing and carefully centered laterally and vertically so as to provide uniform clearance.
8. Place glazing tape on free perimeter of glazing in same manner described above.
9. For Fireglass20® Provide minimum edge clearance of >1/4 inch (+1/8 inch/-1/16 inch) and a minimum edge cover of <3/8 inch (+1/16 inch/-1/16 inch).
10. For Pilkington Pyrostop® provide minimum 3/16 inch edge clearance
11. Install removable stop and secure without displacement of tape. Prior to glazing, remove stops and clean out all dirt, oil, droppings, or other material, which will affect proper glazing.
12. Use specified glazing compound, without alteration; bed glazing material in glazing compound; entirely fill all recess and spaces. Provide visible glazing compound with smooth and straight edges.
13. Install in vision panels in fire-rated doors to requirements of NFPA 80.
14. Install so that appropriate UL and FireLite Plus®, Fireglass20® & Pilkington Pyrostop® markings remain permanently visible and upright.

3.02 PROTECTION AND CLEANING

A. Glass shall be suitably screened from paint, construction debris, and the like. All such soiling occurring on glass shall be promptly and completely washed off by methods approved by the glass manufacturer.

B. Upon completion of installation and acceptance, markings and labels of whatever sort shall be carefully and completely removed from glass panels and the glass washed clean with a mild neutral or slightly acidic solution as recommended by the glass manufacturer, after which no marking or labels of any sort shall be placed on the glass. Care shall be taken during cleaning to avoid scratching of glass surfaces by grit particles.

C. Ventilate buildings after glazing by opening windows slightly to prevent condensation on glass. Maintain ventilation until compound has set.

3.03 GUARANTEE

A. The Contractor shall guarantee all workmanship and material in accordance with the General Conditions and Section 01700 – Contract Closeout.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08870 – SECURITY WINDOW FILM

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Safety and Security Window Film:
   1. Clear microlayered film. (Ultra S800)

B. RELATED SECTIONS

1. Division 7 Section *"Joint Sealants"*.
2. Division 7 Section *"Building Insulation"*
3. Division 8 Section *"Steel Doors and Frames"*.
4. Division 8 Section *"Aluminum Doors and Frames"*.
5. Division 8 Section *"FRP Doors and Frames"*.
6. Division 8 Section *"Flush Wood Doors"*.
7. Division 8 Section *"Aluminum Entrances & Storefronts"*.
8. Division 8 Section *"Aluminum Windows"*.
9. Division 8 Section *"Vinyl Clad Wood Windows"*.
10. Division 8 Section *"Vinyl Clad Wood Doors"*.
11. Division 8 Section *"Glazed Aluminum Curtain Walls"*

1.02 REFERENCE STANDARDS:

A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

B. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.

C. ASTM International (ASTM):
   1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
   2. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -- Tension.
   3. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
   4. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
   5. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
   6. ASTM D 2240 - Standard Method for Rubber Property - Durometer Hardness.
   7. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
   8. ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
   9. ASTM D 4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
   10. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
   11. ASTM E 308 - Standard Recommended Practice for

Spectrophotometry and Description of Color in CIE 1931 System.

12. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
13. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
14. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
15. ASTM F 1642 - Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings
16. ASTM F 2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.

D. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.

E. GSA-TS01 - Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.

F. NFRC 100/200 (Formerly ASTM E903) - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.

G. IES LM-83-12: IES Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure.

H. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.

I. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.

J. Window 6.3 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.

1.02 DEFINITIONS:

A. Light to Solar Gain Ratio: The ratio of visible light transmission to Solar Heat Gain Coefficient.

1.03 PERFORMANCE REQUIREMENTS:

A. Safety Glazing Impact Performance:
   1. 400 ft-lbs impact resistance, meeting ANSI Z97.1 (Class A, Unlimited) and 16 CFR 1201 (Category 2) impact requirements with film applied on 1/4 inch annealed glass.
   2. Impact Resistance after Aging: 400 ft-lbs, meeting ANSI Z97.1 (Class A, Unlimited) and 16 CFR 1201 (Category 2) impact requirements with film applied on 1/8 inch annealed glass.

B. Blast Hazard Mitigation Performance:
   1. GSA Rating of "2"/ ASTM F1642 "No Hazard" with minimum blast

load of 9 psi and 63 psi*msec, on1/4" single pane glass and film attachment system.
2. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with minimum blast load of 10 psi and 89 psi*msec, on 1 inch (25 mm) double pane glass and film attachment system.
3. GSA Rating of "3B" / ASTM F1642 "Very Low Hazard" with minimum blast load of 5 psi and 28 psi*msec, on 1/4" pane glass without film attachment system.
4. GSA Rating of "3B" / ASTM F1642 "Low Hazard" with blast minimum load of 10 psi and 42 psi*msec, on 1 inch (25 mm) double pane glass without film attachment system.

C. Impact Resistance and Pressure Cycling:
1. ASTM E1996 / E1886: Large Missile "C", +/- 75 psf Design Pressure

D. Tear Resistance:
1. Minimum Graves Area Tear Strength of 1,200 lbs% as measured on coated film product, without liner, per ASTM D1004.

E. Adhesion to Glass:
1. Minimum 6 lbs/in peel strength per ASTM D3330 (Method A).

F. Flammability: Surface burning characteristics when tested in accordance ASTM E 84, demonstrating film applied to glass rated Class A for Interior Use:
1. Flame Spread Index: no greater than 25.
2. Smoke Developed Index: no greater than 55.

G. Abrasion Resistance:
1. Film shall have a surface coating that is resistant to abrasion such that less than 3 percent increase of transmitted light haze will result when tested in accordance to ASTM D 1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

H. UV Light Rejection:
1. Minimum of 99.9% UV light rejection (300 - 380 nm), per ASTM E903, as determined with film applied on 1/4 inch clear glass.

1.04 SUBMITTALS:

A. Submissions shall be in accordance with Section 01300 – “Submissions” and as modified below.

B. Product Data: Manufacturer's current technical literature on each product to be used, including:
1. Manufacturer's Data Sheets.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

C. 3rd Party Test Report Submittal Requirements. Submit the following 3rd Party test reports indicating compliance with the test values listed in this section.
1. Flammability Testing, ASTM E84.
2. Film Properties Testing, ASTM D882.
3. Abrasion Resistance Testing, ASTM D1044.

4. Peel Strength Testing, ASTM D3330.
5. Tear Resistance Testing, ASTM D1004.
6. Puncture Strength Testing, ASTM D4830.
7. Safety Glazing Impact Testing, ANSI Z97.1 and/or 16 CFR 1201.
8. Impact Resistance and Pressure Cycling, ASTMs E1886 and E1996.
9. Blast Hazard Mitigation Testing, ASTM F1642 / F2912 and/or GSA-TS01-2003.

D. Other Product Submittals:
1. Manufacturer's summary of 3rd Party Blast Hazard Mitigation Testing, ASTM F1642 / F2912 and/or GSA-TS01-2003
2. 3rd Party test reports from Forced Entry Resistance evaluations.

E. Verification Samples: For each film specified, two samples representing actual film color and pattern.

1.05 QUALITY ASSURANCE:

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
1. Provide documentation that the adhesive used on the specified films is a Pressure Sensitive Adhesive (PSA).

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
a. Name of building.
b. The name and telephone number of a management contact.
c. Type of glass.
d. Type of film and/or film attachment system.
e. Amount of film and/or film attachment system installed.
f. Date of completion.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Follow Manufacturer's instructions for storage and handling.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local

authorities having jurisdiction.

1.06 PROJECT CONDITIONS:

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.07 WARRANTY:

A. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

B. In order to validate warranty, installation must be performed by an Authorized 3M dealer and according to Manufacturer's installation instructions. Verification of Authorized 3M dealer can be confirmed by submission of active 3M dealer code number.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Acceptable Manufacturer: 3M Commercial Solutions, which is located at: 3M Center Bldg. 220-12-E-04; St. Paul, MN 55144-1000; Toll Free Tel: 888-650-3497; Tel: 651-737-1081; Fax: 651 737 8241; Email:request info (vkampmeyer@mmm.com); Web:http://www.3m.com/3M/en_US/architectural-design-us/?utm_medium=redirect&utm_source=vanity-url&utm_campaign=www.3M.com/AMD|http://www.3m.com/3M/en_US/building-window-solutions-us

2.02 CLEAR MICROLAYERED SAFTEY AND SECURITY WINDOW FILM:

A. 3M Scotchshield Ultra S800 Safety and Security Window Film. Optically clear microlayered polyester film, nominally 8 mils (0.008 inch) thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.
   1. Physical / Mechanical Performance Properties (nominal):
      a. Film Color: Clear.
      b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
      c. Tensile Strength (ASTM D882):
         1) Base Film: 32,000 psi (MD) / 32,000 psi (TD).
         2) Coated Film: 32,000 psi (MD) / 32,000 psi (TD).
      d. Break Strength (ASTM D882):
         1) Base Film: 250 lb/in (MD) / 250 lb/in (TD).
         2) Coated Film: 245 lb/in (MD) / 265 lb/in (TD).

e. Percent Elongation at Break (ASTM D882):
    1) Base Film: 115 % (MD) / 115 % (TD).
    2) Coated Film: 132 % (MD) / 130 % (TD).
f. Yield Strength:
    1) Base Film: 12,000 psi (MD).
    2) Coated Film: 15,000 psi (MD).
g. Percent Elongation at Yield (ASTM D882):
    1) Base Film: 7% (MD).
    2) Coated Film: 9% (MD).
h. Graves Tear Resistance (ASTM D1004):
    1) Maximum Force (lbs):
        a) Base Film: 40 (MD) / 40 (TD).
        b) Coated Film: 40 (MD) / 40 (TD).
    2) Maximum Extension (in):
        a) Base Film: 0.45 (MD) / 0.65 (TD).
        b) Coated Film: 0.50 (MD) / 0.57 (TD).
    3) Graves Area Tear Resistance (lbs%):
        a) Base Film: 1,100 (MD) / 1,300 (TD).
        b) Coated Film: 1,100 (MD) / 1,300 (TD).
i. Puncture Propagation Tear Resistance (ASTM D2582):
    1) Coated Film: 9 lbf (MD) / 10 lbf (TD).
j. Puncture Strength (ASTM D4830):
    1) Material Properties (as supplied).
    2) Coated Film: 185 lbf.

2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
4. Identification: Labeled as to Manufacturer as listed in this Section.
5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass.
    a. Visible Light Transmission (ASTM E 903): 87 percent.
    b. Visible Reflection (ASTM E 903): Not more than 10 percent.
    c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
    d. Solar Heat Gain Coefficient (ASTM E 903): 0.79
6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
    a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
    b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
7. Impact Resistance and Pressure Cycling: Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/ 75 psf Design Pressure with use of 3M Impact Protection Adhesive. Film applied to 1/4-inch tempered glass.
8. Blast Hazard Mitigation:
    a. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 44 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Profile Attachment system
    b. GSA Rating of "2"/ ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 43 psi*msec blast impulse, on 1/4 inch (6 mm) tempered single pane glass and 3M Impact Protection Profile Attachment system

c. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 9 psi and 62 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Adhesive Attachment system
d. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 9 psi and 63 psi*msec blast impulse, on 1/4 inch (6 mm) tempered single pane glass and 3M Impact Protection Adhesive Attachment system
e. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 9 psi and 60 psi*msec blast impulse, on 1 inch (25 mm) annealed double pane glass and 3M Impact Protection Profile Attachment system
f. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 10 psi and 89 psi*msec blast impulse, on 1 inch (25 mm) annealed double pane glass and 3M Impact Protection Adhesive Attachment system
g. GSA Rating of "3B" / ASTM F1642 "Very Low Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass, daylight applied film (no attachment)
h. GSA Rating of "3B" / ASTM F1642 "Very Low Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on 1/4 inch (6 mm) tempered single pane glass, daylight applied film (no attachment)
i. GSA Rating of "3B" / ASTM F1642 "Low Hazard" with blast pressure of 7 psi and 42 psi*msec blast impulse, on 1 inch (25 mm) annealed double pane glass, daylight applied film (no attachment)

9. Forced Entry Resistance: Product shall have been evaluated for time to resist complete body passage by a qualified 3rd Party test lab.

PART 3 - EXECUTION

2.03 PREPARATIION:

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.

2.04 INSTALLATION:

A. Film Installation, General:
1. Install in accordance with manufacturer's instructions.
2. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.

3. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
4. Apply film to glass and lightly spray film with slip solution.
5. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
6. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
7. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
8. If completing an exterior application, check with the manufacturer as to whether edge sealing is required.

B. Impact Protection Adhesive Installation:
1. The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator. Refer to 3M publication, 70-0709-0322-7, 3M Impact Protection Adhesive Attachment System Installation Instructions.
   a. For blast mitigation: minimum 1/2 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets).
   b. For windborne debris protection: minimum 3/8 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets).
2. To ensure a straight and consistent bead width is achieved, masking tape may be applied to film and frame surfaces prior to application.
3. With prior approval of the building owner or property manager, existing compression gaskets may be partially removed or trimmed to allow for a thinner bead and stronger anchorage. If removing the gaskets, sections shall be trimmed approximately 3 inches in length and inserted with appropriate spacing along all sides of the window to help secure the glazing during application and curing of the Impact Protection Adhesive.
4. The Impact Protection Adhesive shall be dispensed with a caulk gun with nozzle opening diameter sized to match the approximate size of the desired bead width.
5. A plastic putty knife or other tool with a clean straight edge shall be used to trowel and smooth out the adhesive. The completed adhesive bead shall be relatively triangular in shape.
6. Any masking tape used shall be carefully removed within 10 minutes after applying the wet glaze.

C. Impact Protection Profile Installation:
1. The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator trained to install 3M Impact Protection Profile. Refer to 3M publication, 70-0709-0323-5, 3M Impact Protection Profile Attachment System Installation Instructions.
2. Each profile piece shall span continuously to both sides of the window, within 1/8 inch to the frame edge. Splicing the profile between frame edges is prohibited.

3. Profile shall be aligned and applied by 3M recommended or approved methods and tools to ensure a quality installation.
4. Corner joints shall be fabricated by 3M recommended and approved methods. No part of the profile adhesive shall make contact with an adjacent profile.
5. Sufficient pressure shall be evenly applied along the entire length of the profile to ensure full adhesion from both adhesive strips. A roller tool is required to minimize entrapment of air in the adhesive.

3.05 CLEANING AND PROTECTION:

A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09250 - GYPSUM WALLBOARD

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The work of this section is subject to all applicable provisions of the "General Conditions" and "Division 1 - General Requirements" which form part of this specification.

B. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Light gauge interior metal drywall studs for partitions and bulkhead framing.

2. Gypsum wallboard as specified, anchorages and control joints.

3. All trim, battens, corners, and similar items.

4. All required fastenings, framing, and attachments.

5. All adhesive, tapes, and joint compound systems as required.

6. Wall to wall corner expansion joints.

7. Metal drywall ceiling framing, furring and accessories.

8. Acoustical insulation and sealants.

C. Products installed but furnished under other sections and trades:

1. Metal drywall suspended ceiling grid system.

2. Metal wall/ceiling access panels furnished by other trades, as appropriate to project.

3. Metal lighting fixture plaster frames and rings, etc., within gypsum board ceiling system.

4. Cementitious backer units: Division 9 Section, “*Ceramic Tile*”.

1.02 RELATED WORK

A. Related work specified under other sections of the specifications:

1. Division 7 Section “*Joint Sealants*”.
2. Division 8 Sections for all doors and frames.
3. Division 9 Section “*Ceramic Tile*”; for cementitious backer units.
4. Division 9 Section “*Painting*”: priming and final field paint finishing.

5. Division 16 Section "*Lighting*"; ceiling lighting fixtures with plaster frames and/or rings for recessing fixtures in gypsum board ceiling systems.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
2. ASTM C36 - Gypsum Wallboard.
3. ASTM C79 - Gypsum Sheathing Board.
4. ASTM C442 - Gypsum Backing Board and Core Board.
5. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
6. ASTM C630 - Water Resistant Gypsum Backing Board.
7. ASTM C635 - Manufacture, Performance, and Testing of Metal Suspension Systems
8. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners(Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
9. ASTM C646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gage Steel Studs.
10. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
11. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
12. ASTM C840 - Application and Finishing of Gypsum Board.
13. ASTM C931 - Exterior Gypsum Soffit Board.
14. ASTM C955 - Load-Bearing (Transverse and Axial) Steel Studs, Runners (track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
15. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.
16. ASTM C1047 - Accessories for Gypsum Wallboard and Gypsum Veneer Base.
17. ASTM C1278 - Fiber Reinforced Gypsum Panels.
18. ASTM E84 - Test method for Surface Burning Characteristics of Building Materials.
19. ASTM E136 - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
20. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
21. ASTM F1267 - Specification for Metal, Expanded, Steel.

B. Gypsum Association (GA):

1. GA-201 – Gypsum Board for Walls and Ceilings.
2. GA-203 – Installation of Screw-Type Steel Framing Members to receive Gypsum Board.
3. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board.
4. GA-600 – Fire Resistance Design Manual.

C. Underwriters Laboratory, Inc. (UL):

1. UL US-22 – Wallboard, Gypsum.
2. UL 40-U18 – Fire Resistance Classification.

D. Steel Structures Painting Council (SSPC):

1. SSPC – Painting Manual.

1.04 QUALITY ASSURANCE

A. To assure compatibility, studs, runner track, clips, etc. shall be the product of the same manufacturer.

B. Comply with the minimum requirements of the following except where more stringent requirements are specified herein. All gypsum wallboard shall be asbestos free.

1. Gypsum Wallboard: ASTM C-36.

2. Joint Treatment: ASTM C-475.

3. Non-load bearing steel studs, runners, and rigid furring channels for screw attachment of gypsum wallboard: ASTM C-645.

C. Perform work in accordance with ASTM C754, ASTM C840, GA-201 and GA-216.

D. Maintain copies of GA-201 and GA-216 documents on site.

E. When fire-resistive construction is detailed or noted on the Contract Drawings, perform work in accordance with GA-600.

1.05 QUALIFICATIONS

A. Erector Qualifications: Company specializing in the erection of metal stud framing and gypsum wallboard systems on at least three (3) acceptable projects equal in scope to work specified.

1.06 SUBMITTALS

A. Shop Drawings, Product Data and Samples: Shall be submitted in accordance with Division 1.

B. Shop Drawings: Indicate all special details associated with fireproofing, acoustical seals, and ceiling and bulkhead framing.

C. Product Data: Provide manufacturer’s descriptive literature on metal framing, gypsum board, joint tape, and installation instructions and procedures.

D. Manufacturer’s verification that gypsum wallboard contains 100% post-consumer and post-industrial recycled content.

E. Manufacturer’s verification that VOC content of interior sealants is less than 250 g/L.

F. Manufacturer’s verification that VOC content of gypsum wallboard adhesive is less than 50 g/L.

G. Manufacturer’s verification that steel studs and framing contain at least 35% combined post-consumer and post-industrial recycled content.

I. Samples:

1. Submit samples for the Architect's approval in accordance with the applicable provisions of the contract documents.

2. Submit three (3) samples of each of the following:

a. Gypsum wallboard: 12" by 12" each type and finish.

b. Trim: 6" lengths of each type and finish.

c. Compound: 1 pint cans.

d. Tape: 12" lengths.

e. Screws and fastenings: Each size and type.

f. Submit shop drawings and engineering calculations for special areas as requested by the Architect.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in unopened, original containers bearing manufacturer's labels. Store materials in a clean, dry, protected place and do not leave exposed to weather. Handle all materials with proper care to prevent damage. Handle and protect all materials and metal accessories from damage, dampness or wetting.

B. Remove all items delivered in broken, damaged, rusted or unlabeled condition from site immediately.

C. Storage:

1. Store all materials inside under cover, providing protection from damage and exposure to the elements, stacked flat, and off-floor.

2. Stack wallboard so that lengths are not over short lengths, avoid overloading floor system.

3. Store adhesives and ready-mixed joint compound in dry area; provide protection against freezing at all times.

4. Damaged, frozen, and deteriorated materials shall be removed from the job site.

1.08 JOB CONDITIONS

A. Environmental Conditions:

1. Temperature: During cold weather, in areas receiving wallboard installation and joint finishing, maintain temperature range between 55 degrees to 70 degrees F (13 degrees C to 21 degrees C) for 24 hours before, during, and after gypsum wallboard and joint treatment applications.

B. Ventilation:

1. Provide adequate ventilation to carry off excess moisture during and following adhesive and joint compound treatment applications.

2. Use temporary air circulators in enclosed areas lacking natural ventilation. Under slow drying conditions, allow additional drying time between coats of joint treatment.

3. Protect installed materials from drafts during hot, dry weather.

4. Protection: Protect adjacent surfaces against damage and stains.

PART 2 - PRODUCTS

2.01 METAL FRAMING MATERIALS

A. Provide metal wall and bulkhead framing materials in accordance with GA 216.

B. Metal Studs - Drywall Type: ASTM C645: non-load bearing, galvanized sheet steel, ASTM A525; Cee-shaped, size as indicated, conforming to the following:

1. Rated/non-rated, non-bearing metal stud partitions with single/double layer drywall: 20 gauge (up to 11 feet-6 inches in height; 18 gauge over 11’-6” in height.

2. Rated/non-rated, load bearing metal stud partition with single/double layer drywall: 20 gauge.

3. Ceiling and Wall Furring Channels: 1-3/8" face x 7/8" deep as manufactured by U.S. Gypsum or approved equal. "Z" furring channels, 26 gauge hot dipped galvanized, 1-1/2" deep as manufactured by U.S. Gypsum or approved equal.

4. Metal stud partitions with gypsum board/cement backerboard and ceramic tile finish: 20 gauge or heavier.

5. Metal stud framing at hollow metal door and light openings: 20 gauge.

6. Metal studs for infill framing at renovation/alteration areas: 25 gauge. Runners: Of same material and thickness as studs, bent leg retainer notched to receive studs.

C. Ceiling Runner: Where required, provide with extended leg retainer. Furring, Bridging and Bracing: Of same material as studs; thickness to suit purpose. Sheet Metal Backing: 20 gauge thickness, galvanized steel.

D. Fasteners: GA-216.

E. Touch-Up Primer for Galvanized Surfaces: SSPC SP 20, zinc rich.

F. Anchorage to Substrate: Tie wire, screws, nails and other metal

supports, of type and size to suit application; to rigidly secure materials in place.

2.02 CEILING FRAMING

A. Channels: Fabricated of 16 gauge (1.5 mm) cold-rolled steel, factory applied black asphaltum rust-resistant paint. Minimum weight per 1,000 lineal feet:

1. Depth: 2 inches, 590 lbs.
2. Depth: 1 1/2-inches, 300 lbs.

B. Furring Channels: Screw-type, hat-shaped, 25 gauge (0.5 mm)

C. Optional Framing: Metal stud, ASTM C645 and GA 216, galvanized sheet steel, screw-type, Cee-shaped, minimum 25 gauge.

D. Ceiling Hangers: Minimum 8 gauge, galvanized, annealed steel wire.

E. Tie Wire: 16 gauge, galvanized, annealed steel wire.

F. Anchorage to Substrate: Tie wire, screws, nails and other metal supports, of type and size to suit application; to rigidly secure materials in place.

2.03 SUSPENDED GYPSUM BOARD CEILING GRID SYSTEM

A. Type: Tee grid, ASTM C635.

1. Structural Classification: Heavy-duty system.

2. Main and Cross Members:

a. Web Design: Double-web construction, 1 1/2-inches high with rectangular top bulb.

b. Material: Cold-rolled steel, minimum .0179” thickness prior to protective coating, hot-dipped galvanized, minimum G40 per ASTM C645.

c. Flange: 1 1/2-inch (38mm) width, knurled flange.

d. When fire rated ceilings are required, main beams shall be formed to include integral design for expansion relief.

3. Design: Designed specifically for suspended drywall ceiling systems as manufactured by *Armstrong, USG, Chicago Metallic,* or equal.

2.04 MANUFACTURERS – GYPSUM BOARD

A. Subject to compliance with requirements, provide products by one of the following:

1. United States Gypsum Co. (USG)

2. *Gold Bond Building Products*

3. *Lafarge*

4. *Georgia-Pacific Co.*

2.05 GYPSUM BOARD MATERIALS

A. Provide 5/8″ thick *Firecode* Core *Sheetrock* brand ***Mold Tough AR*** gypsum wallboard panels, as manufactured by United States Gypsum Company, conforming to ASTM C-1396. Per ASTM E136, all panels shall have a noncombustible gypsum core. Similar manufacturers shall be: Georgia Pacific, National Pacific, or approved equal. Sheetrock Mold Tough AR panels are designed and tested to offer greater resistance to surface indentation and impact damage than standard gypsum wallboard materials. All panels shall have a non-combustible, moisture- and mold-resistant, 100-percent recycled green face and brown back papers. The face paper is folded around the long edges to reinforce and protect the core, and the ends shall be square cut and finished smooth. Long edges of panels are tapered, allowing joints to be reinforced and concealed with joint compound. The paragraphs below identify specific characteristics of gypsum wallboard materials; actual types of material to be used shall be as indicated or noted on Contract Drawings.

1. Surface Burning Characteristics: When listed in accordance with ASTM E 84 requirements.

   a. Flame Spread Index: 15 maximum.

   b. Smoke Development: 5 maximum.

B. UL Classification: This product is classified by UL as to fire resistance, and meets the requirement for Type X in the model building code.

C. Product Details:

1. Thickness: 5/8-inch (16 mm) thickness unless otherwise indicated; 2.8 lbs./sf.

2. Width: 4 feet.

3. Length: 8 feet through 12 feet; use maximum permissible length.

4. Edges: Tapered long edges and square cut ends.

5. Labeling: Each 5/8″ *Firecode* Core panel shall bear the Underwriter's Laboratories, Inc. mark as evidence of UL Classifications for fire resistance, surface burning characteristics and non-combustibility.

D. Limitations:

1. Do not expose to sustained temperatures exceeding 125^{0}F.

2. Do not expose to excessive, repetitive or continuous moisture before, during or after installation. Eliminate sources of moisture immediately.

3. Not suitable for use in high-moisture areas such as tub and shower enclosures, gang showers and other areas subject to direct water exposure.

4. Non-loadbearing.

5. For abuse-resistant construction over steel framing, minimum 20-gauge studs at a maximum of 16″ on center are required.

6. Application of Sheetrock Mold Tough AR gypsum panels over insulating blanket, installed continuously across the framing members is not recommended. Blankets should be recessed and blanket flanges attached to sides of studs or joists.

E. Finishing and Decorating:

1. Painting products and systems should be used that comply with recommendations and requirements in Appendices of ASTM C-840. For priming and decorating with paint, texture or wall covering, follow those manufacturer's directions for materials used.

2. All surfaces, including applied joint compound, must be thoroughly dry, dust-free and not glossy. Prime with *Sheetrock* brand First Coat primer, or with an undiluted, interior latex flat paint with high-solids content. Allow to dry thoroughly before decorating.

3. To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (eggshell, semi-gloss or gloss), the gypsum panel surface should be skim-coated with joint compound. This equalizes suction and texture differences between the drywall face paper and the finished joint compound before painting. As an alternative to skim coating, or when a Level 5 finish is required, use manufacturer's *Tuff Hide* primer-surfacer.

G. Moisture and Mold Resistance:

1. Per ASTM C473, the average water absorption for panels is not greater than five percent (5%) by weight after a two-hour immersion.

2. In independent lab tests conducted on 5/8″ *Sheetrock Mold Tough AR* panels at the time of manufacture per ASTM D3272, *"Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"*, the panel score was 10.

3. This ASTM lab test may not accurately represent the mold performance of building materials in actual use. Given unsuitable project conditions during storage, installation, or after completion, any building material can be overwhelmed by mold. To manage the growth of mold, the best and most cost-effective strategy is to protect building products from water exposure during storage and installation and after completion of the building. This can be accomplished b y utilizing good design and construction practices; the Contractor is fully and solely responsible for protection of all materials, and replacement of all damaged materials at his own cost.

H. Abuse Resistance:

4. Surface Abrasion: Tested in accordance with ASTM C1629, Level 2.

5. Surface Indentation: Tested in accordance with ASTM C1629, Level 2.

6. Soft Body Impact Test: Tested in accordance with ASTM C1629, Level 1.

I. Fire Protection:

1. 5/8″ panels are UL Classified. Provide one- and two-hour Fire Ratings when used in accordance with UL designs U420, U442, U445, U451, U465, U466, U467 and U468. The gypsum core meets requirements for noncombustible construction.

J. ***Hi-Impact 2000 Gypsum Board*** (Regular and Type X): Gypsum core encased in heavy natural-finish paper on face side, and strong liner paper on the back side. Lexan film is bonded to back side to provide additional impact/penetration resistance. Long edges to be tapered to allow joints to be reinforced and concealed, conforming with ASTM C-36; and Fed. Spec. SS-L-30D.

1. Thickness: 5/8-inch thickness unless otherwise indicated.

2. Width: 4 feet.

3. Length: 8 feet; use maximum permissible length.

4. Edges: Tapered long edges and square cut ends.

2.06 GYPSUM BOARD ACCESSORIES

A. Provide gypsum wallboard accessories in accordance with GA 216.

B. Each interior sealant and adhesive product must meet the VOC limits specified in Section 01352 "*LEED Requirements*".

C. Fasteners: Screws ASTM C1002, self-drilling, self-tapping, Bugle Head, for use with power driven tool.

1. Type "S": for wallboard application to sheet metal framing

2. Type "W": for wallboard application to wood framing.

3. Length:

a. 1 inch (25 mm) for single layer construction.

b. 1 5/8-inches (41 mm) for double layer construction.

4. For Fire Rated Construction: Same type and size as used in fire rating test.

5. For Other Applications: Type and size as recommended by gypsum board manufacturer.

D. Metal Trim Accessories: Size required for thickness of wallboard used, fabricated from galvanized steel and roll-formed zinc, or other corrosion-resistant treatment. All metal trim shall be 25 gauge, manufactured by *U.S. Gypsum* under the following numbers or approved equal:

1. Corner Beads: Formed galvanized steel angle, 1/8-inch round bead, 1-1/4-inch perforated metal flanges, ASTM C1047, similar or equal

to *“Dura-Bead”*.

2. Edge Trim: Formed galvanized steel casing bead, 0.014-inch thick base steel, face nailed, reveal bead and exposed metal flange surface finished with joint compound, ASTM C1047.

3. Control Joints: Manufacturer's standard roll-formed zinc with 1/4-inch; “V”-shaped slot protected by plastic tape, for face application, exposed flange surfaces finished with joint compound, ASTM C1047; similar or equal to No. 093.

4. Casings: No. 400.

5. Wall to Wall (corner) Expansion Joints: *Wabo ECC-200* corner coverplate, aluminum alloy 6063-TS or 6061-T6, mill finish. Paint as per Section 09900.

E. Joint Treatment Materials:

1. Joint Tape: ASTM C475; paper reinforcing tape, perforated.

2. Joint Compound: ASTM C475; drying type pre-mixed vinyl base compounds, as manufactured by the approved manufacturer of the gypsum board.

3. Laminating Adhesive: Manufacturer’s recommended laminating adhesive or liquid contact adhesive for double-layer systems.

F. Adhesive: Similar or equal to USG Durabond 90.

G. Adhesive VOC content must be less than 50 g/L.

H. Special Architectural Metal Drywall Profiles: Furnish and install, where indicated on Contract Drawings, extruded and roll-formed Architectural profiles *"Softforms"* as manufactured by *Pitcon Industries, Inc.*, Riverdale, MD. Subject to compliance with requirements, provide the named product or a comparable product.

1. Designs:

a. Corners: Custom Inside Corner, *Model #SI-LRt*, 6-inch inside radius by 90 degrees.

b. Reveals: Wall Reveal, Model #SWR-200-050, 2-inch wide by 15/32-inch deep.

c. Grooves: V-Groove, Model #SWR-100V-050, 1-inch wide by 45 degrees.

2. Material: Extrusions shall be of 6063 T5 aluminum alloy, and roll formed shapes shall be of 3003 H-14 aluminum alloy.

3. Construction: Profile shall incorporate continuous integral tapering fins for surface contact, 7/8-inch wide. Fins shall be punched with ¼-inch holes staggered ½-inch o.c. to accept standard screw fastening.

4. Finish: Profiles shall receive a factory-applied, high

porosity, corrosion-resistant primer compatible with materials commonly in use in conjunction with commercial interiors, i.e. – joint compound, latex or enamel paints, and wall covering adhesives.

2.07 ACOUSTICAL ACCESSORIES

A. Sound Attenuation Fire Blankets:

1. Manufactured from slag wool fiber.

2. Unfaced batts in manufacturers' standard thickness to fit cavity in compliance with manufacturers Sound and Fire-Rated SAFB Assemblies.

3. Length: 48 inches.

4. Batts shall have a density of 2.5 lbs. per cu.ft.

5. R-Value, per 1-inch thickness: 3.7.

6. Flame Spread and Smoke Developed (ASTM E84, Surface Burning Characteristics): 0.

B. Basis-of-Design Product: The design for Slag Wool Fiber is based on *USG Thermafiber, Sound Attenuation Fire Blankets* (SAFB). Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. *Owens Corning*.
2. *Fibrex Insulations, Inc*.

C. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board; type as recommended by gypsum manufacturer.

PART 3- EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on Contract Drawings and approved shop drawings.

3.02 METAL STUD INSTALLATION - GENERAL

A. Install metal stud framing in accordance with manufacturer's instructions, and ASTM C754, except as otherwise specified herein.

B. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8-inch in 10 feet in any direction.

C. Align all partitions accurately according to layout. Runners shall be attached to concrete slab or other type of floor 24 inches on center with concrete stub nails or power-driven anchors, to suspended ceilings with toggle bolts, or to slab above where indicated.

D. Position studs vertically in runners, spaced 16 inches on center maximum.

E. Anchor all studs adjacent to door frames and at partition intersections and corners, to runner flanges with metal lock fasteners, or positive screw engagement through each stud and runner flange.

F. When necessary, studs shall be spliced by nesting 2 studs with a minimum lap of 8 inches, attaching flanges with 2 screws per flange.

G. Provide horizontal bracing of studs at mid-point in partition height. Bracing shall be standard metal stud cut to fit and secured to studs.

H. Metal studs at door frames shall be erected 2" maximum from frames and as follows:

1. Anchor door frame clips to studs securely by bolt or screw attachment.

2. Doors 2'-6" and wider shall be framed with double studs, placed back to back.

3. Over door frames, install a section (cut to length) of runner with slip flanges and bent web to allow flanges to overlap adjacent vertical studs; screw attach all components.

4. Position a stud at the locations of vertical joints in wallboard over door frames. Stud shall extend from frame header to the ceiling runner.

I. Unless otherwise indicated or specified, the suspension system for gypsum board ceilings and soffits shall consist of runner channels and furring channels, suspended by hanger bars or hanger rods.

3.03 INSTALLATION OF FLOOR AND CEILING TRACKS

A. Align floor and ceiling tracks.

B. Attach metal runners at floor and ceiling to structural elements with appropriate power-driven fasteners.

C. Attach tracks to structure with fasteners located 2 inches from each end and spaced at a maximum of 24 inches on center.

D. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.

3.04 INSTALLATION OF METAL STUD

A. Plumb and align studs.

B. Space studs at 16 inches on center, unless otherwise indicated.

C. Attach studs to floor and ceiling tracks by crimping flange of

runner track, screwing, tack welding or method as recommended by stud manufacturer.

D. If necessary, splice studs by nesting with minimum lap of 8 inches.

E. Refer to Contract Drawings for indication of partitions extending to finished ceiling only, and for partitions extending through the ceiling to the structure above.

3.04 INSTALLATION OF FRAMING AROUND DOORS AND LIGHT OPENINGS

A. Install double studs at each jamb of door, continuous for full height of partition.

B. Attach stud track horizontally on each side of opening, at frame head height.

1. Install jack studs at 16 inches on centers over head of door frame.

2. Attach jack studs to runner track and anchor top in same manner as provided for full studs.

3. Screw, bolt or weld stud to jamb anchors of frame, as recommended by stud manufacturer.

4. Anchor a second stud to stud at doorjamb, as recommended in manufacturer's printed instructions, nested to form a box.

5. Provide headers above and below framed wall openings having an area of 2 square feet or more.

3.05 CORNERS AND INTERSECTIONS

A. Form corners and intersection of partitions with three studs as detailed in ASTM C754, Fig. 2 and Fig.3, as detailed on drawings. Two stud corner construction is not acceptable.

B. Place studs forming internal corners 2 inches (50 mm) from point of partition intersections.

3.06 BLOCKING

A. Bolt or screw steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and other similar items.

3.07 INSTALLATION – WALL FURRING

A. Attach wall furring for direct attachment to concrete block and/or concrete walls.

B. Erect furring channels horizontally or vertically; space maximum 16" (400 mm) on center, not more than 4 inches (100 mm) from floor and ceiling lines or abutting walls. Secure in place on alternate channel flanges at maximum 24" on center.

C. Where furring channels are installed directly to exterior walls and a possibility of moisture penetration through walls exists, install asphalt felt paper protection strip between the channel and wall.

3.08 INSTALLATION – CEILING FRAMING

A. Space 8 gauge hanger wire 48" on centers along carrying channels and within 6" of ends of channel run.

B. Install carrying channels 48" on centers and within 6" of walls.

C. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel.

D. Interlock flanges, at channel splices, and overlap ends 12" and secure each end with double-strand 18 gauge tie wire.

E. Erect metal furring channels at right angles to carrying channels or support members. Space furring channels 16″ o.c. and within 6" of walls.

F. Secure furring to carrying channels with clips or saddle-tie with double-strand 16 gauge tie wire.

G. Nest furring channels at least 8" at splices, and securely wire-tie each end with double-strand 18 gauge tie wire.

3.09 INSTALLATION – SUSPENDED CEILING GRID SYSTEM

A. Install fire rated ceiling system(s), when indicated, in accordance with applicable UL Design requirements.

B. Install in accordance with ASTM C636 and manufacturer's recommendations to produce finished ceiling true to lines and levels and free from warped, soiled or damaged grid.

C. Install ceiling system(s) in a manner capable of supporting all superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8″ in 12 ft.

D. Rough Suspension:

1. Hanger Clips on Inserts: Install as recommended by manufacturer.
2. Hanger Wire: Space 4 ft. on center, each direction.
3. Do not splay wires more than 5″ in a 4 ft. vertical drop.
4. Wrap wire a minimum of three times horizontally, turning ends upward.
5. Saddle tie carrying channels to main structure for indirect hung suspension system, as appropriate.
6. Provide extra wire hangers at light fixtures, grilles, access doors as required.

E. Main and Cross Runners:

1. Space main runners at 4 ft. on center, in direction of lighting pattern.

a. At right angle to carrying channel, wire clip to channels at intersections, if indirect suspension is required.

b. Level and square to adjacent walls.

2. Space cross runners at 2 ft. on center.

3. Suspend grid system(s) independently of walls, columns, ducts, lighting fixtures, pipes and conduit.

F. Channel Molding:

1. Install wall channel molding at intersection of suspended drywall ceilings and vertical surfaces.

2. Attach vertical surface to wall with mechanical fasteners, using maximum lengths; straight, true-to-line, and level.

3.10 FURRING FOR FIRE RATINGS

A. Install furring for fire resistance ratings in accordance with appropriate UL requirements and/or Design Numbers indicated.

3.11 INSPECTION PRIOR TO WALLBOARD INSTALLATION

A. Check framing for adequate spacing and alignment.

B. Verify that spacing of installed framing does not exceed maximum allowable for thickness of wallboard to be used.

C. Verify that frames are set for thickness of wallboard to be used.

D. Do not proceed with installation of wallboard until deficiencies are corrected and surface to receive wallboard are acceptable.

E. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of wallboard is started.

F. Commencing installation of wallboard means “acceptance” of existing conditions.

3.12 WALLBOARD INSTALLATION - GENERAL

A. Unless otherwise specified, methods of installation shall be in accordance with the requirements of the Gypsum Association (GA-201, GA-216) and the approved manufacturer’s instructions..

B. Stockpile wallboard, flat on floor in piles. Leave in original wrappings or containers until ready for use. Protect wallboard

from moisture from any source.

C. Butt all wallboard joints loosely together with a 1/4" cap. Butt ends shall not be placed against tapered edges.

D. Install in maximum practical lengths to span walls without butt joints. If butt joints do occur, stagger joints and locate as far as possible from center of walls or ceilings.

E. Abut wallboard without forcing. Neatly fit ends and edges of wallboard. Do not place butt ends against tapered edges.

F. Support end joints on studs. Apply end joint compound to the back of the board along end joints.

G. No end joints shall align with edges of openings. Install expansion and/or control joints where shown or required.

H. Install metal trim at corners, edges, and elsewhere as shown in accordance with the manufacturer's instructions and recommendations.

I. Openings cut in wallboard to fit mechanical and electrical items shall fit snugly and be small enough to be covered by escutcheons and plates. Both face and back paper shall be cut when cutouts are not made with a saw.

J. Adhesive and joint finishing compounds shall be mixed in strict accordance with the manufacturer's instructions. Mix only enough at one time to be used during the recommended pot life of the compound.

K. Fasteners shall be installed as follows:

1. Install no closer than 3/8-inch to end or edge.

2. Begin from center of wallboard and proceed to outer edge.

3. Pressure shall be applied on wallboard adjacent to fasteners being driven to ensure a tight fit of wallboard to the studs.

L. Drive screws with a power screw driver as recommended by the manufacturer. Surface of head shall finish below the surface of the paper without puncturing the paper.

M. Minimum temperature in areas where gypsum board is to be installed shall be 65°F for 24 hours before, during, and after installation. Provide adequate heat and ventilation to remove any moisture.

N. Install continuous sound absorbing blanket in partitions indicated on drawings. Installation shall be in accordance with manufacturer's directions. Sound absorbing blanket insulation shall be paperless, semi-rigid mineral fiber batts 1" thick "Thermafiber" sound attenuation blanket, flame spread rating of 15 (ASTM E-84) as manufactured by U.S. Gypsum or approved equal.

3.13 INSTALLATION - WALLBOARD OVER FRAMING

A. Single Layer Construction:

1. Ceilings:

a. Gypsum wallboard shall be applied first to ceiling with long dimension at right angles to framing using panels of maximum practical length.

b. Position end joints over framing members and stagger in adjacent rows.

c. Fit ends and edges closely, do not force together. Fasten panels to furring with mechanical fasteners, spaced 12″ o.c., in field of panels and along abutting ends and edges.

2. Walls:

a. Apply wallboard horizontally for wall height of 8′-0″ or less, and vertically for wall height greater than 8′-0″. When installing wallboard horizontally, attach upper panel first.

b. Apply single layer fire rated wallboard vertically, with edges occurring over firm bearing.

c. Stagger end joints to occur on different framing members on opposite sides of partition.

3. Mechanical Fastening:

a. Screws:

1) Attach single layer of wallboard to metal framing with power driven screws.

2) Minimum edge clearance from mechanical fastener: 3/8″.

3) Stagger mechanical fasteners opposite each other on adjacent ends and edges.

4) Sand abutting ends or edges over support surface.

5) Space screws 16″ o.c. when framing is spaced 16″ o.c., or 12″ o.c. when framing is spaced 24″ o.c.

6) Drive screws with a positive clutch electric screwgun.

B. Double Layer Construction:

1. Ceilings:

a. Apply wallboard face layer perpendicular to edges of base

layer.

b. Position end joints of face layer to offset base layer joints by at least 10”.

c. Gypsum wallboard shall be installed in such a manner to provide two-hour fire resistant rating shown, when indicated, and in accordance with requirements of UL.

2. Walls:

a. Apply wallboard base layer vertically.

b. Stagger vertical joints of base layer on opposite side of partition to occur on different framing members.

c. Apply face layer horizontally, minimum offset of joints between face layer and face layer shall be at least 10".

d. Gypsum wallboard shall be installed in such manner to provide two hour fire resistant ratings indicated, and in accordance with requirements of UL.

3. Adhesive Lamination:

a. Apply adhesive with notched spreader or caulking gun, as recommended by wallboard manufacturer, for this particular application and job condition.

4. Permanent Attachment:

a. Permanently attach face layer with specified fasteners in accordance with UL requirements for systems selected.

3.14 CONTROL JOINTS

A. Non-Rated Gypsum Construction: Gypsum panel surfaces shall be isolated with control joints or other means, as detailed and at locations indicated on the drawings, if not shown, where:

1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;
2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration;
3. Construction changes within plane of partition or ceiling;
4. Partition or furring run exceeds 30 ft.;
5. Ceiling dimensions exceed 50 ft. in either direction with perimeter relief, 30 ft. without relief;
6. Exterior soffits exceed 30' in either direction;
7. Wings of “L”, “U” and “T” shaped ceiling areas are joined;
8. Expansion or control joints occur in the exterior wall.
9. Less-than-ceiling height door/light frames shall have control joints extending to the ceiling from both opening corners. Ceiling height doorframes may be used as control joints.

B. Fire-Rated Gypsum Construction: Gypsum panel surfaces shall be

isolated with control joints or other means, as detailed and at locations indicated on the drawings, if not shown, where:

1. A partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.

2. Where a wall or partition runs in an uninterrupted straight plane exceeding 30 lineal feet. NOTE: Full height door frames may be considered a control joint.

3. Interior Ceilings With Perimeter Relief: Control joints shall be installed so that linear dimensions between control joints shall not exceed 50 ft. and total areas between control joint shall not exceed 2500 sq.ft.

4. Interior Ceilings Without Perimeter Relief: Control joints shall be installed so that linear dimensions between control joints shall not exceed 30 ft. and total areas between control joint shall not exceed 900 sq.ft.

5. Exterior Ceilings and Soffits: Control joints shall be installed so that linear dimensions between control joints shall not exceed 30 ft. and total area between control joints shall not exceed 900 sq.ft.

6. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

7. A control joint is desired or incorporated as a design accent or Architectural feature.

3.15 INSTALLATION – ACOUSTICAL ACCESSORIES

A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.

B. Apply acoustical sealant within partitions in accordance with manufacturer's instructions and recommended procedures.

3.16 INSTALLATION – METAL ACCESSORIES

A. Install corner beads and edge trim as specified in ASTM C840.

B. Install corner beads at all external corners.

C. Install edge trim at perimeter of openings and at juncture with other materials except, where covered by casings or flanges.

3.17 JOINT TREATMENT SYSTEM

A. Execute joint treatment in accordance with the manufacturer's printed instructions and these specifications.

B. Reinforce wall corners and angles with tape folded to conform to the contour and embed in compound.

C. Flanges of corner beads and trim shall be concealed by 2 coats of compound. Feather cut compound 9 inches from beads.

D. Sand compound when thoroughly dry; avoid roughing surfaces of finish wallboard.

E. Leave all surfaces smooth and uniform, ready to receive paint.

F. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840.

1. Level 4.

G. Taping and Finishing Joints:

1. Taping and Embedding Joints:

a. Apply compound in thin uniform layers to all joints and angles to be reinforced.
b. Apply reinforcing tape immediately.
c. Center tape over joint, and seat tape into compound.
d. Leave approx. 1/64" to 1/32" compound under tape to provide bond.
e. Apply skim coat immediately following tape embedment, but not to function as fill or second coat.
f. Fold tape and embed in at inside corners to provide true angle.
g. Allow embedding coat to thoroughly dry prior to application of fill coat.

2. Filling:

a. Apply second coat of joint compound over embedding coat.
b. Fill taper flush with surface.
c. Apply fill coat to cover embedding coat.
d. Feather out fill coat beyond embedding coat and previous joint compound line.
e. Joints with no taper: Feather out at least 4″ on either side of tape.
f. Do not apply fill coat on interior angles.
g. Allow fill coat to thoroughly dry prior to application of finish coat.

3. Finishing:

a. Spread joint compound evenly over and beyond fill coat on all joints.
b. Feather coats onto adjoining surfaces so that camber is maximum 1/32″ to 1/16″., and to a smooth, uniform finish.
c. Apply finish coat to taped inside angles to cover tape and taping compound.
d. Sand final application of compound to provide a smooth

surface, ready for decoration.

G. Filling and Finishing Depressions:

1. Apply joint compound as first coat to fastener and other depressions.
2. Apply at least two additional coats of compound after first coat is dry.
3. Leave filled and finished depressions level with plane of surface.

H. Finish Beads and Trim:

1. First Fill Coat:

a. Apply joint compound to beam and trim.
b. Feather out first coat from ground to plane of wallboard surface.
c. Allow compound to thoroughly dry prior to application of second fill coat.

2. Second Fill Coat:

a. Apply joint compound in same manner as first coat.
b. Extend beyond first coat onto face of wallboard.
c. Allow compound to thoroughly dry prior to application of finish coat.

3. Finish Coat:

a. Apply joint compound in same manner as second coat.
b. Extend beyond second fill coat.
c. Feather out finish coat from ground to plane of wallboard surface.
d. Sand finish coat to provide a flat surface ready for decoration.

4. Taping, filling and sanding is not required at surfaces behind adhesive applied ceramic tile.

3.18 AIRTIGHT DRYWALL OR RETURN AIR PLENUM SPACES

A. Finish all drywall plenum construction below access floor or above finished ceiling.

1. Finish Level: Level 1.

a. Seal all pipes, ducts, conduit and other penetrations.
b. Seal perimeter of all drywall to floors and deck above with sealant.

3.19 INSTALLATION OF ACCESS PANELS

A. Install metal access panels and rigidly secure in place, as required by other sections and other trades.

B. Install in accordance with manufacturer's printed instructions and requirements of regulatory agencies, when applicable.

C. Coordinate the installation of rough bucks, anchors, blocking, mechanical and electrical work which is to be placed in or behind wall framing and ceiling furring. Allow such items to be installed after framing and furring is complete.

3.20 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8″ in 10 feet, in any direction.

3.21 PATCHING AND REPAIRING

A. After trim is applied, correct all surface damage and defects as required, to the Architect's satisfaction, so that blemishes will not show through the decoration.

B. If, in the opinion of the Architect, the wallboard is irreparable, the Contractor shall remove same and replace it with new material at no extra cost to the Owner.

C. Punctures:

1. When face paper is punctured, drive new nail approximately 1 1/2" from defective fastening and remove defective fastener.

2. Fill all damaged surface areas with compound.

3. Leave clear depression to receive tape.

4. Permit prefill joint compound to harden prior to application of tape.

D. Ridging:

1. Do not repair ridging until condition has fully developed; approximately six months after installation of one heating season.

2. Sand ridges to receive reinforcing tape without cutting through tape.

3. Fill concave areas on both sides of ridge with topping compound.

4. After fill is dry, blend in topping compound over repaired areas.

E. Cracks:

1. Fill all cracks with compound, and finish smooth and flush.

3.22 INSPECTION

A. Wall surface, when prepared for painting, shall be inspected and approved by the Architect before proceeding further.

END OF SECTION

DIVISION 9 – FINISHES

Section 09300 – CERAMIC TILE

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, equipment and services and perform all operations required to complete the installation of all work of this Section and related work as indicated on the drawings and specified herein, including, but not limited to, the following:

1. Ceramic tile floors, bases, and walls in rooms and spaces indicated on Finish Schedule on drawings.

2. Grouting and cleaning all tile work under this section.

3. Cutting, fitting and drilling.

4. Protection and replacement.

5. Additional materials.

6. Caulk joints to match grout at floor, inside corners, and at door frames.

7. Sealer for gypsum board to receive tile.

8. Marble saddles.

1.02 RELATED WORK

A. Related work specified under other sections of the specifications:

1. Section 07900 – Joint Sealers

2. Section 10800 – Toilet Accessories

1.03 CONTRACT DOCUMENTS

A. Applicable provisions of the “Conditions of the Contract” shall govern all work under this Section.

1.04 QUALITY ASSURANCE

A. All ceramic tile shall be Standard Grade, of domestic manufacture, and shall conform to ANSI A137.1.

B. Thin-set mortar shall conform to ANSI 118.1.

C. Installation Specifications: 1990 Handbook for Installation by the Tile Council of America.

1.05 SUBMITTALS

A. Samples:

1. The Contractor shall, before placing order for tile, submit to the Architect for approval a complete and full set of all tiles, representative of the different sizes, shapes, colors, textures, and finish to be used in the work.

2. Each sample shall be labeled stating the grade.

B. Before proceeding with the tile work, the Contractor shall furnish the Architect with a certificate of Grade (signed by both tile manufacturer and subcontractor) in form adopted by the Tile Manufacturer's Association, Inc., stating the grade, type of tile, identification marks for tile containers, and the name and location of the project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in unopened, original containers bearing manufacturer's labels. Store materials in a clean, dry, protected place and do not leave exposed to the weather. Take all precautions to prevent intrusion of foreign matter. Handle all materials with proper care to prevent damage of any kind.

B. Delivered materials shall match approved samples in all respects.

C. Tile containers shall be branded with, or have sealed within, the shipping mark and other designations corresponding with the information given on the master grade certificate.

1.07 JOB CONDITIONS

A. Tile work shall not be installed in freezing or near freezing weather.

1.08 GUARANTEE

A. The Contractor shall guarantee in writing to the Architect that his work will remain in place without coming loose or cracking, whatever the cause or other defects due to faults of materials or workmanship or method of setting for a period of one year after the acceptance of the building by the Owner, and that he will, within time, upon notification in writing, immediately replace any defective work or materials and restore all damage to adjoining work caused thereby at his own expense and without cost to the Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Ceramic tile and base shall be as manufactured by American-Olean Company or approved equal.

B. Other acceptable manufacturers: Manarch Tile Manufacturers, Inc., Sparta Ceramic Company, DalTile Corporation, or approved equal.

C. Ceramic tile for walls, wainscots, and base shall be non-vitreous, dust pressed, 1-1/4″ x 4-1/4″ thick or of size to match existing with sanitary cove and bullnose top as required.

D. Ceramic mosaic tiles for floor shall be dust pressed, porcelain type, cushion edge, 1″ x 1″ x ¼″ thick, unless otherwise shown or to match existing, mounted on sheets approximately 2′-0″ square.

E. Color and Pattern: Unless otherwise specified, colors shall be as selected by the Architect. Patterns for walls, wainscots, base, and floors shall match existing where appropriate or as shown on the Finish Floor Plans and Interior Wall Elevations or to include a minimum of two and/or three colors in a pattern as determined by the Architect. In the event that the Finish Floor Plans and Interior Wall Elevations in part of in their entirety are not provided herein, 30 percent of the total amount of all ceramic tile to be provided shall be of American Olean Price Group 6 or better, and the balance of 70 percent of the total amount of all ceramic tile shall be of American Olean Price Group 4 or equal in color mix as stated above.

F. Floor tile shall be non-slip with a coefficient of friction of 0.05.

G. All mortar mixtures for tile work shall be as recommended by the Tile Council of America and the American National Standards Institute, Inc.

H. Caulking and expansion joints – one part silicone rubber.

I. Marble saddles shall be Alabama White, Class “B” or better, polished.

2.02 ADDITIONAL MATERIAL

A. Provide one box of tile used and store them where directed by the Owner.

PART 3 – EXECUTION

3.01 INSPECTION

A. Before proceeding with any tiling work, make sure that all sleeves and flashing for various pipes have been installed and that pipes have been run and tested; that conduits which are to be covered are in position and have been approved; and that the locations of all other work required by other trades to be set in the walls or floors are their correct locations, height, or projections. Immediately report any errors or discrepancies to the Architect.

B. Spaces in which tile is to be set shall be closed to traffic and other work. Spaces shall remain closed until tile is firmly set. Protect tile from damage until work is accepted by the Architect.

3.02 WORKMANSHIP

A. Internal angles shall be butted and external angles shall be bullnosed using integral combination tile.

B. At door trim, the tile of all base members shall be bullnosed back to the trim with integral combination tile. No block angles will be allowed.

C. Tile shall extend into all recesses and recess openings, shall return around jambs or trimmed openings, and shall form curbs where required.

D. All base tile required in any room shall be set before work on the floor is started. The tiles shall be brought to true lines and levels and with joints flush. Base shall stop tile at opening flush with trim.

E. Installation of tile work shall be performed in manner conforming with the best current practice in the industry.

3.03 SETTING

A. Thin-set bed for floor tile shall be in conformance with ANSI 108.5. Surfaces shall be clean, smooth, and level.

B. All tile shall be set in strict accordance with the recommendations of the approved tile manufacturers, the Tile Council of America, Inc., and the American National Standards Institute, Inc.

3.04 INSTALLATION

A. General:

1. Press individual tile onto setting bed using extreme care to maintain accurate joint alignment and spacing.

2. Tile work shall be laid out in such manner to avoid excessive cutting. No cuts smaller than one-half size shall be made. All areas of tile shall be centered and balances. All cuts shall be made on the outer edge of the field.

3. Smooth all cut edges with a carborundum stone, and install no tile with jagged or flaked edges.

4. Fit tile closely where edges will be covered by trim, escutcheons, or other similar devices.

5. The splitting of tile is expressly prohibited.

6. Make corners of all tile flush and level with corners of adjacent tile, with due allowance to warpage tolerances.

7. Keep all joint lines straight and of even width, including miters. All joints shall be uniform, not more than ¼".

8. Finish floor areas level and plumb with 1/8″ of true plan in 8 feet.

9. The finished tile work shall be clean and free of tiles that are pitted, chipped, cracked or scratched.

B. Recommended Installation Standards (as per Tile Council of America):

1. Floors:

a. Concrete Subfloor:

F112-90 – Cement Mortar, Bonded
F113-90 – Dry-Set Mortar or Latex-Portland
F122-90 – Thin-Set (on waterproof membrane)

2. Walls:

a. Interior Walls (Solid Backing):

W222-90 – One Coat Method
W242-90 – Gypsum Board, Organic Adhesive

3.05 CUTTING, FITTING, AND DRILLING

A. Do all necessary cutting, fitting, etc. of tile work wherever required in connection with this work as may be necessary to overcome an inaccuracies and to make the materials properly fit and conform to the conditions of the building, and as may be required for other mechanics in connection with their work, and to finish up after them, all in a neat and accurate manner as approved.

B. All intersections and returns shall be neatly formed. All cutting and drilling shall be neatly done without marring the surfaces. Around outlets, piping, fittings or fixtures, etc., the tile shall be fitted close so that the usual plates, collars, or coverings shall overlap the tile.

3.06 GROUTING AND CLEANING

A. As soon as the setting beds have sufficiently set, tile, and floors shall be thoroughly cleaned of all dirt, mortar, and foreign matter by washing and scrubbing with clean water and then all joints in quarry tile shall be grouted with gray Portland Cement and fine white sand mixed with clean water, forced into joints and finished flush and true. All traces of cement shall be wiped for the surface of tile before hardening. Grout materials shall conform to ANSI 118.1.

B. The floor tile grout shall be spread uniformly over the floor and thoroughly worked into the joints, filling them solidly. After grouting has been completed, all surplus grout shall be removed and the floors left clean.

C. Grout shall be colored by the addition of approved mineral coloring pigment where directed by the Architect.

D. Grout for tile shall be mixed with an integral waterproofing compound.

E. The use of acid solutions is prohibited. Any tile work and other work damaged by the use of a strong cleaning agent shall be replaced at the Contractor’s expense.

F. All work of other Contractors, which may have become soiled during the operation of any of the work covered under this Contract, shall be properly cleaned off without damage to such work and left in a clean, neat, and perfect condition, as approved by the Architect.

3.07 PROTECTION AND REPLACEMENT

A. All tile work shall be adequately protected by approved means and all finished tiled areas shall be closed to all traffic or work by an approved barrier. Protection and barrier shall be removed when directed without causing any damage.

B. Protect all work of other trades and contracts from damage caused by work under this section and make good all such damage to the satisfaction of the Architect and without cost to the Owner.

C. Any work of other trades damaged or injured by the removing of any rejected work and the setting on new work or by a trimming, cutting, fitting, drilling, etc., or by cleaning or other cause shall be made at the Contractor’s expense.

D. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended. All methods and materials to be per tile manufacturer’s recommendations.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09510 - ACOUSTIC CEILING SYSTEMS

(2X4 or 2X2 SUSPENDED TILE)

PART 1 - GENERAL

1.01 DESCRIPTION

A. Ceiling Types:

1. The extent of each type of acoustic ceiling is shown on the drawings and in schedules.

2. The types of acoustic ceilings required are as follows:

a. Mineral fiber acoustic panels in exposed grid suspension system.

B. Related Work:

1. Section 09900 - Painting.

C. Related Work in Other Contracts:

1. Heating, Ventilating, and Air Conditioning Work:

a. Grilles, diffusers, and similar air distribution components installed in acoustic ceiling system. Refer to Division 15.

2. Electric Work:

a. Lighting fixtures, smoke detection systems, sound systems, and similar electrical components installed in acoustic ceiling system. Refer to Division 16.

1.02 QUALITY ASSURANCE:

A. Installer Requirements:

1. Acceptable to manufacturer of primary acoustic materials.

1.03 SUBMISSIONS:

A. Submissions shall be in accordance with Section 01300 - Submissions, and as modified below.

B. Product Data:

1. Submit manufacturer's specifications and installation instructions for each acoustic ceiling system required.

C. Samples:

1. Architect's review will be for color and texture only. Compliance with all other requirements is the exclusive responsibility of the contractor.

2. Submit samples of the following:

a. Exposed grids: Submit three 12" long samples of each type exposed runner.

b. Moldings: Submit three 12" long samples of each type required.

c. Acoustic units: Submit 3 sets of 12" square samples for each different acoustic unit required. Each set of samples shall show the full range of color and texture to be expected in the completed work.

D. Maintenance Instructions:

1. Submit two copies of the manufacturer's recommendations for cleaning and refinishing each type of acoustic unit used in the work. Include precautions against materials and methods which may be detrimental to finishes and acoustic efficiency. Submit to Architect for transmittal to Owner.

E. Replacement Materials:

1. When work is completed, deliver stock of replacement material to Owner for each type of acoustic unit used in the work. Furnish full size units, matching installed materials, package and mark for identification. Obtain receipt; submit copy of receipt for Architect.

2. Furnish not less than 1% of the total amount of each type of acoustic panel unit installed.

1.04 DELIVERY AND STORAGE:

A. Deliver acoustic ceiling materials to the job site in original, unopened packages, bearing manufacturer's name and label identifying each type of acoustic unit.

B. Storage Areas:

1. Comply with acoustic material manufacturer's recommendations for storage of units to be used in the work.

1.05 PROJECT/SITE CONDITIONS:

A. Environmental Requirements:

1. Do not install ceiling panels until building is closed in and HVAC system is operational.

2. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture equilibrium.

3. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:

a. Relative Humidity: 65-75%

b. Uniform Temperature: 55-70°F (13-21°C).

PART 2 - PRODUCTS

2.01 SUSPENSION SYSTEMS:

A. Quality Standard:

1. Provide direct hung suspension system complying with ASTM C 635 for the following structural classifications:

a. Intermediate duty, unless otherwise indicated.

B. Manufacturers:

1. Provide suspension systems for acoustic ceilings as produced by one of the following:

a. Chicago Metallic Corp., Chicago, Illinois.

b. Donn Corp., Westlake, Ohio.

C. Hangers:

1. Provide hangers as recommended by suspension system manufacturer to comply with specified structural classification.

a. If suspension system manufacturer does not indicate hanger recommendation, provide not less than 9 gauge galvanized, soft annealed, mild steel wire.

2. Where hanger wires cannot be directly wire-tied to structural or intermediate framing members, provide attachment devices designed for the type of construction used in the work and with a carrying capacity of not less than 5 times the design loads involved.

D. Edge Moldings:

1. Provide manufacturer's standard angle or channel molding for edges and penetrations of ceiling, with single flange of molding exposed, white baked enamel finish.

E. Exposed Grid Suspension System:

1. Provide Class A fire rated single web steel main runners, matching interlocking cross runners, adapters, and accessories with exposed cross runners coped to lay flush with main runners.

2. Finish: Smooth, matte white baked enamel.

F. Protective Coatings and Finish:

1. Provide manufacturer's standard coatings and finishes for normal use environments (ASTM C 635), except as noted.

2. In toilet rooms, provide protective coatings and finishes

complying with High Humidity Test Requirements (ASTM C 635).

2.02 ACOUSTIC CEILING UNITS:

A. Manufacturers:

1. For convenience, details and specifications have been based on products indicated by the following manufacturers:

a. Mineral fiber acoustic panels and tiles: Armstrong World Industries, Lancaster, Pennsylvania.

2. Other manufacturers offering mineral fiber acoustic panels and tiles complying with the requirements include:

a. Celotex Corp., Tampa, Florida.

b. United States Gypsum Co., Chicago, Illinois.

B. Mineral Fiber Acoustic Panels:

1. Provide units, not less than 5/8" thick, with flame spread of 25 or less (ASTM E84) complying with performance requirements and physical characteristics of the specified panels indicated in the construction documents.

2.03 ACCESSORIES:

A. Hold Down Clips:

1. Provide manufacturer's standard spring steel clips spaced as recommended by said manufacturer in the following spaces:

a. All gymnasiums.
b. All recreation rooms.
c. All High School corridors.
d. All Middle School corridors.

PART 3 - EXECUTION

3.01 INSTALLATION OF SUSPENSION SYSTEMS:

A. General:

1. Coordination: Prior to start of acoustic ceiling work, consult other trades and contractors involved to determine areas of potential interference. Do not start installation of suspension systems until interferences have been resolved.

2. Provide framed openings around all sides of openings receiving items set in or attached to ceilings.

3. Install suspension systems in accordance with manufacturer's printed instructions and to comply with the requirements of ASTM C 636.

B. Hangers:

1. Space not more than 6" from each end and not more than 4' o.c. between ends of members to be supported. Provide additional

hangers for support of light fixtures and other items to be supported by the ceiling suspension system including clips to securely fasten all framing members (used to support fixtures) to each other to prevent eccentric deflection or rotation of supporting runners.

C. Moldings:

1. Provide edge moldings where ceilings meet walls, partitions, and other vertical elements.

2. Corners: Miter cut inside and outside corners.

D. Runners:

1. Support main runners directly from hangers; do not bear on walls or partitions. Space main runners to support acoustic panels and other work resting in or on the ceiling, as

required to comply with specified performance requirements. Interlock cross-runners with either main runners or with cross-runners structurally classified as main runners. Install moldings with exposed leg in same plane as bottom flange of runners.

E. Where ceiling suspension systems are attached directly to the bottom chord of joists, ceiling extensions (either an extended bottom chord element or a separate unit, to suit manufacturer’s standards, or sufficient strength to support ceiling construction) shall be provided. Extend ends to within 1/2″ of finished wall surface unless otherwise indicated.

3.02 INSTALLATION OF ACOUSTIC CEILING UNITS:

A. General:

1. Do not install acoustic ceilings until installation areas meet the following requirements:

a. Exterior openings have been closed and roofs are weathertight.

b. Mechanical, electrical, and other work above ceilings has been completed.

c. Wet work has been installed.

d. Temperature and relative humidity have reached levels which comply with acoustic material manufacturer's recommendations for the units to be used in the work and are acceptable to the installer.

2. Install materials in accordance with manufacturer's printed instructions and other recommendations applicable to the work.

3. Balance border areas to avoid units of less than 1/2 unit width wherever possible. Wherever ceiling area is a multiple of full size acoustic units used in the work, balance alignment to be square and true and install only full size units for entire ceiling including borders.

B. Installation of Acoustic Panels in Exposed Grid Suspension Systems:

1. Install square edge panels to rest on flanges of grid tees with border units supported by moldings.

a. Field cut border units square and support on wall moldings.

2. Provide hold-down clips for panel areas where indicated; omit clips where access areas are shown.

a. Install 2 clips per panel at center of opposite sides of long dimension.

b. Install 4 clips per panel at midpoint of each side.

3.03 CLEAN UP AND PROTECTION:

A. Clean exposed surfaces of acoustic units and suspension systems; comply with manufacturer's instructions. Remove and replace units and members which are damaged or cannot be cleaned.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09650 - RESILIENT FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide new resilient flooring and base where noted on drawings.

1.02 RELATED SECTIONS

A. 03300 – Cast-in-Place Concrete

B. 03511 – Self-Leveling Concrete Floor and Underlayment

C. 03512 – Self-Leveling Concrete Floor Underlayment (Over Extruded Polystyrene Foam)

D. 06100 – Rough Carpentry

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01300 - Submittals and as modified below.

B. Product Data:

1. Submit manufacturer's technical data and installation instructions for each type of resilient flooring, adhesives and accessories.

2. Include manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessories.

C. Samples:

1. For projects requiring initial selection of color and pattern by Architect, submit samples in form of actual sections of resilient flooring, including accessories, showing manufacturer's full range of colors and patterns available, for each type of resilient flooring required.

2. For projects requiring verification of previously selected styles and colors; submit, for verification purposes, samples of each type, color, and pattern of resilient flooring, including accessories, selected by Architect, indicating full range of variation in color and pattern selected. Provide full-size tile units and minimum 2 1/2" long sections of resilient flooring accessories.

D. Maintenance Instructions:

1. Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessories.

E. Replacement Material:

1. Submit to Owner at project site one box of each type and color of tile for each 50 boxes (or fraction thereof) of each type and color installed.

1.04 PRODUCT DELIVERY AND STORAGE

A. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors, patterns, and quality designations legible and intact.

B. Do not open containers or remove markings until materials are inspected and accepted by installation contractor.

C. Store and protect accepted materials in accordance with manufacturer's directions and recommendations.

D. Unless otherwise indicated, store materials in original containers at not less than 70°F for not less than 48 hours immediately before installation.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in space to receive tile between 70°F and 90°F for not less than 48 hours immediately before installation.

B. Maintain minimum temperature of 55°F after flooring is installed except as specified in "A" above.

C. Temperatures provided for installation and initial finishing shall be maintained at levels in accordance with manufacturer’s requirements.

PART 2 - PRODUCTS

2.01 TILE FLOORING

A. Vinyl Composition Tile: (VCT) Azrock by Tarkett or equivalent.

1. Meets ASTM F1066 Class 2 (Through Pattern)

2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.

a. The flooring specified is classified in accordance with NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.

b. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.

3. Size: 12" x 12" unless otherwise shown. Thickness: 1/8".

4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer’s full range of standard VCT patterns and colors. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or

in their entirety are not provided herein, the bid shall include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.

5. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.

6. 150 psi rating.

7. Manufacturers offering products complying with these requirements include:

   a. Azrock by Tarkett, Houston, Texas

   b. Mannington Commercial; Calhoun, GA.

   c. Armstrong Commercial US, Lancaster, PA.

B. Vinyl Enhanced Tile: (VET) Azrock by Tarkett or equivalent

1. Meets ASTM F1066.

2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.

   a. The flooring specified is classified in accordance with NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.

   b. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.

3. Size: 12″ x 12″ unless otherwise shown, 1/8″ thick.

4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer’s Azterra, Color Essence, or Color Essence SR series or manufacturer’s current full range of standard V.E.T. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or in their entirety are not provided here, the bid shall include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.

5. Slip resistance: ADA Compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.

6. 400 psi rating.

7. Manufacturers offering products complying with these requirements include:

   a. Azrock by Tarkett, Houston, Texas.

   b. Roppe Corporation; Fostoria, Ohio.

C. Homogeneous Solid Vinyl Tile: (SVT) Azrock by Tarkett or equivalent.

1. Meets ASTM F1700, Class 1, Type A (Type B for Slip

Resistance).

2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.

   c. The flooring specified is classified in accordance with NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.

   d. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.

3. Size: 16″ x 16″ unless otherwise shown, 1/8″ thick.

4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's Cortina Grande or Karim Kolors series or manufacturer's current full range of standard V.E.T. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or in their entirety are not provided within. Include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.

5. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.

6. 800 psi rating.

7. Manufacturers offering products complying with these requirements include:

   a. Azrock by Tarkett, Houston, Texas.

   b. Polyflor Ltd., Manchester, UK.

2.02 ACCESSORIES

A. Rubber Cove or Wall Base:

1. Rubber cove or wall base shall be extruded and as manufactured by Roppe Corporation. It shall be constructed of first quality materials, properly vulcanized, and shall be smooth and free from imperfections which detract from its appearance. The base shall conform fully to the requirements of U.S. Federal Specification SS-W-40a, Type I Rubber. All cove base shall be of the cove Style B with a height of 4″ (101.6 mm), in lengths continuous coil (1.22 m), in the color stated (see No. 4 below), and of 1/8″ (3.175 mm) thickness.

2. Height: 4" unless otherwise noted.

3. Thickness: 1/8" gauge.

4. Color: As may be detailed in the finish floor plans or as selected by Architect from the manufacturer's premium colors.

5. Style: Standard top-set cove, except as may be detailed in finish floor plans or as selected by the Architect.

6. In the event that the finish floor plans in part or in their entirety are not provided herein, for bidding purposes, the Contractor shall utilize and, therefore, for inclusion in the scope of work and contract, that 100 percent of all rubber cove base shown to be provided shall be of Roppe Corporation Premium Colors Group IV or equal.

B. Accessories:

1. The Contractor shall utilize for bidding purposes and, therefore, for inclusion in the scope of work, all transitional reducers, reducer strips, cove caps, thresholds, edging, fillet strips and/or joiners as may need to be required by the project and/or Architect to provide a complete and acceptable project. All accessories shall be rubber and as manufactured by Roppe Corporation Color Group II or equal.

C. Adhesives (Cements):

1. Waterproof, stabilized type as recommended by flooring manufacturer for the type of tile to be installed. Asphalt emulsions and other non-waterproof types are not acceptable.

D. Concrete Slab Primer:

1. Non-staining type as recommended by flooring manufacturer.

E. Leveling and Patching Compounds

1. Trowel Grade, featherable, latex modified Portland cement or blended hydraulic cement based formulation acceptable to the flooring manufacturer.

2. Gypsum based compounds shall not be used in slab on grade construction and will only be considered where specifically approved by the flooring manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Examine surfaces to receive resilient tile materials before installation begins for:

1. Defects or conditions that would adversely affect quality and execution of installation.

2. Deviations beyond allowable tolerances of surfaces to receive resilient flooring:

a. Maximum variation in sub-floor surfaces: 1/8 inch in 10 feet.

3. Do not proceed with installation until unsatisfactory conditions have been reported in writing to the Architect and have been corrected.

B. Prepare substrates according to ASTM F 710 including the following:

1. Moisture Testing: Perform tests recommended by manufacturer.

Proceed with installation only after substrates pass testing.

a. Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours.

Special Note: If MVER is greater than 5 lbs. but less than 8 lbs. consult manufacturer for special adhesive recommendations.

- or –

b. Perform relative humidity test using in situ probes, ASTM F 2170. Results must not exceed 80%.

Special Note: If MVER is greater than 80% but less than 90% consult manufacturer for special adhesive recommendations.

c. When slab moisture content is in excess of manufacturer's requirements and if further drying is not possible, it may be necessary to install a moisture vapor barrier such as Chapco's Defender by Fuller Construction Products, Inc. If such a barrier product is determined to be required the product shall be deemed acceptable by the flooring and adhesive manufacturer'. The cost for application for such a barrier if not otherwise specified is considered an additional cost to the project. Added cost shall be agreed prior to proceeding.

d. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

C. Wood subfloors must have a minimum of 18″ (45.7 cm) of cross-ventilated space beneath the bottom of the joist.

1. The floor must be rigid, free of movement.

2. Single wood and tongue and groove subfloors should be covered with ¼″ (6.4 mm) or ½″ (12.7 mm) APA approved underlayment plywood.

a. Use ¼″ (6.4 mm) thick underlayment panels for boards with a face width of 3″ (76 mm) or less.

3. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.

D. Condition of Surfaces to Receive Resilient Materials: Dry, clean and free of oil, grease, or wax.

E. Substrates shall be free of curing compounds, sealers, hardeners.

F. Fill all minor cracks in substrates using approved crack filler in accordance with manufacturer's printed instructions.

G. Flash patch with products acceptable to the resilient flooring manufacturer. If condition requires self-levelling underlayment, refer to that specification in Division 3.

H. Clean substrates of all dirt and loose particles before application of flooring materials.

I. Provide additional underlayment and build up to abutting dissimilar flooring materials.

J. Store and use adhesives in accordance with the manufacturer's printed instructions.

K. Proceeding with installation constitutes acceptance of the substrate conditions.

3.02 INSTALLATION

A. Strictly adhere to manufacturer's printed instructions and the following:

1. Lay resilient tile so as to ensure full uniform contact with substrate and to produce finished surfaces, which are smooth, even, and in true plane, free of buckles, waves, or other imperfections.

2. Cut and scribe tile neatly into breaks and recesses, walls, door frames, casework, and around pipes, columns, and other projections where flashed base is not required.

3. Lay tile square with room axis. Do not install border tiles that are less than 1/2 the width of a field tile. Tile against walls shall be the same width on each side of room.

4. Tile pattern when laid shall lie in an alternating direction as determined by the Architect.

B. Rubber Base:

1. Use approved cove base adhesive and apply in accordance with manufacturer's printed instructions such as Roppe Corporation’s No. 205 Cove Base Adhesive or equal. Adhesive shall hold base tightly in contact.

2. Where necessary, patch and fill back-up material with underlayment material to provide continuous, uniform surface.

3. Scribe base accurately; use specified preformed corners; butt joints between sections tightly.

4. Provide base at built-in work, casework, and elsewhere as indicated or required.

C. Reducing Strips: Install at points of transition from new resilient flooring to dissimilar flooring material. Whenever possible, locate strips between door jambs centered under doors.

3.03 ADJUSTMENTS

A. Reset any tiles which have not seated in a level plane with surrounding tiles.

B. Carefully remove and replace any tiles with broken corners with surrounding tiles.

3.04 CLEANING AND PROTECTION

A. Protect floors from rolling loads for 72 hours after installation by covering with hardboard or plywood. Protect the floor with undyed, untreated building paper until final inspection.

B. Initial cleaning and maintenance is the responsibility of the installing contractor and must be performed as soon as possible after installation. Initial cleaning may be not be performed until 3 days (72 hours) after installation or as otherwise specified by the manufacturer. The intent is to allow the tile become well seated in the adhesive and to prevent excess moisture and cleaning agents from interfering with the adhesive bond. Sweep and protect the floor until initial cleaning and maintenance can begin.

Initial Cleaning and Maintenance after Installation:

1. Sweep or vacuum floor thoroughly.

2. Clean flooring utilizing a pH neutral cleaner such as Super Shine All by Hillyard. Allow to stand for 5-15 minutes, but do not allow to dry. Scrub with a single disc rotary machine (175-350 rpm) with a blue or green pad. Remove solution and rinse with clean water. Allow flooring to dry completely before applying finish.

   a. Heavily soiled floor may require a stripping procedure as the initial cleaning.

3. Floor finish:

   a. For VCT, Apply four coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.

   b. For VET, Apply three coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.

   c. For SVT, Apply two coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.

   d. S.V.T. has an alternative for maintenance which follows a dry buffing procedure. The awarded scope includes the standard cleaning and application of floor finish. Prior to proceeding with the application of finish, the dry buffing option is to be review with the Owner. If the Owner prefers the dry buffing process then the contractor shall perform the initial dry buffing in lieu of the initial application of floor finish.

3.05 CLEAN UP

A. Remove from the site and legally dispose of all cartons, rubbish, and debris resulting from the work of this Section.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09651 - RUBBER STAIR TREADS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide new Rubber stair treads where shown on the drawings and as specified herein.

1.02 SUBMITTALS

A. Submittals shall be in accordance with Section 01300 - Submittals and as modified below.

B. Product Data:

1. Submit manufacturer's technical data and installation instructions.

2. Include manufacturer's written instructions for recommended maintenance practices.

C. Samples:

1. For initial selection of color and pattern by Architect, submit three sets of samples showing manufacturer's full range of standard and custom colors and patterns available.

2. Submit samples of epoxy adhesive (waterproof) stabilized type as recommended by the manufacturer.

D. Maintenance Instructions:

1. Submit three copies of manufacturer's written instructions for recommended maintenance practices after installation.

E. Replacement Material:

1. Submit to the Owner at project site one carton of installed Rubber tread type and color for future replacement.

1.03 PRODUCT DELIVERY AND STORAGE

A. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors, patterns, and quality designations legible and intact.

B. Do not open containers or remove markings until materials are inspected and accepted.

C. Store and protect accepted materials in accordance with manufacturer's directions and recommendations.

D. Unless otherwise indicated, store materials in original containers at not less than 70°f for not less than 24 hours immediately before installation.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in space to receive rubber stair treads between 70°F and 90°F for not less than 24 hours immediately before installation.

B. Maintain minimum temperature of 55°F after rubber stair treads are installed except as specified in "A" above.

PART 2 - PRODUCTS

2.01 RUBBER STAIR TREADS

A. FS SS-T-312, Type IV, Composition 1 (Asbestos-free).

B. Flame spread rating: Less than 75 by ASTM E 84.

C. Size:

1. Length: 42", 48", or 72".

2. Depth: 12 3/8" (with square nose).

3. Thickness: 1/4" tapering to 1/8".

D. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's standard or custom colors. Pattern shall be heavy-duty rib.

E. Rubber stair tread shall be as manufactured by Roppe Corp., Fostoria, Ohio, or approved equal by the Architect.

F. The treads shall be homogeneously constructed of first-quality raw materials, and the color shall extend throughout the thickness of the tread.

G. All treads shall be free from objectionable odors, blisters, cracks, and other imperfections which will affect the serviceability of the treads.

H. The treads shall conform fully with U.S. Federal Specification RR-T-650C, Composition B, Types 1 and 2.

I. Adhesive:

1. Waterproof, stabilized (epoxy) type as recommended by manufacturer. Asphalt emulsions and other non-waterproof types are not acceptable.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Examine surfaces to receive rubber stair tread material before installation begins for:

1. Defects or conditions that would adversely affect quality and execution of installation.

2. Deviations beyond allowable tolerances of surfaces to receive rubber treads.

3. Do not proceed with installation until unsatisfactory conditions have been reported in writing to the Architect and have been corrected.

B. Condition of Surfaces to Receive Rubber Tread Material: Dry, clean and free of oil, grease, or wax.

C. Fill all minor cracks in substrates using approved crack filler in accordance with manufacturer's printed instructions.

D. Clean substrates of all dirt and loose particles before application of adhesive.

E. Store and use adhesives in accordance with the manufacturer's printed instructions.

3.02 INSTALLATION

A. Strictly adhere to manufacturer's printed instructions and the following:

1. Lay stair treads so as to ensure full uniform contact with substrate and to produce finished surfaces which are smooth, even, and in true plane, free of buckles, waves, or other imperfections.

2. Neatly cut and scribe treads as required to fit stair step length and width.

3. Spread adhesive over entire underside of rubber stair tread and over entire step and nosing area to receive tread, to create a smooth and consistent area of adhesion.

3.03 ADJUSTMENTS

A. Reset any treads which have not seated in a level plane with the step surfaces.

B. Carefully remove and replace any tread with broken or damaged edges.

3.04 CLEANING AND PROTECTION

A. Clean installed rubber stair treads not sooner than 5 days after installation using cleaners recommended by the flooring manufacturer, followed by rinsing with clean water.

3.05 CLEAN UP

A. Remove from the site and legally dispose of all cartons, rubbish, and debris resulting from the work of this Section.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09680 - CARPETING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Carpeting in rooms and spaces designated on drawings.

2. Rubber base as required by the work.

3. Carpet accessories as required by the work.

4. Substrate preparation as required by the work.

1.02 RELATED WORK

A. Related work specified in other sections of the specifications.

1. Section 09650 - Resilient Floor Tile.

1.03 CONTRACT DOCUMENTS

A. Applicable provisions of the "Conditions of the Contract" and the General and/or Supplementary Conditions shall govern all work under this section.

1.04 QUALITY ASSURANCE

A. Installer's Qualifications:

1. A minimum of three years experience.

2. Successfully completed projects of similar magnitude.

B. Accessibility Requirements:

1. Floor surfaces shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations. These requirements supersede Technical Specifications in this Section.

1.05 SUBMITTALS

A. Comply with requirements of Section 01300.

B. Manufacturer’s product data, installation and maintenance instructions for all components of the work.

C. Shop Drawings:

1. Carpeted areas shall include the entire area of the room or space, recesses, closets, and similar areas or as indicated on finish floor plans.

2. Shop drawings shall indicate a working layout for each area showing seam locations, pattern of carpet, colors, trim or edge strips, and other pertinent details.

3. No carpet shall be installed before approvals have been received.

D. Samples:

1. Submit two samples of each of the following for approval:

a. Carpet: 12" x 12" each type, pattern, and color.

b. Rubber base or other accessories: Manufacturer’s standard sample sizes.

E. Certificates: Prior to shipment of materials, submit to the Architect for approval certificates signed by the manufacturer attesting compliance with specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. All carpeting shall be delivered to the job in the original mill wrappings with each roll having its register number properly marked thereon.

B. Adhesives, solvents, and the like shall be delivered to the job in the manufacturer's original unopened containers, clearly marked.

C. All materials shall be stored under cover in clean, dry, well ventilated spaces immediately after delivery to the job. Any material which becomes damaged or soiled and, in the opinion of the Architect, cannot be repaired, will be replaced with new specified material at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All carpeting shall be first quality. No "seconds" or "imperfects" shall be installed.

B. All carpet shall be Class I and shall have minimum critical radiant flux of not less than .45 watts/sq. cm.

C. All Broadloom carpeting shall be "Constellation-Ecoworx Performance Broadloom" as manufactured by "Shaw Contract Commercial Carpets" or approved equal, of color to be selected by the Architect from the manufacturer’s standard line.

Product Type: Performance broadloom
Size: Broadloom 12 foot
Construction: pattern loop
Dye Method: solution & yard dyed
Fiber Product: 100% eco*solution q® nylon – 55% solution dyed/45% space dyed
Protective Treatment(s): SSP® Shaw soil protection
Primary Backing: SYNTHETIC
Secondary Backing: Ecoworx performance broadloom
Gauge: 1/10
Face Weight: 26 oz.
Stitches per inch: 09.83
Finished Pile Thickness: 0.120
Average Density: 7,800 ozs./yd3
Pattern Repeat: 13/32″W X 6 29/32″L
Flammability: ASTM E-648 flooring radiant panel class I, ASTM E-662
Methenamine pill test (ASTM D-2859): Pass
NBS smoke chamber less then 450
Electrostatic Propensity: less than 3.5 KV, permanent conductive filament
Warranty: lifetime commercial limited warranty for ecosolution q sd nylon, lifetime commercial limited warranty for Ecoworx performance broadloom backing system
Recommended Installation: full spread Shaw 3500 or Shaw 3600 adhesives
Post Consumer Recycled Content: 0
Post Industrial Recycled Content: 9.7
Green Label Certification #: 59269968
Green Label Plus Certification #: GLP9968

D. All carpet tile shall be “Constellation-Tile” as manufactured by "Shaw Contract Commercial Carpets" or approved equal, of color to be selected by the Architect from the manufacturer’s standard line.

Product Type: carpet tile
Size: 24″ x 24″
Construction: loop
Dye Method: solution & yarn dyed
Fiber Product: 55% ECO SOLUTION Q PREMIUM BRANDED NYLON-45% YARN DYED BCF NYLON
Protective Treatment(s): antistatic, SSP® Shaw soil protection, florsept antimicrobial
Primary Backing: SYNTHETIC
Secondary Backing: Ecoworx®
Gauge: 1/10
Face Weight: 24 oz.
Stitches per inch: 09.83
Finished Pile Thickness: 0.099
Average Density: 8,727 ozs./yd3
Pattern Repeat: N/A
Flammability: ASTM E-648 flooring radiant panel class I, ASTM E-662
Methenamine pill test (ASTM D-2859): Pass
NBS smoke chamber less than 450
Electrostatic Propensity: less than 3.5 KV, permanent conductive filament
Warranty: lifetime commercial limited warranty for Ecoworx tile backing system
Recommended Installation: monolithic
Post Consumer Recycled Content: 0

Post Industrial Recycled Content: 37.4
Green Label Certification #: 59269968
Green Label Plus Certification #: GLP9968

2.02 CARPET ACCESSORIES

A. Rubber Cove or Wall Base

1. Rubber cove or wall base shall be extruded and as manufactured by Roppe Corporation or equal. It shall be constructed of first quality materials, properly vulcanized, and shall be smooth and free from imperfections which detract from its appearance. The base shall conform fully to the requirements of U.S. Federal Specification SS-W-40a, Type I Rubber. All cove base shall be of the straight Style A, with a height of 4″ (101.6 mm), in lengths continuous coil (1.22 m), in the color stated (see No. 4 below), and of 1/8″ (3.175 mm) thickness.

2. Height: 4″

3. Thickness: 1/8″ gauge.

4. Color: as may be detailed in the finish floor plans or as selected by Architect.

B. Rubber Carpet Edge Guard: shall be by Roppe, or equal. Colors as selected by Architect. Provide edge type as follows:

1. Carpet to Vinyl: Roppe #50 tile/carpet joiner or equal.

2. Carpet Termination Reducer: Roppe #38 or #39, or equal. Glue down carpet edge as required.

3. Coordinate with door schedule (if included) and any metal thresholds that may be indicated under that component of the work.

C. Rubber Stair Nosing: Roppe #13 or #14 single flange carpet stair nosing as required or equal.

D. Adhesive: Water-based, water resistant and non-staining as recommended by carpet manufacturer to comply with flammability and VOC requirements for installed carpet.

E. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for use in taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams. Shaw recommends the use of Shaw 3500 or 3600 (AATCC174) adhesives or equivalent adhesives, which have been formulated with a higher solids content and will perform adequately with the Eco Broadloom backings.

F. Leveling and Patching Compounds: Types as recommended by carpet manufacturer and as appropriate for compatibility with substrate.

2.03 OTHER ACCEPTABLE MANUFACTURERS

A. Collins and Aikman
B. Bentley/Prince Street
C. Interface
D. An equal approved by the Architect

PART 3 – EXECUTION

3.01 PREPARATION AND SUBFLOOR CONDITIONS

A. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1. Dimensions supplied in these specifications and drawings are approximate. The Contractor shall carefully check dimensions and other conditions affecting his work in the field and shall be responsible for proper installation of carpet in areas designated.

2. Surfaces to receive carpet shall be thoroughly clean, smooth, free from irregularities, and dry; apply sealer recommended by carpet manufacturer to prevent dusting if required.

3. Contractor shall prepare floors to receive new flooring by washing, etching, sanding, or filling or other procedures as necessary for satisfactory installation.

B. Subfloor Moisture Conditions: Moisture emission rate of not more than 5 lbs./1000 sq.ft./24 hours where tested by anhydrous calcium chloride moisture test in compliance with CRI 104, with subfloor temperatures not less than 55°F.

1. Contractor shall include in the base bid additional costs for any additional surface preparation work and materials required to install carpet relative to specific slab-moisture content.

C. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHydrion paper is applied.

D. Apply latex underlayment where required to correct subfloor. Fill concrete slab on grade control joints with latex or as recommended by manufacturer for proper substrate. Underlayment shall be steel troweled smooth to prevent marks showing through installed carpet. Substrate imperfections telegraphing through installed carpet will not be acceptable and shall be reason to remove.

E. Concrete floors must be sealed if dusting or powdering exists. **Do not use sweeping compounds as they may leave oily deposits.** The following floor sealers are suggested for concrete. Coordinate with manufacturers requirements for materials selected.

1. Shaw Contract 9050 Floor Sealer and Shaw 8550 Level Primer.

2. Kure-N-Seal-Sonneborn #0800 – Chemrex, Inc.

3. Spartan Cote Cure Seal Hardener – The Burke Group.

3.02 INSTALLATION

A. Carpeting shall be installed in accordance with the manufacturer's instructions and the best methods of the trade.

B. All surfaces to receive carpet shall be level, smooth, clean, and dry, in a finished condition suitable to receive carpet. The carpet contractor shall notify the Owner in writing of any and all conditions to the contrary or otherwise unsatisfactory. In an instance where the flooring Contractor is the Prime Contractor, this Contractor shall be responsible for all floor preparation unless otherwise indicated. The installation of carpet shall be an indication of his acceptance of the existing conditions. No carpet shall be installed before approval.

C. Broadloom carpet shall be installed with adhesive applied directly to the sub-floor. Where seams occur in carpeting, they shall be seam sealed and latex reinforced with a lifetime edge ravel warranty. Where edge of carpeting butts other flooring material, the edges shall be protected with rubber edge strip unless aluminum thresholds are otherwise indicated. Edging shall be anchored to concrete floors with adhesive.

1. Fit sections of carpet prior to application of adhesive. Trim edges and butt caps with seaming cement.

2. Apply adhesive uniformly to substrate in accordance with manufacturer’s instructions. Butt edges tight to form seams without gaps. Roll entire area lightly to eliminate air pockets and ensure uniform bond. All seams on vinyl backed carpet are to be chemically welded.

3. All patterned carpet shall have pattern aligned at seams.

D. Carpet tile shall be installed with pressure sensitive adhesive such as Shaw Contract 5000, 5100 or equal. A 3/8” foam paint roller may be used to apply the adhesive. Allow the adhesive sufficient open time so that it will not transfer to the back of the tile. **The adhesive must be allowed to dry completely before installing the carpet.** Installing into wet adhesive will result in a permanent bond and may cause carpet to bubble. **NOTE – A FULL SPREAD OF ADHESIVE IS REQUIRED.**

E. Roll entire installation with a 75# roller at completion.

F. On completion of installation, dirt, carpet scraps etc., must be removed from the surface of the carpet. The carpet must be cleaned with a beater type vacuum cleaner. Soiled spots or adhesive on the carpet shall be removed with the proper spot remove. Loose pieces of face yarn must be removed with sharp scissors.

G. Use plywood over the carpet when heavy objects are moved within 24 hours after installation. A non-staining building material paper must be placed over the carpet to protect it when additional construction activity is to take place that would soil or stain it. **Do not use plastic sheeting as it will trap moisture.**

3.03 MAINTENANCE

A. The carpet manufacturer shall conduct a maintenance seminar for Owner's personnel.

B. Include a maintenance schedule and a list of necessary equipment required to maintain carpet.

3.04 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below packaged with protective covering for storage and identified with labels describing contents.

1. Carpet & Carpet Tile: Furnish quantity of material, in full width roll, equal to 2 percent of the amount of each carpet type installed, but not less than 100 sq. ft.

3.05 WARRANTY

A. Manufacturer must guarantee the following:

1. Abrasive Wear: Warrant that the carpet will lose no more than 10 percent by weight of pile face fiber during the lifetime warranty period when installed and maintained in accordance with manufacturer's procedures.

2. Static Protection: Warrant that the carpet will not generate static build-up in excess of 3.5KV during the lifetime warranty period as tested by AATCC test method 134.

3. Backing Integrity Delamination: Warrant that the secondary backing of the carpet will not delaminate from the face carpet for lifetime warranty period. Chair pads are not required whether the carpet is installed direct to the floor or by conventional tackless installation over cushion.

4. Edge Ravel: Warrant that under normal use the carpet will not edge ravel at seams or edge for the lifetime warranty period.

5. Tuft Bind: Warrant that the carpet will have an average face yard tuft bind of 20 pounds for the lifetime warranty period when tested using the ASTM D-1335-67 method. This portion of the warranty must protect against insufficient tuft bind, whether the carpet is dry or wet (as it might be during steam cleaning, hot water extraction, or as a result of a broken pipe or flood).

6. Pattern matching of seams (Broadloom only): Warrant that under normal use the carpet will pattern match within acceptable industry standards. Regardless of pattern repeat

size, when installed in accordance with manufacturer installation guidelines.

7. Moisture Management (Broadloom Only): Warrant that under normal use, the carpet will keep liquid spills above the pre-coat layer for a minimum of 24 hours as tested under the British Spill Method; Part 2.

B. Warranty shall be from the manufacturer, written specifically for the project.

DIVISION 9 – FINISHES

SECTION 09699 - WATER VAPOR EMISSION CONTROL SYSTEM FOR CONCRETE SLABS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Testing and application of systems for the reduction of moisture vapor transmission and alkalinity control for interior concrete slabs scheduled for floor finish of VCT, vinyl flooring, rubber flooring, linoleum, carpet, and/or epoxy flooring systems.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In Place Concrete: Installation and curing requirements according to ACI 302.
B. Section 03650 – Self Leveling Uderlayment
C. Section 09410 – Thin Set Epoxy Terrazo
D. Section 09650 – Resilient Flooring
E. Section 09668 - Linoleum
F. Section 09680 – Carpeting
G. Other finish flooring materials not described above requiring low moisture vapor emission rates.

1.03 REFERENCES

A. American Society of Testing and Materials (ASTM):

1. C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or Cube Specimens).
2. C 348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
3. D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
4. E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
5. F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Floor Using Anhydrous Calcium Chloride.
6. F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ probes.

B. International Concrete Repair Institute (ICRI) Guideline No. 310.2R-2013 - Selecting and Specifying Concrete; Surface Preparation for Sealers, Coatings and Polymer Overlays.

1.03 SUBMITTALS

A. Submit under provisions of Specification Section 01300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Manufacturer's specification.
2. Installation instructions.
3. Independent test data.
4. Certification requirements.
5. Warranty information.

C. Pre-Installation Testing: Submit anhydrous calcium chloride test results (test shall be performed according to ASTM F 1869) and/or digital RH probe test results (test shall be perfomred according to ASTM F 2170). Test shall be performed by an I.R.C.I. Certifeid Moisture Testing Technician (subcontracted by the Contractor) and submitted to the Architect and Construction Manager. Additional testing may be performed by the Owner at their discretion. Testing shall be conducted when the building environment is representative of the actual interior working climate.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer shall have no less than five years experience in manufacturing water vapor reduction systems. The water vapor reduction system shall be specifically formulated and marketed for water vapor reduction and alkalinity control. System design shall provide protection from vapor emission rates less than or equal to 25 pounds per 1000 square feet per 24 hours and/or 99% relative humidity.

B. Installer Qualifications:

1. Applicator shall be approved by the manufacturer, experienced in surface preparation and application of the material and shall be subject to inspection and control by the manufacturer.
2. Installer shall have no less than five years experience installing the specified fluid based coating systems.

C. Product Performance History:

1. Manufacturer shall provide independent lab test reports documenting performance per the following:
   a. ASTM E 96, Water Vapor Transmission (wet methods) Performance shall be documented by an independent testing laboratory indicating a minimum of 90 percent water vapor transmission reduction compared to untreated concrete.
   b. ASTM D 1308; Insensitivity to alkaline environment up to pH 14.
   c. Certify acceptance and exposure to continuous topical water contact after final cure.

2. Submit list of product use and performance history, for the same formulation and system design, listing reference sources. Similar projects shall have documented minimum initial water vapor transmission rates of 25 lb per 1000 sf per 24 hours to 3 lb per 1000 sf per 24 hours, and have

resulted in maintained water vapor reduction rate of less than 3 lb per 1000 sf per 24 hours when tested according to ASTM F1869.

D. Mock-up: Provide a 10'x10' mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until preparation and workmanship are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.

B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light. Product should not be stored in areas with temperatures in excess of 90 degrees F (32 degrees C) or below 50 degrees F (10 degrees C).

C. Handle product in a manner that will prevent breakage of containers and damage products.

1.06 PROJECT CONDITIONS

A. The specified floor covering system scheduled for the treated concrete substrate shall have the ability to withstand water vapor transmission levels up to 3 lb per 1000 sf (1.5 kg/100 sq. m) /24 hours.

B. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1. Do not apply moisture vapor reduction system to unprotected surfaces or when water is accumulated on the surface of the concrete.
2. Do not apply water vapor reduction system when temperature is lower than 50°F (10°C) or expected to fall below this temperature within 24 hours from time of application.
3. Allow continuous ventilation and indirect air movement at all times during application and curing process of the water vapor reduction system.
4. Protection: Protect water vapor reduction system to prevent damage from active rain or surface water for a minimum of 24 hours from time of application.

1.07 SCHEDULING

A. Before installation of new flooring systems over the interior concrete slabs, anhydrous calcium chloride testing shall be performed per ASTM F 1869 or in situ probe testing per ASTM F 2170 by the Contractor to determine the level of water vapor transmission or relative humidity in the slab and the application rate of the moisture vapor reduction system required.

B. The Contractor will coordinate the scheduling of the water vapor reduction system testing, allowing adequate time to test, review results and determine the water vapor reduction system application rate before installation of floor finish is required.

C. All mastics, glues, curing compounds and contaminants shall be removed to provide a clean, sound, concrete substrate prior to performing anhydrous calcium chloride tests or RH tests.

1.08 WARRANTY

A. Manufacturer shall provide the Owner with a system warranty including adhesives and surface preparation products for a period of no less than ten years at no additional cost.

B. Installer of water vapor reduction system shall provide standard installation warranty for workmanship.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: CHAPCO / H.B. Fuller Construction Products Inc.: 1105 S. Frontenac Street, Aurora, IL 60504. (www.chapco-adhesive.com) or Architect approved equal.

B. Provide materials of one manufacturer throughout the project.

2.02 SYSTEM

A. Single Coat System: 2-component, VOC Compliant, Low viscosity, 100 percent solid epoxy formulated as a vapor barrier against high moisture and alkalinity in concrete substrates. The water vapor reduction system shall, after final cure, reduce vapor emissions from a maximum of 99 percent relative humidity and alkalinity reduction to acceptable pH levels.

1. Product: For the basis of performance, this section is based upon CHAPCO'S DEFENDER. For 'or equal' submissions, proof of equivalency is up to the contractor.
2. A Single Coat System consists of one coat of CHAPCO'S DEFENDER coating to be applied to a properly prepared concrete surface at an application rate determined by an anhydrous calcium chloride tests or RH in situ probes.
3. Mix Component A and B at a ratio per manufacturers strict instructions.

B. Primer and Skim Coating (Additional process below non-permeable floor systems): The Chapco Defender surface must be primed with undiluted CHAPCO MP and covered with CHAPCO Smooth Finish skim coat underlayment (or Architect approved equal) prior to installation of finish flooring.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Proceeding with the installation will indicate the Contractors accetpance of the substrate conditions.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Inspect surfaces with manufacturer's representative to determine its suitability to receive the moisture vapor reduction system. Provide an uncontaminated, sound surface.

B. Clean surfaces to receive moisture vapor reduction system. Remove defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, shot blast abrasive residue, etc.

C. Mechanical preparation of an existing slab surface will be required to remove a weak top layer (laitance), damaged concrete (spalling, scaling, delaminating or crubmbling), adhesives (excludes asbestos mastic), sealers, paint, curing compounds or oil by mechanical method of shot blasting. Broom sweep and vacuum the prepared surface. Mechancially prepared surfaces must have a concrete surface profile of CSP 2-3, as defined by ICRI (International Concrete Repair Institute, Guideline No. 03732). Acid etching, solvents, sweeping compounds, adhesive removers and sanding are not accetpable methods of preparing the substrate. Shot blasting is not required for clean and sound concrete.

D. Joint and Crack Treatment:

1. Static Cracks/Control Joints **<1mm** (with no movement): Remove any dirt, debris or existing sealant from cracks and joints. Mix CHAPCO DEFENDER per instructions. Treat all static joints with CHAPCO DEFENDER Moisture Vapor Barrier by applying material into the joint with a paintbrush to completely coat the walls of the cavity.
2. Static Cracks/Control Joints **>1mm** (with no movement): Remove any dirt, debris or existing sealant from cracks and joints. Mix CHAPCO DEFENDER per instructions. Blend at a 1:1 ratio with fine silica sand. Immediately pour into control joints and cracks, level with concrete surface.

3. Expansion Joints/Dynamic Cracks (with movement): Remove any dirt, debris or existing sealant from cracks and joints. Treat all dynamic joints with CHAPCO DEFENDER Moisture Vapor Barrier applying a layer into the joint with a paintbrush to completely coat the walls of the cavity. Once cured, fill the joint with sand or backer rod while leaving the top of the joint open for proper treatment wiht sealant.

E. Verify that surfaces to be treated with moisture vapor reduction system have not previously been treated with materials such as underlayments, screeds, penetrating sealants, etc.

1. Consult with vapor reduction system manufacturer prior to application.

F. Verify if concrete additives such as chlorides or other soluble compounds that may contaminate surfaces have been used in the concrete mix.

1. Consult with vapor reduction system manufacturer prior to application.
2. Do not acid etch surface.

G. Verify that the substrate surface does not deteriorate due to the presence of sulphurous compounds or alkaline aggregate/silica reaction encountered in certain areas.

1. Consult with vapor reduction system manufacturer prior to application.
2. Testing for concrete deficiencies / contamination such as alkaline silica reaction, untreated silicates, organic residue, etc. is the responsibility of the Contractor.

H. The surface substrate shall remain uncontaminated, absorptive, and sound prior to receiving a water vapor reduction system. Comply with all requirements as listed in manufacturer's technical data information. No exceptions.

3.03 APPLICATION

A. Single Coat System Application:

1. The coverage rates for the Single Coat System are dependant on the surface texture and porosity of the substrate.
2. Apply at manufacturers required application rate relative to existing levels of moisture vapor to achieve 3 lb/1000 sf / 24 hours Moisture Levels:

a. Up to 25 lb/1000 sf / 24 hr: 130-180 s / gallon.
b. Typical coverage rate: 150 sf per blended gallon. Coverage will vary depending on the surface profile and porosity ranging from 100-180 sf per blended gallon. Finish application must be cover the substrate completely without any voids or pinholes to ensure moisture vapor suppression.

3. Apply one coat of CHAPCO'S DEFENDER Moisture Vapor Barrier using a squeegee. Allow 5 minutes for surface to "off gas". Back roll CHAPCO'S DEFENDER with a 3/8 inch (9.5 mm) nap roller to achieve uniform, continuos application of membrane. Allow the minimum cure time before installing the finish flooring.

B. Primer and Skim Coating (Additional process below non-permeable floor systems): The Chapco Defender surface must be primed with undiluted CHAPCO MP Multi-Purpose Primer and covered with CHAPCO Smooth Finish skim coat underlayment prior to installation of finish flooring.

1. Multi-Purpose primer can be applied with paint brush, short nap roller or soft bristeled push broom. Apply an even, continuos coat and allow product to dry to a clear film. Avoid allowing primer to puddle. Apply at manufacturers required application rate in accordance with substrate surface. Minimum tensile bond strength of 72 psi is required.
2. Smooth Finish skim coat is applied with a flat steel trowel worked into the void to be filled. Finish to level surface for smoothness in accordance wiht finish flooring system tolerances. Do not overwork the product. Minimum tensile bond strength of 72 psi is required. Substrate temperature should be a minimum of 43°F during application and air temperature maintained above 50°F. Do not cover building expansion joints.

3.04 TESTING

A. Initial Tests:

1. Anhydrous calcium chloride and/or relative humidty testing shall be performed by the installer.
2. Provide initial anhydrous calcium chloride tests according ASTM F 1869 or relative humidty tests according to ASTM F 2170 to the prepared concrete surfaces. Tests shall be performed on properly prepared concrete. No exceptions.
3. Conduct tests at the same temperature and humidity as designed normal occupancy. If this is not possible, test conditions shall be 75 degrees F +/-10 degrees (24 degree C +/- 5 degrees) and 50 percent +/-10 percent relative humidity. Maintain these conditions 48 hours prior to and during tests. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature are not acceptable.
4. Installer shall provide test results with a marked up floor finish plan showing test results.
5. Installer shall provide a marked up floor plan showing areas with vapor reduction system recommendations.

B. Post-Treatment / Pre-Flooring Tests:

1. Before installation of flooring systems and after proper cure of the final coat of the water vapor reduction system provide anhydrous calcium chloride tests according ASTM F 1869. Allow the vapor mitigation system to cure 72 hours before performing test. Water vapor transmission and alkalinity tests shall be performed on properly treated concrete
2. The installer shall provide test results of the level of water vapor transmission and alkalinity of the concrete slab to all parties involved. The flooring manufacturer and installer shall accept the floor condition and certify that the flooring application materials and methods are compatible with the test results and floor condition.

C. Adhesion

1. The flooring installer shall verify the usage of CHAPCO Multipurpose Primer prior to the installation of any patches or floor prep materials.

3.05 CLEANING/PROTECTION

A. Remove all debris resulting from water vapor reduction system installation from project site.

B. Protect each coat during specified cure period from any kind of traffic, topical water and contaminants.

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09900 – PAINTING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 DESCRIPTION

A. Work included: Paint and finish all new and existing interior and exterior wall surfaces related with proposed work area and all new and existing steel structures specified on drawings.

1. Examine the specifications and drawings of all trades and thoroughly be familiar with all provisions regarding painted work included therein. Surfaces shown, noted, scheduled, or specified to receive painters' finish as part of the work of this section.

2. The painting subcontractor shall furnish, maintain, and remove when no longer required, all scaffolding, staging, and riggings required for this work.

1.03 RELATED WORK DESCRIBED ELSEWHERE

A. Shop Coats: Refer to specific project manual sections for shop coats on items such as structural steel, miscellaneous metal, custom hollow metal work, and similar items.

B. Pre-Finished Items: Refer to specific project manual sections for factory-finished, or installer finishes.

1.04 WORK NOT INCLUDED

A. Do not include painting, which is specified under other sections.

B. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.

C. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this section except as may be specified herein.

D. Do not paint any moving parts of operating units, mechanical or electrical parts such as valve operators, linkages, sinkages, sensing devices, and motor shafts, unless otherwise indicated.

E. Do not paint over any required labels or equipment identification, performance rating, name or nomenclature plates.

1.05 DEFINITIONS

A. The term "paint," as used herein, means all coating systems materials including primers, emulsions, epoxy, enamels, stains, sealers, fillers, and other applied materials where used as prime, intermediate, or finish coats.

1.06 QUALITY ASSURANCE

A. Standards: Comply with standards specified in the section and as listed in Section 01085.

B. Qualifications of Manufacturers: Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Architect.

C. Qualifications of Applicators:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.

2. Provide adequate numbers of workman skilled in the necessary crafts and properly informed of the methods and materials to be used.

3. Minimum three years of experience in applying commercial coating systems similar to the materials specified.

D. Paint Coordination:

1. Provide finish coats, which are compatible with the prime coats used.

2. Review other sections of this specification as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.

3. Upon request, furnish information on the characteristics of the specific finish materials to ensure that compatible prime coats are used.

4. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.

5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coating supplied under other sections.

E. Field Samples:

1. Before proceeding with paint application, finish one complete surface of each color scheme required, clearly indicating selected colors, finish texture, materials, and workmanship.

2. Sample areas, when accepted by the Architect, shall serve as a minimum standard fro work throughout the entire project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title.

2. Product description (generic classification or binder type).

3. Federal Specification Number, if applicable.

4. Manufacturer's stock number and date of manufacture.

5. Contents by volume, for pigment and vehicle constituents.

6. Thinning instructions.

7. Application and instructions.

8. Color name and number.

B. Storage:

1. Provide proper storage to prevent damage to, and deterioration of, paint materials.

2. Store all materials in a single location approved by the Architect. Storage area is to be kept neat and clean. Any damage to the storage area or surrounding occurring during its use for storage shall be repaired to its original state (Architect's acceptance required). Remove all soiled or used rags, waste, and trash from the building every night and take every precaution to avoid damage of fire.

C. Protection:

1. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.

D. Replacement:

1. In the event of damage, immediately make all the repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.08 JOB CONDITIONS

A. Provide continuous heating and ventilation as required to maintain surface and ambient temperatures above 50°F for at least 24 hours before, during and for at least 48 hours after paint application.

B. Do not apply paint in snow, rain, fog, or mist, or when relative humidity exceeds paint manufacturer's recommended limits. Avoid painting surfaces while they are exposed to hot sun.

C. Lighting: Provide minimum 80 foot candle light level at mid-height of substrate surface.

1.09 EXTRA STOCK

A. Amount: Upon completion of the work of this section, deliver to the Owner an extra stock equaling 10% of each color, type, and gloss of paint used on the work.

B. Packaging: Tightly seal each container and clearly label with the contents and location used.

1.10 SUBMISSIONS

A. General: Comply with requirements of Section 01300 and as modified bellow.

B. Product Data:

1. Submit to the Architect a complete schedule of paint materials proposed to be furnished and installed under this section, including name of manufacturer and type of paint.

2. Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.

3. For information only, submit two copies of manufacturer's specifications, including paint analysis and application instructions for each material. Indicate by transmittal that a copy of each manufacturer's instructions has been distributed to the applicator.

C. Samples: Submit three (3) 8 ½" x 11" paint strike offs of each paint color and paint type specified for color match verification. Identify each sample as to finish, formula, color name, and color number.

D. Stain Samples: Submit three (3) 8 ½" x 10" wood samples of stain matching specified wood species and color for architect's approval.

E. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

PART 2 – PRODUCTS

2.01 PAINT MATERIALS

A. Design is based on the use of paint products manufactured by Benjamin Moore and the materials of that manufacturer are named in the painting schedule. Equal products of other manufacturers approved in advance by the Architect may be utilized.

B. General: Provide the best quality grade of the various types of coatings as regularly manufactured by paint materials manufacturers approved by the Architect. Materials not displaying the manufacturer's identification as a standard best-grade product will not be acceptable.

C. Durability: Provide paints of durable and washable quality. Do not use paint materials, which will not withstand normal washing, as required to remove pencil marks, ink, ordinary soil, and similar material without showing discoloration, loss of gloss, staining or other damage.

D. Colors and Glosses: Provide colors and glosses to match existing from manufacturer's full range of colors for each product indicated.

E. Undercoats and Thinners: Provide undercoat paint produced by the same manufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer, and use only the recommended limits. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

F. Standards: Provide paint materials which meet or exceed the standards listed for each application in the Painting Schedule in Part 3 of this section.

1. All paint to be V.O.C. compliant.

G. Application Equipment: For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint and as approved by the Architect.

H. Other Materials: All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first-quality of their respective kinds, and as selected by the Contractor subject to the approval of the Architect.

PART 3 – EXECUTION

3.01 INSPECTION

A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that such work is complete to the point where this installation may properly commence. Verify that painting may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the Architect.

3.02 DISCREPANCIES

A. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

1. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.

3.03 MATERIALS PREPARATION

A. General

1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's requirements and application instructions as approved by the Architect.

2. Remove all removable items, which are in place and are note scheduled to receive paint finish, or provide surface-applied protection prior to surface preparation and painting operations.

3. Following completion of painting in each space or area, reinstall the removed items by using workmen skilled in the necessary trades.

4. Clean each surface to be painted prior to applying paint or surface treatment.

5. Remove oil and great with clean cloths and cleaning solvents of low toxicity and a flash point in excess of 38°C (100°F), prior to start of mechanical cleaning.

6. Schedule the cleaning and painting in coordination with the Owner.

B. Preparation of Metal Surfaces: Clean non-galvanized, ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush; clean with solvents recommended by the paint manufacturer, and touch-up with same primer as the shop coat.

3. On galvanized surfaces, use solvent for the initial cleaning and then treat the surface thoroughly with phosphoric acid etch. Remove all etching solution before proceeding.

4. Allow to dry thoroughly before application of paint.

3.04 STAIN APPLICATION

A. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of priming coat. After priming fill holes and imperfections in finished surfaces with putty or plastic wood filler. Sandpaper smooth when dried.

B. Stain or seal wood required to be painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases and paneling.

C. When transparent finish is required, use spar varnish for back priming.

D. Back-prime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

E. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

3.05 PAINT APPLICATIONS

A. General

1. Apply products in accordance with manufacturer’s instructions.

2. Secure color schedules before applying paint or finish. Tint primer and undercoat to the approximate shade of the finish coat.

3. Apply all materials under adequate illumination and as follows:

a. Brush Application: Brush out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

b. Spray Application:

1. Confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.

2. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building of film thickness of two coats in one pass.

4. Allow sufficient drying time between coats. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.

5. Apply materials in sufficient quantity to insure complete coverage and hide. Provide and apply additional coats until paint film is uniform in finish, color, appearance, and coverage.

B. Cleaning:

1. Promptly remove spilled, splashed, or splattered paint on finish as work proceeds and upon completion.

2. Keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris during progress of work.

3. Upon completion of work, leave premises in neat and clean condition.

C. Completed work shall match the approved samples for color, texture, and coverage. Remove, refinish, or repaint all work not in compliance with specified requirements.

3.06 PAINTING SCHEDULE

A. General: Painting required under this section is called for on the drawings. Paint types are as defined below:

Exterior Work:

Surface	1st Coat	2nd Coat	3rd Coat
Hollow Metal Doors & Frames	*	P	P
Exposed Miscellaneous Metal or Structural Steel	*	I	I
Steel Handrails & Steel Lintels	T	I	I
Traffic Bearing Exterior Metals (Steel Ladders – Foot Traffic)	*	R	R
Aluminum	B	A	A
Wood, Visible Blocking, Plywood	C	D	D
Visible Metal Plaster accessories adjoining stucco	B	I	I
Concrete Block	E	F	F
Galvanized Metal	*	I	I

Interior Work:

Surface	1st Coat	2nd Coat	3rd Coat
Concrete Block	E	G	G
Plaster	M	G	G
Gypsum Drywall	M	G	G
Concrete Walls	E	K	K
Concrete Floors (Note 1)	N	Q	Q
Concrete Floors (High Vehicle Traffic, Wet Environments) (Note 1)	N	U	N/A
Wood-Painted (Note 2)	H	G	G
Wood-Natural Finish	J	J	J
Wood-Stained Finish	S	J	J
Hollow Metal, Steel Handrails & Steel stair components	*	P	P
Exposed structural steel & steel joists (Note 3)	*	T	L
Miscellaneous Metal (Note 3)	*	T	L
Steel Deck	*	T	L
Galvanized Metal	*	P	P
Exposed Ductwork (Note 4)	B	B	L

- Shop Coat – See other sections of Project Manual

Note 1: Where non-skid properties are required, a non-skid additive shall be used. Apply per manufacturer's instructions. Confirm if required via Architect.

Note 2: This is for large exposed surfaces. Where paint is indicated on narrow recesses, or on visible surface of back-up supports or blocking, use flat enamel.

Note 3: Inspect shop coat and touch up prior to finish coat application to prevent finish coat contacting bare steel. All exposed structural steel is to be painted in finished areas as per schedule unless noted otherwise on the Contract Documents.

Note 4: Prior to priming and painting of exposed ductwork, both the General and Mechanical Contractors shall clean all ductwork scheduled to receive priming and painting with XIM GON_20 Water-Based Pre-Paint Prep Cleaner, as manufactured by XIM Products, Inc., 1169 Bassett Road, Westlake, Ohio 44145. This product shall be ready to apply from the container. Careful surface preparation and cleaning is required. All surfaces shall be thoroughly clean and free from all grease, wax, oil, polish, loose paint, dirt or rust. Do not use mineral spirits, turpentine solvent or cleaners which will leave an oily residue. Apply product from the can to a clean cloth or wiper and wipe onto the surface to be cleaned. Turn the wiper over or use another cloth to wipe off product and contamination. The cleaning product shall utilize strong alkaline detergents and additives for cleaning tough soils and contamination.

Water-Based Pre-Paint Prep Cleaner Technical Data:

Weight per Gallon: 8.6 lbs/gallon
Color: Clear Semi-Transparent
Application Temperature: 40 degrees F to 100 degrees F
Flash Point: Not Applicable
VOC Content: Less than 10%
Product pH: 12.0 to 13.0

3.07 KEY TO PAINTS

* Shop coat: See other section of Project Manual.

A	Moore's Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29
B	Moore's Super Spec HP Acrylic Metal Primer No. P04 or Corotech Acrylic Metal Primer No. V110
C	Fresh Start Moorewhite Exterior Wood Primer No. 100
D	Benjamin Moore Aura Waterborne Exterior Paint, Low Lustre Finish 634
E	Moore's Super Spec Masonry Interior/Exterior Hi-Build Block Filler No. 206
F	Moore's Super Spec Latex House and Trim Paint No. 170
G	Moorecraft Super Spec Interior Latex Semi-Gloss Finish No. 276 or Super Spec Interior Latex Eggshell Finish No. 274 (Item "G" gloss shall be determined by this Architect)
H	Moore's Fresh Start Multi-Purpose Oil-Based Primer No. 24
I	Moore's Super Spec HP Urethane Alkyd Gloss Enamel No. P22
J	Benwood Stays Clear Acrylic Polyurethane Low Lustre, No. N423
K	Moore's Super Spec Interior Latex Semi-Gloss Finish No. C276
L	Moore's Ultra Spec 500 Interior Acrylic Flat N536
M	Moore's Fresh Start All Purpose 100% Acrylic Primer 023
N	Moore's Corotech 100% Solid Epoxy Pre-Primer No. V155
O	NOT USED
P	Moore's Super Spec DTM Alkyd Semi-Gloss Enamel No. P24
Q	Moore's Latex Floor & Patio Enamel, No. 122, or Corotech Surface Tolerant Epoxy Mastic Coating, No. V160. (Item "Q" shall be as determined by this Architect).
R	Moore's Corotech Polyamide Epoxy Coating No. V400
S	Moore's Quickstain Alkyd Wiping Stain No. 1 AS. 12xx or Lenmar Waterborne Interior Wiping Stain No. 1Wb.1300 (Item "S" shall be as determined by this Architect)
T	Moore's Super Spec HP Alkyd Metal Primer P6
U	Moore's Corotech 100% Solids Epoxy Floor Coating, No. V430

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10100 - VISUAL DISPLAY PRODUCTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 specification sections, apply to the work of this section.

1.02 WORK INCLUDED

A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Chalkboards, tackboards and/or markerboards.

1.03 REFERENCED STANDARDS

A. American Society for Testing Materials

1. ASTM-E 84 Standard Test Method for Surface Burning Characteristics for Building Materials.
2. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Wires, Profiles and Tubes.

1.04 QUALITY ASSURANCE

A. Provide all items in this section as manufactured by: Claridge Products and Equipment, Inc., Harrison, Arkansas 72602-0910, Phone: 870/743-2200 Fax: 870/743-1908.

B. Regulatory Requirements: Conform to applicable code for flame/smoke rating in tackboards in accordance with ASTM-E 84.

C. Operation and Maintenance: Include data on regular cleaning, stain removal, and precautions.

1.05 SUBMITTALS

A. General: Comply with requirements of Section 01300: Submissions.

B. Shop Drawings: Provide shop drawings for each type of visual display board required.

C. Product Data: Provide technical data for materials specified. Include Material Safety Data Sheets, when applicable.

D. Samples and color charts: Provide Manufacturer’s color charts and composition samples of face, core, backing and trim to illustrate finish, color and texture, where required.

E. Manufacturer’s Instructions: Provide Manufacturer’s installation

instructions.

1.06 PROJECT CONDITIONS

A. Field measure prior to preparation of shop drawings and fabrication to ensure proper fit.

B. Comply with manufacturer's recommendations for climatizing area for interior moisture and temperature to approximate normal occupied conditions.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delay.

B. Delivery: Deliver materials in original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Visual Display Board Manufacturer: Claridge Products and Equipment, Inc., Contact: P.O. Box 910, Harrison, AR 72602;
Telephone: (870)743-2200; Fax:(870)743-1908;
E-Mail: claridge@claridgeproducts.com;
website: www.claridgeproducts.com.

B. The terminology used may include reference to the manufacturer's proprietary products. Such reference shall be construed only as establishing the quality of materials and workmanship to be used under this section and shall not, in any way, be construed as limiting competition.

C. Products used shall be those upon which the design is based or shall be equal products as approved in advance by the Architect.

D. All chalkboards and tackboards shall be by one manufacturer.

2.02 MATERIALS

A. Claridge Porcelain Enamel Chalkboards and Markerboards: Porcelain enamel Vitracite chalkboards and LCS markerboards shall be manufactured in accordance with Porcelain Enamel Institute's specification. Porcelain enamel finish shall be fusion bonded to a 24 gauge steel substrate at lowest possible temperature to reduce steel and porcelain stresses and achieve superior enamel bond and hardness.

1. Claridge Factory-Built Chalkboards:

a. Face Sheet: 24 Gauge Vitracite Chalkboard.
b. Core Material: 3/8" Particle Board.
c. Panel Backing: 0.005" Aluminum Foil Panel.

d. Series: Series 1.

e. Typical Arrangement: Type A, Type C, Type D, Type F, Type H, Type BR, reverse BL, Type ER, reverse EL, or Type GR, reverse GL – as indicated on drawings.
f. Panel Size: As indicated on drawings.
g. Panel Color: Color(s) to be selected from manufacturer's standard colors. Color charts furnished on request.

2. Claridge Factory-Built Markerboards:

a. Face Sheet: 24 Gauge LCS Markerboard.
b. Core Material: 3/8" Particle Board.
c. Panel Backing: 0.005" Aluminum Foil Panel.
d. Series: Series 1.
e. Typical Arrangement: Type A, Type C, Type D, Type F, Type H, Type BR, reverse BL, Type ER, reverse EL, or Type GR, reverse GL – as indicated on drawings.
f. Panel Size: As indicated on drawings.
g. Panel Color: Color(s) to be selected from manufacturer's standard colors. Color charts furnished on request.

B. Tackboards

1. Claridge Factory Built Tackboards:

a. Tackboard Surface: Designer Fabric: Fabric on cork underlay with 1/4" hardboard back.
b. Series: Series 1.
c. Typical Arrangement: Type CO, Type C, Type D, Type F, Type H, Type BR, reverse BL, Type ER, reverse EL, or Type GR, reverse GL – as indicated on drawings.
d. Panel Size: As indicated on drawings.
e. Panel Color: Color(s) to be selected from manufacturer's standard colors. Color charts furnished on request.

C. Claridge Tackwalls:

1. Edgewrapped panels of fabric butted together or arranged in configurations as shown on drawings.

a. Designer Fabric (3104EW), fabric on duracore backing with edges wrapped.
b. Architect shall select from fabric manufacturer's (Guilford of Maine) product line.

D. Claridge Horizontal Sliding Markerboard/Chalkboard

1. Series: Two track

a. Sliding panels and back panel x writing surface. 24 gauge steel LCS markerboard or 24 gauge steel Vitacite chalkboard.
b. Core: 3/8" Honeycomb (Sliders) 3/8" particle board (back panel).
c. Backing: Steel (Sliders) moisture barrier back (back panel).

2. Sizes: As indicated on drawings.
3. Typical arrangement: Two (2) sliding panels and back panel to match sliding writing surfaces.

4. Fabrication: Reinforced corners with angles to strengthen frame. Nylon ball bearing rollers at top of unit and nylon guide rollers at bottom of unit to be of sufficient size and number to eliminate vibration and provide smooth and quiet operation of the panels.

E. Claridge Extruded Aluminum Trim with Satin Anodize Finish and Accessories

1. Factory-Built Trim:

a. Series: Series 1.

2. Field-Assembled Trim:

a. Snap-On Aluminum Trim.
b. Length: As required by size indicated on drawings.
c. Finish: Satin Anodize.

3. Chalktrough:

a. Standard continuous, hollow aluminum box tray with injection molded end closures.

4. Map Rail:

a. Standard continuous 1" map rail with cork insert and end stops at the top of each chalkboard or markerboard.

5. Accessories:

a. Map Hooks: One map hook furnished for every two feet of Map Rail on Factory-Built Units.
b. Roller Brackets: (2) two each.
c. Flag Holders: (1) one each.

F. Claridge Modular Markerboard, Chalkboard and Tackboard Units (Where noted on drawings):

1. Typical Arrangement: MOD3.
2. Writing Surface: 24 gauge Vitracite chalkboard and/or 24 gauge LCS markerboard.
3. Tackboard Surface: Fabricork.
4. Panel Size: As indicated on drawings.
5. Wall Standards: Single or double aluminum wall standards, slotted to receive special modular panel clips. Standards to be fastened directly to wall on 4 foot centers.
6. Panel Color: Color(s) to be selected from manufacturer's standard colors.

PART 3 - EXECUTION

3.01 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of the work. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

B. Verify before installation that interior moisture and temperature approximate normal occupied conditions.

C. Verify that wall surfaces are prepared and ready to receive boards.

3.02 INSTALLATION

A. Delivery factory-built chalkboard and tackboard units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide two or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

B. Install units in locations and mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.

1. Anchor all components securely using tamper-proof fasteners, where accessible or with completely concealed continuous hangers.

C. Coordinate job-site assembled units with grounds, trim, and accessories. Joint all parts with a neat, precision fit.

3.03 ADJUST AND CLEAN

A. Verify that accessories required for each unit have been properly installed and that operating units function properly.

B. Clean units in accordance with the manufacturer's instructions. Break in chalkboards and marker boards only as recommended by the manufacturer.

3.04 WARRANTY

A. Submit a “Life of the Building” warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer’s instructions and recommendations, Claridge porcelain enamel steel Vitracite chalkboards and LCS markerboards are

guaranteed for the life of the building. Guarantee covers replacement of defective boards but does not include cost of removal or reinstallation.

B. Submit a standard warranty, stating when installed in accordance with manufacturer's instructions and recommendations, Claridge tackboards are guaranteed for one year against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of effective material but does not include cost of removal or reinstallation.

C. Writing Surface Warranty Period: 10 years commending on Date of Substantial Completion.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10441 - SIGNAGE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish and install non-illuminated signs at selected locations as specified herein.

1.02 SHOP DRAWINGS

A. Before any work is fabricated or delivered to the job site, shop drawings and/or catalog cuts of accessories shall be submitted for approval in accordance with the applicable provisions of the "General Conditions". Furnish itemized accessory lists, indicating location, height, quantity, and accessories being provided.

1.03 SAMPLES

A. Submit samples, if requested, for approval in accordance with applicable provisions of the "General Conditions".

1.04 GENERAL REQUIREMENTS

A. Visit the site and check field conditions, locations, and dimensions affecting this work. Report any conditions which will interfere with, or prevent, proper execution of the work.

PART 2 - PRODUCTS

2.01 SIGNAGE

A. Furnish and install, at all exterior ramps, walkways, and parking locations modified to accommodate the handicapped, die embossed 12" x 18" heavy duty steel signs, protected with three (3) coats of baked enamel. Sign shall be provided with the international words "HANDICAPPED PARKING" printed in white at the bottom. Signs shall be securely mounted on heavy rail steel (weight 2 lbs./ft.) U-channel posts, driven into the ground a minimum of four (4) feet or embedded into minimum 1'-0" diameter x 2'-0" deep concrete footings.

B. Furnish and install, at all handicap accessible entries, toilet rooms, and ramp locations, handicapped signs with 1/8" thick raised white international symbol of access and raised letters and/or numerals 1/32" high (minimum), upper case Sans Serif or Simple Serif type, accompanied with Grade 2 Braille characters at least 5/8" high, but no higher than 2". Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram.

C. The vertical space allowed for a pictogram shall be a minimum of 6" in height, (i.e., picture a 6" high window with a pictogram superimposed into it; the pictogram itself does not have to be a full 6"). Within this 6" window, you cannot place Grade 2 Braille or text.

D. Raised borders around pictograms are not required and can sometimes cause confusion for the tactile reader. If used, it is suggested that they be placed a reasonable distance from the other text elements.

E. Pictograms do not need to be raised. This gives the sign maker the option to use surface engraving, reverse engraving, raised, or other methods for the pictogram portion of the sign.

F. Furnish and install "Emergency Evacuation Route" signage, (12"h x 18"w), location, style and quantity shall be as directed by Architect. Refer to Item B above for lettering and Braille requirements.

G. Furnish and install all building "Maximum Occupancy" signage, (18"h x 24"w) in all areas affected by the scope of work where not already provided. Location, style and quantity shall be as directed by Architect. All signage shall be in conformance with local Fire Marshal's Office requirements.

H. ADA Pictograms shall be the current standard symbol for accessibility for New York State adopted per Law A.8193/S.6846.

2.02 CHARACTER PROPORTION

A. Letters and numbers in signs shall have a width-to-height ratio between 3:5 and 1:1.

B. Stroke width-to-height ratio shall be between 1:5 and 1:10.

2.03 SIGN FINISH AND CONTRAST

A. Characters and background of signs shall be eggshell, matte, or other non-glare finish.

B. Characters and symbols contrast with their background - either light characters on a dark background or dark characters on a light background. Examples of acceptable color combinations would be white/black, white/red, and white blue. Unacceptable would be light green/dark green, dark green, and dark gray/black.

C. The preference is through the use of light characters or symbols on a dark background.

D. All interior plastic signage shall have a surface burning characteristic, Class A and flame spread rating not to exceed 0-25 and smoke developed rating not to exceed 450, in accordance with ASTM E-84.

PART 3 - EXECUTION

3.01 MOUNTING LOCATION AND HEIGHT

A. Where permanent identification is provided for rooms and spaces, signs shall be installed on the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door

(including double leaf doors), signs shall be placed on the nearest adjacent wall.

B. Mounting height shall be 60" above the finish floor to the centerline of the sign.

C. Mounting location for such signage shall be so that a person may approach within 3" of signage without encountering protruding objects or standing within the swing of a door.

D. Location and colors of signs shall be as selected by the Owner and approved by the Architect.

E. Signs shall be securely mounted to the wall surface as recommended by the manufacturer and as approved by the Architect.

F. Signs shall be as manufactured by Allstate Sign and Plaque, 70 Burt Drive, Deer Park, New York, or approved equal. (Signage shall comply with M.U.T.C.D.)

G. All signage shall be installed in accordance with CABO/ANSI 117.1 and ADA standards and requirements.

3.02 GUARANTEE

A. All materials and workmanship shall be guaranteed for a period of not less than one (1) year from date of final completion in accordance with the applicable provisions of the "General Conditions".

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10520 - FIRE EXTINGUISHERS, CABINETS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Fire extinguishers.

2. Fire extinguisher cabinets.

1.02 RELATED WORK

A. Related work specified in other sections of the specifications:

1. Section 04200 – Unit Masonry.

2. Section 05500 – Metal Fabrication.

2. Section 06100 - Rough Carpentry.

1.03 CONTRACT DOCUMENTS

A. Applicable provisions of the Conditions of the Contract shall govern all work of this section.

1.04 QUALITY ASSURANCE

A. Conform to NFPA 10 requirements for portable fire extinguishers.

B. Fabricated materials must be the product of a manufacturer known as experienced and able in the specialty trade involved, and the manufacturer shall be approved by the Architect.

C. All work is to be executed by skilled mechanics and shall be of the finest quality, neat in appearance, and free of defects.

D. Installation shall be made by the manufacturer or by his licensed or franchised representative who shall be approved by the Architect.

1.05 REFERENCES

A. NFPA 10 - Portable Fire Extinguishers
B. ADA Accessibility Guidelines
C. UBC Standard 7-5 (ASTM E-814-83) - Fire-rated cabinet option for combustible and non-combustible walls

1.06 SUBMITTALS

A. Shop Drawings: Submit complete an accurate shop drawings, details, or illustrated literature to the Architect for approval. No installation shall be made without the prior approval of the Architect.

B. Manufacturers Product Data: Submit manufacturers product literature for both extinguishers and cabinets in accordance with Section 01300.

1.07 JOB CONDITIONS

A. Take and verify all measurements required for the proper execution and fit of the work at the building before starting fabrication or erection and examine the nature of material to which work is to be attached.

B. The Contractor will be responsible for the proper attachment of work furnished under this section and for the work of other trades related to it.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fire Extinguishers:

1. Furnish and install Multi-Purpose dry chemical fire extinguishers similar or equal to **Model MP5-A** as manufactured by Larsens Manufacturing Company, 7421 Commerce Lane N.E., Minneapolis, MN 5532, (763) 571-1181.

2. Body of extinguishers shall be red enameled steel, approximately 16 inches high, 4-1/4 inches in diameter, and weighing approximately 9 lbs. Each extinguisher shall be provided with chrome plated valves, color code nozzles, pressure indicating gauges, charging adaptors, moisture traps, metal pull rings complete with chain, and all other accessories required for a complete installation including metal wall brackets for units not encased in cabinets.

3. Dry chemicals for extinguishers shall be specially fluidized and siliconized mono ammonium phosphate prepared as a multi-purpose product developed for the use of Class A, B, and C fires.

4. Fire extinguishers indicated on drawings not provided with cabinets shall be wall hung on metal brackets from which extinguishers shall be hung. Fire extinguishers shall be installed at height recommended by OSHA and in coordination with ADA guidelines.

5. Fire extinguisher units shall be of type approved by the National Board of Fire Underwriters' Standard No. 299, the requirements of the Occupational Safety and Health Administration, and all other local codes and authorities having jurisdiction over same, and they shall bear the necessary labels of the Underwriters' Laboratories, Inc.

6. Fire extinguishers shall have a dial to indicate air pressure.

7. All fire extinguishers shall be of manufacture approved by the Architect.

8. The required quantity, and location of fire extinguishers shall be as shown on the drawings.

9. All fire extinguishers shall be fully charged and left ready for operation.

B. Fire Extinguisher Cabinets:

1. Semi recessed type fire extinguisher cabinets shall be Architectural Series **Model No. FS2409-R3** Fire Rated Cabinet as manufactured by Larsen Manufacturing Company, or equal as approved by the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that rough openings for cabinets are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with the manufacturer's printed instructions, requirements of agencies having jurisdiction and reviewed shop drawings. Installation shall maintain fire rating of partitions requiring same.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10601 - POLYMER TOILET PARTITIONS

PART 1 - GENERAL

1.01 SCOPE

A. Requirements of the General Conditions and Special Conditions apply to the work in this section.

B. Provide all labor, materials, etc. necessary for the completion of the work of this section as specified or shown on the drawings.

C. Work of this section consists of, but is not limited to, the following:

1. Provision and installation of toilet stalls, stall doors, urinal screens, privacy screens, restroom entry partitions and shower partitions.

2. Hardware, etc. for stalls & partitions.

3. Shop drawings.

4. Labor and Material Guarantee per General Conditions and provide 15 year manufacturer's material guarantee to the Architect for approval with Contractor's Final Application for Payment.

1.02 SUBMITTALS

A. All submittals shall be in accordance with Section 01300 – Submissions.

B. Submit manufacturer’s product data and shop drawings, including details and a sample of each item of hardware for Architect's approval.

C. Provide drawings showing locations for adequate steel reinforcements of wood blocking in walls to be provided for proper securement of the finished work.

D. Furnish physical samples and/or color cards for the use of the Architect. Selection of colors shall be from all Color Collections including but not limited to: Classic, Metallic, Mosaic & Designer and in all Texture options, as selected and approved by the Architect.

E. Provide manufacturer’s recommended maintenance procedures.

PART 2 - MATERIALS

2.01 GENERAL

A. Toilet partitions, privacy screens and restroom entry partitions shall be floor mounted, overhead braced, with non-corrosive panels, doors, pilasters, shoes, and wall brackets similar and equal to 1”

thick high density polyethylene resin partitions as manufactured by Scranton Products, ASI Global Partitions or comparable products with hardware as specified herein.

B. Panels, doors, pilasters, shoes, and wall brackets shall be fabricated from Polymer resins under high pressure forming a single component section which is waterproof, nonabsorbent, and has self-lubricating surface that resists marking with pens, pencils, or other writing utensils. All panels, doors, and pilasters to arrive at job site with special protective plastic coating.

C. Construction:

1. Single component construction of solid HDPE in colors that extend from the surface throughout the entire thickness of the panels, doors, and pilasters. **Color: 'ASI #9509 Blue'**

2. Doors, panels, and pilasters shall be 1-inch thick and all edges machined to a radius of .250 inch and all exposed edges to be free of saw marks.

3. Dividing panels shall be 55 inches high and mounted at 14 inches above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all panels full length. Panel at the end of layout shall extend up and fasten into headrail.

4. Doors shall be 55 inches high and mounted at 14 inches above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all doors full width.

5. Pilasters shall be 82 inches high and fastened to 3 inch high Type 304 20 gauge stainless steel shoes with one-way stainless steel theft proof torx head sex bolts.

6. Finish of doors, panels, and pilasters shall be similar or equal to Scranton Products "Plastic-Glaze 280."

D. Performance Requirements:

1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:

   a. Smoke Developed Index: Not to exceed 450
   b. Flame Spread Index: Not to exceed 75
   c. Material Fire Ratings:

      1. National Fire Protection Association (NFPA): Class B
      2. International Code Council (ICC): Class B

NOTE: ALL Color Collections and Textures by Scranton Products & ASI Global Partitions are available in Class B fire ratings – additional lead times should be anticipated.

E. Quality Assurance:

1. Manufacturer's Qualifications: A company regularly engaged in

manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

2. Installer's Qualifications: A company or individual, regularly engaged in installation of products specified in this section, with a minimum of 5 years experience.

2.02 HARDWARE

A. Door hardware shall be as follows:

1. Full length continuous piano hinges shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wrap around flanges, surface mounted, and thru-bolted to doors and pilasters with stainless steel one-way sex bolts. Hinges will be factory set to a full close position unless otherwise noted.

2. Each door shall be furnished with one coat hook/bumper of heavy chrome plated Zamack with rubber bumper (handicapped doors also include one door pull and one wall stop).

3. Door strike and keeper shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wrap around flange, surface mounted, and thru-bolted to pilaster with one-way stainless steel sex bolts. Strike shall be heavy duty 6-inch strike plates. Bumper shall be made of extruded black vinyl.

4. Door latch housing shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish, surface mounted, and thru-bolted to door with one-way sex bolts. Slide bolt and button shall have a black anodized finish.

B. Pilaster shoes shall be made of 20 gauge stainless steel, 3 inches high. Pilaster shoes shall be anchored to finish floor with No. 5 Plastic Anchors and stainless steel tamper resistant Torx head sex bolt.

C. Full length continuous wall brackets 6364-T5 alloy with mill finish weighing not less than 1.685 lbs. per linear foot, similar and equal to Scranton Products 1 ½" stirrup type shall be used for all panels to pilaster, pilaster to wall, and panel to wall connections. Wall brackets shall be predrilled by manufacturer with holes spaced every 6 inches along the full length of the brackets. Wall brackets shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment of bracket to adjacent wall construction shall be accomplished by one theftproof Zamac mushroom nail in head anchor directly behind the vertical edge panels and pilasters at every 12 inches along the full length of the bracket and two No. 5 plastic anchors and No. 14 x 1 1/4-inch stainless steel Phillips head screws at each 12 inch interval alternately spaced between anchor connections.

D. Headrail shall be heavy aluminum extrusion (6364-T5 Alloy) with mill finish in anti-grip configuration weight not less than 1.188 lbs. per linear foot similar and equal to Scranton Products, Section No. 58993. Headrail shall be fastened to tops of pilasters

and headrail brackets by thru-bolting with one-way stainless steel sex bolts.

E. Headrail brackets shall be 20-gauge stainless steel with a satin finish and secured to the wall with a stainless steel tamper resistant torx head screw.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Erection of partitions, etc. shall be in accordance with the manufacturer's standard recommendations and the following:

1. All parts shall be erected in a substantial manner, straight, level, and plumb.

2. No evidence of drilling, cutting, or patching shall be visible in the finished work.

3. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/16-inch.

4. Finished surfaces shall be cleaned after installation and left free of imperfections.

5. Doors and panels shall be mounted at 14” above finished floor unless otherwise indicated.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10800 - TOILETACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. The Contractor shall provide and install all toilet room and water closet accessories as specified herein.

B. Related work in other sections of the specifications includes, but are not limited to, the following:

1. Section 10601 - Polymer Toilet

rtitions.

1.02 SUBMITTALS:

A. Shop Drawings.

1. Submit shop drawings of all accessories. Shop drawing shall show location, mounting height, and attachment and anchorage details.

B. Manufacturer's Data:

1. Submit manufacturer's product data for all accessories to include recommended installation requirements.

C. Submission:

1. All submittals shall be forwarded in a timely manner in accordance with the requirements of Section 01300 of the Project Manual.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver all materials to project in manufacturer's unopened, original packaging bearing clear identification of brand and name.

1.04 JOB CONDITIONS:

A. General Contractor shall be responsible for receiving, storing, and protection of toilet accessories against loss, misplacement, theft, or damage.

B. General Contractor shall be responsible for the proper installation of the toilet accessories in strict accordance with the approved submittals and instruction sheets.

C. Inserts and anchoring devices which must be set in concrete or masonry shall be delivered in time so as not to delay the construction schedule.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. All products shall be as manufactured by Bradley (unless otherwise noted), or equal, as follows.

1. Mirrors: Standard Model 780-1836-2 Framed Mirror. Provide barrier free Model 740-1836-2 where indicated on the drawings. For all mirror types, provide quantity as indicated on the drawings for 18" wide x 36" high mirror with theft resistant mounting. Mirror shall be framed with Type 304 (18-8), 3/4" x 3/4" 18 gauge stainless steel angle with 20 gauge-concealed stiffeners. Welded corners shall be polished to a uniform satin finish. Mirror shall be of first quality 1/4" tempered glass guaranteed for 15 years against silver spoilage and protected by shock absorbing, waterproof filler. Back of unit shall be 20 gauge galvanized steel secure to frame with concealed screws, equipped with integral horizontal hanging brackets and separate wall hanger for concealed mounting.

2. Soap Dispensers: Provided by owner, installed by General contactor.

3. Grab Bars: Model 8320-2 grab bars with safety grip finish. Provide grab bars as specified herein and indicated on the drawings. Flanges shall be fabricated of Type 304 (18-8), 3-1/8" diameter 11-gauge stainless steel. Escutcheons shall be of Type 304 (18-8), 22-gauge stainless steel. One piece drawn construction with exposed surfaces in architectural satin finish. Provide snap over flanges to conceal mounting screws. Tubing shall be of Type 304 (18-8), 1-1/4" O.D. 18 gauge stainless steel, and seamless construction with exposed surfaces in architectural satin finish. Bent ends of tubing pass through the flanges and are heliarc welded into a single structural unit for maximum strength. Intermediate supports are contour cut and joined by heliarc welding to form an integral part of the grab bar. All welds ground and polished to blend. Use mandrel-bending process to maintain uniform bar diameter. Return shall provide 1-1/2" standard safety clearance between wall and bar. Heavy-duty grab bars shall withstand loads in excess of 1,300 lbs. without failure when mounted as per manufacturer's recommendation. Provide certification of the grab bar test data as performed by an independent professional testing laboratory.

4. Paper Towel Dispenser: Provided by owner, installed by General contactor.

5. Toilet Paper Dispenser: Provided by owner, installed by General contactor.

6. Automatic Hand Dryers: Excel Dryer, Inc., Xlerator, Model XL-W (electronic controls). Provide at locations and in quantities as indicated on the Drawings. If not shown in the drawings, only paper towel dispensers are required. Surface mounted, cover shall be one piece heavy-duty, die cast zinc alloy, 5/8" HP motor with air velocity of 16,000 LFM at the air outlet (900 W heating element). Power requirements: 120V, 12.5 amp, 60 Hz. Provide internal noise reduction nozzles.

7. Coat/Robe Hook: Provide coat/robe hook model '9119' as back of toilet room door as noted on drawings.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Installations shall be rigid, straight, plumb, and level with proper clearances.

B. Installation shall be as per manufacturer's instructions.

3.02 ADJUST AND CLEAN:

A. Adjust and lubricate all hardware for proper operation after installation.

B. Clean and touch up exposed surfaces following manufacturer's recommendations.

END OF SECTION

DIVISION 12 - FURNISHINGS

SECTION 12462 – LAMINATE CLAD CASEWORK

PART 1 – GENERAL

1.01 SUMMARY

A. Related Documents:

1. Drawings and provisions of the contract including General Conditions Supplementary Conditions and Division 1, apply to this section.

B. Section Includes:

1. Furnish and install plastic laminate casework and accessories as shown and listed on drawings and specified herein. Includes all countertops, sink cutouts, splashes, supports, shelving, and filler panels necessary for a complete casework installation.

C. Related Requirements to be Performed by Others:

1. Section 06100 – Rough Carpentry
2. Section 06200 – Finish Carpentry
3. Section 07900 – Caulking
4. Section 09650 – Resilient Flooring

1.02 REFERENCES

A. ANSI-A135: For all hardboard.
B. ANSI-A161.2-1998: For performance of fabricated high-pressure decorative laminate countertops.
C. ANSI-A208.1-2016: For grade M-3 mat-formed wood particleboard.
D. BHMA A156.9: For grade-1 hinge requirements.
E. NEMA 3 LD-2005: For performance requirements of high pressure laminates.
F. AWS: American Woodworking Standards, Edition 2.

1.03 DEFINITIONS

A. Exposed:

1. In casework, surfaces visible when drawers and opaque doors (if any) are closed; behind clear glass doors; bottoms of cabinets 42" or more above finished floor; and tops of cabinets less than 78" above finished floor.

B. Semi-Exposed:

1. In casework, surfaces that become visible when opaque doors are open or drawers are extended; bottoms of cabinets more than 30" or tops of cabinets less than 42" above finished floor.

1.04 SUBMITTALS

A. Shop Drawings:

1. Comply with Division 1.

2. Include catalog numbers and detailed written specifications.

3. Submit three sets of shop drawings consisting of:

a. Finish, hardware, construction options selection sheet.
b. Small scale floor plan showing casework in relation to the building.
c. Large scale elevations and plan views.
d. Cross-sections; service runs; locations of blocking within walls (blocking is done by others); rough-in requirements and, sink centerlines.

4. Manufacturer and/or Contractor verifies all critical building dimensions prior to fabrication.

B. Samples:

1. Submit one set of laminate color brochures or webpage reference from standard laminate manufacturers Wilsonart, Formica, Pionite, and Nevamar.

2. Submit one edge color sample chain.

3. Submit catalog showing construction details, material specifications and hardware specifications of all items used.

C. Warranty:

1. Provide sample warranty document stating specified terms as referenced in 1.07.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Must be certified for chain of custody by a third party certification group approved by FSC.

B. Unless otherwise indicated, comply with AWI, for grades of interior architectural woodwork, including installation, complies

with requirements of grades specified. The manufacturer, upon award of work, shall register the work under this section with AWI Quality Certification Program (800-449-8811).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver casework once painting, and similar requirements have been completed that will not damage casework. This includes ensuring spaces are enclosed and weather tight.

2. All casework shall be blanket wrapped for protection during shipping.

B. Storage and Handling:

1. Casework must be protected from dust, dirt and/or other trades.

2. Countertops are stacked, properly supported and spaced evenly to avoid warping. Large pieces are stacked first on the pallets with shorter pieces stacked on top.

1.07 WARRANTY

A. Provide a **Five-Year** warranty to the owner against defective material and workmanship.

1. The warranty specifically does not cover any product or hardware, which has been incorrectly installed, including poor climate conditions, exposed to excessive loads or abuse.

2. Non-casework items supplied, but not necessarily manufactured by the casework manufacturer including, but not limited to sinks, fixtures, apparatus, fume hoods, keyboard trays, spray booths, lights, power outlets, and power strips shall be covered under the original manufacturers' warranty.

PART 2- PRODUCTS

2.01 MANUFACTURERS

A. Design is based on use of products as manufactured **Case Systems**, 2700 James Savage Road, Midland, Michigan 48642 (989) 496-9510 and/or approved dealers, and the terminology used may include reference to that manufacturer's proprietary products. Such reference shall be construed only as establishing the quality of materials and workmanship to be used under this section and shall not, in any way, be construed as limiting completion.

2.02 MATERIALS

A. Provide Plastic Laminate Faced Cabinets Manufactured with:

1. Particleboard Core:

a. All particleboard shall be Grade M-3i and shall meet or exceed all requirements as set by ANSI-A208.1-2016.

Modulus of Rupture	2176 psi
Modulus of Elasticity	362600 psi
Internal Bond	73 psi
Linear Expansion	0.40%
Thickness Tolerance	+/- 0.008"
Face Screw Holding	225 pounds Min

2. MR (Moisture Resistant)/FSC Core shall be:

a. Interior-Grade moisture resistant particleboard.
b. Meet or exceed M-3i Grade, according ANSI-A208.1-2016.

c. ULEF/FSC (No added Urea Formaldehyde) Plywood:

1. Plywood that meets or exceeds the standards set forth by the APA for structural use panels.
2. For casework core being manufactured without the use of urea formaldehyde.
3. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

d. FSC M-3i Particleboard:

1. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

e. FSC Plywood:

1. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

B. Joinery:

1. Mechanical Joinery:

a. All cabinet body components shall be secured utilizing concealed interlocking mechanical fasteners as approved by the AWI Quality Standards 8th Edition-2003 Sections 400A-T-12, 400B-T10 and 1600-T-11.

C. Surface Material:

1. Acceptable laminate color, pattern, and finish as either scheduled or otherwise indicated on drawings or as selected by Architect from manufacturer's standards types and nominal thickness including:

a. Vertical surface decorative grade VGS: .028" thick
b. General purpose decorative grade HGS: .48" thick
c. Cabinet decorative liner grade CLS: .020" thick
d. Non-decorative backer grade BKH: .028" thick
e. Thermally fused melamine laminate.
f. Chemical resistant decorative laminate.

D. Edge banding:

1. PVC

a. Shall be applied utilizing hot melt adhesive and radiused by automatic trimmers. Edging shall be available in a variety of color options.

E. Adhesives:

1. PVA

a. Adhesive shall be mechanically applied.
b. NAUF, no VOC

2. EVA

a. Adhesive shall be mechanically applied.

F. Protective coating option:

1. All surfaces, including: pulls, hinges, countertops and edge banding be coated with OEM-treated, quat-silane antimicrobial AEM 5772 from AEGIS Environments.

2.03 FABRICATION

A. General Cabinet Body Construction:

1. Cabinet Box Style shall be **Reveal Overlay.**

2. Cabinet Box Core shall be **Particleboard.**

3. Bottoms and ends of cabinets, and tops of tall cabinets and tops and bottoms of wall cabinets (all structural components) shall be 1"-inch thick.

4. All panels shall be manufactured with balanced construction.

5. Fixed interior components such as dividers, and cubicle compartments shall be full 3/4" thick and attached with concealed interlocking mechanical fasteners.

6. Cabinet body exterior surfaces shall be: **VGS.**

7. Cabinet finished interior options shall be: **Finished at opens. (Decorative thermally fused).**

8. Cabinet body interior surfaces shall be: **Thermally Fused.**

9. In closed cabinets body front edge shall be: **.020" PVC**

10. Mounting stretchers are 3/4" thick structural components fastened to end panels and back by mechanical fasteners, and are concealed by the cabinet back.

11. When the rear of a cabinet is exposed, a separate finished 3/4" thick decorative laminate back panel shall be provided.

12. Backs of cabinets are 1/2" thick surfaced both sides for balanced construction and fully captured on both sides and bottom.

13. A 5mm diameter row hole pattern 32mm (1-1/4") on center shall be bored in cabinet ends for adjustable shelves. This row hole pattern shall also serve for hardware mounting and replacement and/or relocation of cabinet components.

14. An upper 3/4" thick stretcher shall be located behind the back panel and attached between the end panels with mechanical fasteners. This stretcher is also fastened to the full sub-top thus capturing the back panel.

B. Base Cabinet Construction:

1. All base cabinets, except sink cabinets, shall have a solid 3/4" thick sub-top of core (as specified above), fastened between the ends with interlocking mechanical fasteners.

2. Sink cabinets with a split removable back panel shall have a formed metal front brace, and steel corner gussets shall be utilized to support and securely fasten top in all four corners. Front brace shall be powder coated black.

C. Tall Cabinet Construction:

1. All tall cabinets shall be provided with an intermediate fixed shelf to maintain internal dimensional stability under heavy loading conditions as well as an intermediate 3/4" thick stretcher located behind the back panel and be secured between the cabinet ends with mechanical fasteners. The stretcher shall be secured to the shelf through the back with #8 x 2" plated flat head screws.

D. Wall Cabinet Construction:

1. All wall cabinet bottoms shall be ¾”-inch thick core (type specified above), mechanically fastened between end panels and secured to the bottom back stretcher. A lower 3/4" thick stretcher shall be located behind the back panel and attached

between the end panels with mechanical fasteners. The stretcher is also secured through the back and into the cabinet bottom. Wall cabinets over 36” in width shall receive a fixed intermediate partition.

2. All wall cabinet exterior bottoms shall be: **Match Exterior Surface.**

3. All wall cabinet tops shall be: **¾-inch.**

E. Tall and Wall Cabinet Top Edges shall be: **.020" PVC at Top of End Panels, Stretchers & Back.**

F. Tall, Wall and Hutch Tops shall be: **HPL to Match Exterior Surface.**

G. Tall, Wall and Hutch Upper Door Reveal shall be: **15mm Reveal.**

H. Toe Base of Cabinet:

1. Individual bases shall be constructed of: **Pressure treated plywood** factory applied to base and tall cabinets and shall support and carry the load of the end panels, and the cabinet bottom, directly to the floor. The base shall be let in from the sides and back of the cabinet to allow cabinets to be installed tightly together and tight against a wall, also to conceal the top edge of applied vinyl base molding (not supplied by casework manufacturer). There shall be a front to back center support for all bases over 30" wide.

2. Toe Base Height: **96mm.**

3. Toe Base Options: **Attached.**

I. Drawer Fronts and Solid Doors:

1. All drawer fronts and solid door components shall be: **Particleboard** surfaced both sides for balanced construction.

2. Options shall be: **HPL Door and Drawer Front Exterior and Grade CLS on Interior or Corkboard Doors as selected by Architect.**

3. Surfaces shall be: **HPL Grade VGS.**

4. Door and drawer front edge shall be: **3mm PVC.**

J. Drawer Boxes:

1. Drawer box constructed with a full 1/2" thick core shall be: **Particleboard** non-racking, non-deflecting platform bottom that is carried directly by “L” shaped, bottom mount drawer glides.

2. Drawer box at finished interiors shall be: **Surface to Match Standard Interior.**

3. **Standard: Slides are secured with 1-1/4" long screws driven through the platform and into the sides. Drawer box sides, backs, sub-front, and bottom shall be 1/2". The top edge shall be nominal 1mm (.020") PVC matching the drawer color. Drawer box corners shall be joined with fluted hardwood dowels and glue spaced at a minimum of 32mm on center. Drawer box fronts shall be removable and attached to drawer box sub-front with screws from inside of drawer. Horizontal parting rails between drawers shall be 3/4" thick core, with balanced surfaces, secured to and further reinforcing cabinet ends. File drawer box shall have full-height sides supporting a heavy-duty support rail for hanging file folders.**

K. Doors:

1. Solid Doors shall be: **¾" thick core.**

2. Glazed Doors, Framed shall be:

   a. Hinged or sliding 3/4" thick, framed doors shall be: **Tempered Glass Panels.** Panels must be 1/4" thick. Glazing panel shall be set into the doorframe with the use of a separate molding. Glazing shall be held in place with removable stops.

3. Glazed Doors, Frameless shall be:

   a. Sliding, minimum 1/4" thick tempered glass panels. All edges to be radius ground and polished.

4. Sliding Doors shall be:

   a. Extruded aluminum upper track with anodized finish. All tall cabinets shall receive two hanging brackets per door with two rollers per bracket. All other cabinets shall receive two hanging brackets per door with one roller per bracket. The bottom of door shall be captured in a retainer to prevent doors from swinging in or out.

5. Pocket Doors shall be:

   a. Zinc plated, self-closing, three-way adjustable geometric door hinge with precision steel ball bearing slides.

L. Shelves:

1. Adjustable:

   a. Adjustable shelves shall be: **Particleboard** with balanced surfaces.

   b. Adjustable shelves in closed cabinets shall be: **1" for All Shelves.**

c. All adjustable shelves in open cabinets shall be: 1" thick, except for special use cabinets such as mail, cubical, instrument or locker type units.

d. Adjustable shelf edge on open cabinets shall be: **3mm PVC on Front Edge.**

e. Adjustable shelf edge on closed cabinets shall be: **.020" PVC on All Four Edges.**

f. Adjustable shelf shall be set back: **15mm from the front** or **23mm setback option when locks are used.**

2. Fixed:

a. Fixed shelves shall be: **Particleboard.**

b. Fixed shelves shall be: **1" for All Shelves.**

c. Fixed shelf surfaces on closed cabinets shall be: **Match Interior Selections.**

d. Fixed shelf surfaces on open cabinets shall be: **HPL to Match Exterior.**

3. Wall shelving selections for model numbers R204, R205, R206 only shall be:

a. **3mm PVC.**

b. Particleboard

c. Thermally Fused

4. Wire Shelves shall be white, plastic coated.

5. Hardboard Shelves shall be ¼" thick tempered hardboard. All hardboard shall have a "S2S" surface finish.

M. Specialty Products:

1. Countertops:

a. High-pressure decorative laminate, nominal **1-1/2" thick buildup,** conforming to NEMA Standard LD3-2005 and ANSI A161.2-1998.

1. General Purpose: **HGS.**

2. Laminate bonded to M-2: **Particleboard** core with PVA rigid adhesives. Core shall be balanced with backing Grade BKL.

3. All joints shall be secured with biscuits for alignment and tight joint fasteners.

4. Provide 4" high back splashes with thickness matching countertop thickness where shown and at all ends abutting walls and adjacent cabinets.

5. Provide edges: **3mm**

6. The maximum lengths of HPL buildup particleboard tops is 12’ and the maximum lengths of HPL buildup plywood tops is 8’.

2. Quartz Countertops:

a. Provide quartz countertops as manufactured by Wilsonart. Provide waterfalls, backsplashes where noted on plans, nominal **1/2" thick**

2.02 FINISHES

A. Plastic Laminate Casework Colors:

1. High Pressure Laminate is available in non-premium, non-specialty and manufacturers’ standard suede finishes from our select laminate manufacturers, including:
a. Wilsonart® in a “60” or “38” matte finish and **Standard: Formica in a ”58” finish, unless otherwise noted on the Construction Documents.**

b. Color: Specialty and other manufacturer finishes are available with additional cost and longer lead times.

2. Thermally Fused Melamine Laminate that meets performance requirements of ANSI/NEMA 3 LD – 2005 for GP-28.

a. **Natural Almond (Wilsonart D30), Fashion Grey (Wilsonart D381), Frosty White (Wilsonart 1573).**

3. Cabinet Liner .020" thick, high-pressure cabinet liner conforming to ANSI/NEMA 3 LD – 2005, Grade CLS. Surface texture shall be similar to exterior finish. Color shall match interior.

a. **Almond, Grey, White.**

B. Accessories:

1. Hinges:

a. 5-Knuckle Hinge / Reveal Overlay: Three finishes are available as standard in epoxy powder coat: **Black,** or **Almond,** or **Platinum.**

2. Pulls:

a. 96mm Stainless Steel

b. Epoxy Coated Wire Pulls shall be available as standard in: **Almond, Platinum,** or **Black.** Or as specified by Architect.

C. Glazed Door Trim shall be one of our standard colors: **Black, White, Almond,** or **Grey.**

D. Countertop Supports shall be in one of our standard colors: **HPL to match.**

E. Round Grommet shall be in one of our standard colors: **Black.**

F. Round Grommets shall be in one of our standard colors: **Black.**

2.03 ACCESSORIES

A. Hardware:

1. Hinges

a. 5-Knuckle Hinges/Reveal Overlay: Standard: Hinges shall be: .095” thick settle five-knuckle hospital-tip, institutional Grade (Grade 1 per ASNI/BHMA A156.9) quality with .187” diameter tight pin. Each hinge shall be secured with a minimum of nine No. 8 screws. Hinge shall permit door to swing 270 degrees with binding. Doors less than 48” in height shall have two hinges. Doors have over 48” in height shall have three hinges.

2. Pulls:

a. One pull shall be: located at the centerline of the drawer, regardless of width, to ensure ease of operation and maximize drawer slide life.

1. Epoxy coated wire pull, 8mm diameter with 96mm O.C. mounting holes.

3. Drawer Slides:

a. Full extension, bottom mount epoxy coated with captive roller and positive in stop. Slide shall have 100lb. load rating, must be: full extension, and prevent drawer fronts from contacting the cabinet body. Drawer slides must meet or exceed Grade 1 requirements per ANSI/BHMA.

4. Wall Shelving Hardware:

a. Heavy-duty wall shelving hardware, including standards and brackets, are available in an anochrome finish.

b. Bracket Mounted Shelf Core shall be: **Particleboard.**

c. Bracket Mounted Shelf Edge shall be **3mm.**

d. Bracket Mounted Shelf Surface shall be: **VGS Laminate.**

5. Shelf Clips:

a. Shelf clips shall be injected molded clear plastic, with a double pin engagement 32mm on center and shall have 3/4" and 1" anti-tip locking tabs as approved in AWI 400B-T-9 for premium Grade. Shelf clips shall be:

single pin plastic shelf clip with anti-tip locking tabs, used for all 1/4" hardboard shelves.

6. Coat Hooks shall be Zinc plated, single prong and double prong.

7. Closet Rods shall be Zinc plated rod, 1" diameter with captive sockets.

8. Locks:

   a. Lock Locations:

      1. Locks at All

   b. Lock Type:

      1. Standard Lock – National: Five disc tumbler cam locks, chrome plated steel faceplate. All locks keyed alike or keyed differently by room and mater keypad. Shall permit a minimum of 50 keying options. Lock core is removable permitting owner to easily change lock arrangements. Inactive door of base and wall cabinets shall be: secured by using an elbow catch, or a chain pull for tall cabinets].

9. Casters:

   a. Shall be available in both 4" (3" diameter wheel) and 6" (5" diameter wheel) nominal heights. 4" casters must have a minimum load rating of 165 lbs per caster and the 6" casters must have a minimum load rating of 200 lbs per caster. Shall be ball bearing with 360° swivel. Shall have non-marring wheels available in both locking and non-locking.

10. Catches:

   a. Chain Pulls shall be zinc plated, spring loaded door catch used to hold door securely shut.

   b. Chain Stops shall be zinc plated, looped chain used to limit door swing as specified, mounting plate at each end of chain shall use (4) #7 x 5/8" screws to secure to cabinet door and end panel. They shall be on cabinets at adjoining walls and where casework and countertops can interfere with the door swing of the tall cabinet.

   c. Elbow Catch shall be chrome plated, spring loaded, used to hold non-locking door securely shut.

   d. Roller Catch, (not used with self-closing hinges) shall have: heavy-duty, spring-loaded roller, with molded plastic bumper mounted at door top to keep door securely shut.

e. Magnetic Catch, (not used with self-closing hinges) shall have: white plastic housing with two 32mm spaced, elongated holes for screw-attachment to allow adjustability.

f. Catches shall be: **1 Roller at All.**

11. Tote Tray shall be white, high impact resistant polystyrene, with label holder permanently attached to face of tray. Supported by individual polycarbonate channels mounted to cabinet ends and partitions with two integral 5mm diameter pins and secured with one-euro style screw. Height adjustable on 32mm (1-1/4") centers.

12. Countertop Supports:

a. Powder coated, formed metal supports. Must provide attachment points between countertop and wall.

PART 3 – EXECUTION

3.01 INSTALLERS

A. Installation shall be: by casework manufacturer's authorized representative.

3.02 INSTALLATION

A. Casework shall not be: installed until concrete, masonry, and drywall/plaster work is dry.

1. If ambient conditions are not met at the time of requested delivery, the general contractor or owner must provide Case Systems a letter that releases manufacturer from any liability and responsibility from any warranty or damage resulting from not complying with required ambient conditions.

B. Casework shall be: installed plumb and true and is to be securely anchored in place.

C. The casework contractor shall verify all critical building dimensions prior to fabrication of casework.

D. Provide all labor for unloading, distribution, and installation of casework and related items as specified.

E. All casework shall be: securely anchored to horizontal wall blocking, not to plaster lathe or wall board.

F. The casework manufacturer shall re-configure the casework arrangements to dimensions requiring 2-1/2" or less of filler at each end of wall-to-wall elevations, and to ensure a complete and satisfactory installation.

G. The casework installer shall remove all debris, sawdust, scraps, and leave casework spaces clean.

H. All casework must be installed by casework installer plumb and level, adjust all doors, drawers and hardware to comply with manufacturers specifications and operate properly.

END OF SECTION

DIVISION 12 - FURNISHINGS

SECTION 12530 - MANUAL OPERATED ROLLER SHADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions, Division 1 and Section 06100 - Rough Carpentry specification sections, apply to work of this section.

1.02 DESRIPTION

A. The extent of roller shades is shown on the drawings.

B. The required applications of roller shades includes the following:

1. All window units.

1.03 SUBMISSIONS

A. Comply with requirements of Section 01300 and as modified below.

B. Product Data: Manufacturer's descriptive literature shall be submitted, indicating materials, finishes, construction and installation instructions, and verifying that product meets requirements specified. Manufacturer's recommendations for maintenance and cleaning shall be included.

C. Drawings and Diagrams: Wiring diagrams of any motorized components or units, working and assembly drawings, and installation detail drawings shall be supplied as requested.

D. Samples:

1. Submit manufacturer's color charts consisting of sections of exposed components with integral or applied finishes showing fully range of colors, materials, etc., available for each type of roller shade assembly required.

2. Submit manufacturer's, Style Phifer Shearweave 2500 (1% open mesh) line of mesh fabrics available for selection by owner.

3. After selection of color and fabric by Architect, submit on 4'-0" wide sample for each type of window shade required complete with all components specified including mounting brackets, fasteners, and similar accessories.

1.04 QUALITY ASSURANCE

A. Manufacturer: Provide roller shade units which are complete assemblies produced by one manufacturer for each type required,

including hardware, accessory items, mounting brackets, and fastenings.

B. The Contractor shall be qualified to install the specified products by prior experience, demonstrated performance, and acceptance of the specified roller shades. The Contractor shall be responsible for an acceptable installation.

1.05 DELIVERY, STORAGE AND HANDLING

A. Product shall be delivered to the site in the manufacturer's original packaging.

B. Schedule, receive, and store materials delivered by window blind manufacturer, and provide storage space as required.

C. Store shades in a well ventilated, dry, approved location, and protect from damage; damage shades due to improper protection during storage shall be rejected and removed from site.

1.06 PROJECT CONDITIONS

A. Verify all dimensions and conditions affecting installation of roller shades.

B. Prior to shade installation, building shall be enclosed. Interior temperature shall be maintained between 60°F and 90°F during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

C. Notify Architect in writing of any conditions that will prevent satisfactory installation of window blinds. Beginning of window blind installation indicates acceptance of conditions and Contract shall bear responsibility for any unacceptable finished installation caused by these conditions.

1.07 WARRANTY

A. Provide manufacturer's warranty that all its products, excluding fabrics, blinds and vertical tracks, shall be free from defects in material and workmanship for the manufacturer's one year limited warranty period.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. For convenience and as a basis of required quality, details and specifications have been based on manual operated roller shades as manufactured by *Draper, Inc., 411 South Pearl Street, Spiceland, IN 47385, (765) 987-7999,* www.draperinc.com In no way shall this be construed as limiting competition; products of other manufacturers may be proposed to the Architect, in accordance with the provisions of the Contract.

2.02 MANUAL-OPERATED ROLLER SHADES

(The following components are based on the Manual Flex Shade System)

A. Fabrics:

1. All specified fabrics shall meet or exceed the following:

   a. ASTM E-84: Flame spread rating not to exceed 0-25; smoke development rating not to exceed 450.
   b. Federal Standard 191 Method 5903.
   c. New York State Uniform Fire Prevention and Building Code.
   d. Flame-resistance two seconds after flame maximum with average char length of not more than 2-1/2" in. both warp and fill directions. Must meet U.S. Government specification CCC-C521E, Type II Fiberglass (Opaque).
   e. NFPA 701: Standard Methods of Fire Tests For Flame Propagation of Textiles and Films.

2. The shades shall be composed of a textured fabric, woven from spun glass fibers. Finished weight shall be no less than 12 ounces per square yard, impregnated with a vinyl coating. Window shade fabrics shall be selected from the Phifer Shearweave 2500 (1% open mesh) line of shear weave fabrics of varying opacity and color, and be fully washable with repeatedly scrubbed dampened cloth or sponge with mild detergent. All specified fabrics shall be fade resistant and stain resistant. (No perceptible changes on color after 200 hours in Fade-O-Meter).

3. Provide complete range of shear weave fabrics available in colors and density.

B. Chain/Clutch Operator: Gear box, of die cast aluminum and steel, has ratio of 3.01 to 1. Bi-directional to mount at either end of roller. Chain assembly, of stainless steel heavy-duty chain. Length as required to operate shades.

C. Rollers: 2: diameter x .080 wall extruded aluminum.

D. Mounting brackets: 1018 plated steel universal brackets for wall mounting.

E. Slat: 1/8" x 1" aluminum encased in heat-seamed hem.

F. End Caps: 4 ½" x 4 ½" steel.

G. Dual Roller System: Accepting two (2) shades within a single pocket style headbox.

H. All hardware shall be of heavy-duty quality and shall be chrome plated.

I. The finished shade shall be of a width sufficient to adequately cover the roller. None of the barrel shall be exposed at the end of the roller.

J. Fascia panels and end brackets: All specified roller shades shall be installed with fascia panel and end brackets.

K. Installation Brackets: shall be corrosion-resistant metal, free from burrs and rough edges.

L. Provide (1) length of operable roller-shade per each section of window unit or as directed by the Architect. Roller shade length shall not exceed 60”, provide multiple roller shade sections for lengths that exceed 60”.

M. The Architect shall select the shade fabric color(s) from the manufacturer’s Style Phifer Shearweave 2500 (1% open mesh) line of mesh fabrics available for selection by owner.
execution.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install roller shade units in manner indicated to comply with manufacturer’s instructions. Position units level, plumb, secure, at proper height and location relative to adjoining window units and other related work. Securely anchor units with proper clips, brackets, anchorages, suited to type of monitoring indicated.

B. Provide adequate clearance to permit unencumbered operation of sash hardware.

C. Divisions between shades are permitted only at mullions by continuous windows or openings where more than on blind for one opening occurs, unless otherwise indicated.

D. Isolate metal parts from concrete and mortar to prevent galvanic action. Use tape or thick coating or other means recommended by manufacturer to effect separation.

E. Protect installed units to ensure their being in operation condition, without damage, blemishes, or indication of use at completion of project. Repair or replace damaged units as directed by Architect.

F. Clean finished installation of dirt and finger marks. Leave work area clan and free of all debris.

3.02 GUARANTEE

A. The General Contractor shall warrant all work of this Section, including all labor, materials, and equipment as required, for a period of one (1) year, effective as of the date of Substantial Completion, as determined by the Architect.

END OF SECTION

DIVISION 14 - CONVEYING SYSTEMS

SECTION 14220 - VERTICAL WHEELCHAIR LIFT

PART 1 - GENERAL

1.01 SCOPE

A. Lift must be in accordance with ASME 18.1 as required by ANSI A117.1, Section 410.1, A.D.A. compliant in the USA, including local codes and regulations except where specified otherwise.

B. Furnish all labor, material, and equipment necessary or required to fully complete the installation of two (1) hydraulic lift as indicated on the drawings and specifications.

C. This specification is intended to cover the complete installation of the Savaria Model No. V-1504 Enclosed Vertical Platform Wheelchair Lift.

1.02 PREPARATORY WORK

A. The following preparatory work to receive the lifts specified shall be part of the scope:

1. Permanent 115 volt, 15 amp power to operate lift to be provided from a lockable fused/cartridge type disconnect switch with auxiliary contacts for battery operation. Temporary power may be provided to expedite installation of lift.

2. Provide a plumb and square hoistway with smooth interior surfaces. Include for fascias or furring of the hoistway interior.

3. Provide adequate lighting of lift platform and at landings.

4a. Suitable lintels over landing entrances are to be provided.

4b. Provide rough openings as per lift contractor's shop drawings.

5. Provide substantial level pit floor slab as indicated on the lift contractor's shop drawings.

6. Provide finish grouting and masonry around door frames.

1.03 QUALITY ASSURANCE

A. Subcontractor's Qualifications:

1. Execute work of this section only by a company who has adequate product liability insurance in excess of one million dollars ($1,000,000).

2. Skilled tradesmen must be employees of the contractor to perform

the work on a timely basis.

3. Requirements of Regulatory Agencies:

   a. Fabricate and install work in compliance with applicable jurisdictional authorities.

   b. File shop drawings and submissions with local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on a timely basis as required.

   c. Payment of operating licenses will be the responsibility of the Owner.

1.04 SUBMITTALS

A. Shop Drawings: The shop drawings shall show a complete layout of lifting equipment detailing dimensions and clearances as required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Data:

   1. Model: Savaria Model No. V-1504.

   2. Rated Load: 750 lbs.

   3. Rated Speed: 20 f.p.m.

   4. Car Dimensions: **36"W, 54"L.**

   5. Levels Served: 2.

   6. Number of Openings: 2.

   7. Travel: **6'-5".**

   8. Operation: Constant pressure, anti-creep feature.

   9. Power Supply: 110V, 1 Phase.

   10. Jack Type: 1 to 2 Cable/hydraulic.

   11. Paint: **Powder coat gloss finish – 'White PS111W2'**

   12. Emergency Power: 12V battery operation/up and down protection.

B. Car Enclosure:

   1. Plastic glazing (G.E. MR-7) and aluminum tube 0.100" drywall construction.

2. Non-skid flooring.

3. Emergency Operation: The car will be equipped with an emergency battery operated raising and lowering device and alarm in case of normal building power supply failure. The battery shall be the rechargeable type with an automatic recharging system.

4. Car Operating Panel: It shall consist of constant pressure buttons, an emergency stop/alarm button, and an on/off key switch.

C. Pumping Unit and Control:

1. The pumping unit and control shall be enclosed in the mast. The controller and pump unit shall be prewired and tested prior to shipment, control circuitry to be PCB mounted as an integral unit. Pump unit shall incorporate the following features:

a. Smooth stops at each landing shall be an inherent feature.

b. Adjustable pressure relief valve.

c. Manually operable down valve to lower lift in the event of an emergency.

d. Pressure gauge isolating valve, manually operable.

e. Gate valve to isolate cylinder from pump unit.

f. Electrical solenoid for down direction control.

g. Emergency power raising and lowering by battery power.

D. Cylinder and Plunger:

1. The cylinder shall be constructed of steel pipe of sufficient thickness and suitable safety margin. The top of the cylinder shall be equipped with a cylinder head with an internal guide ring and self-adjusting packing.

2. The plunger shall be constructed of a steel shaft of proper diameter machined true and smooth. The plunger shall be provided with a stop electrically welded to the bottom to prevent the plunger from leaving the cylinder.

E. Cable:

1. Two (2) 3/8" IWRC Galvanized Aircraft Cables, minimum breaking strength 14,400 lbs. each.

F. Leveling Device:

1. The lift shall be provided with an anti-creep device which will maintain the carriage level within 1/2" (13 mm) of the top

landing.

2. All limit switch and leveling device switches shall be located in a position to be inaccessible to unauthorized persons (i.e., located behind the mast wall accessible by removable panels).

G. Guide Yoke:

1. The 1:2 guide yoke/sheave arrangement shall be supplied with a sheave, guide shoes, bearings, and adjustable cable guards. The sheave shall be finished with rounded grooves to fit the cables supplied.

H. Terminal Stopping Devices:

1. Normal terminal stopping devices shall be provided at top and bottom of runway to stop the car positively and automatically.

I. Guide Rails and Brackets:

1. Steel "T" Guide Rails and Brackets shall be used to guide the platform and sling. Guide rails shall form part of the structural integrity of the unit and be integral to the mast enclosure, ensuring stability and minimum platform deflection when loaded.

J. Car Sling:

1. Car sling shall be fabricated from steel with adequate bracing to support the platform and car enclosure. Guide shoes shall be mounted on the top and bottom of the car sling to engage the guide rails. Guide shoes to be solid slipper type. The car sling arms shall be detachable.

K. Wiring:

1. All wiring and electrical connections shall comply with applicable codes. Insulated wiring shall have flame retardant and moisture proof outer covering and shall be urn in conduit, or electrical wireways, outside the unit enclosure.

PART 3 - EXECUTION

3.01 EXECUTION

A. Examination:

1. All site dimensions shall be taken to ensure that tolerances and clearances have been maintained and meet local regulations.

B. Preparation:

1. Pre-inspect the construction and service requirements for work by others. These requirements will be included in drawings,

diagrams, engineering data sheets, and special instructions before the work commences.

3.02 GUARANTEE

A. The lift contractor shall provide three (3) months free service from date of approval by local authorities. The entire lift and all component parts shall carry a one (1) year guarantee. The guarantee shall be for the replacement, at no cost of defective parts, but shall not include the labor costs required to replace the defective part or parts.

B. Install all the components of the lift system that are specified in this section to be provided and that are required by jurisdictional authorities to license the lift.

C. All installation work of this section will be performed by trained employees of the lift contractor.

END OF SECTION

DIVISION 14 - CONVEYING SYSTEMS

SECTION 14224 - PORTABLE WHEELCHAIR LIFT

PART 1 - GENERAL

1.01 SCOPE

A. Lift must be in accordance with ANSI A117.1-03, A.D.A. compliant in the USA, including local codes and regulations except where specified otherwise.
One Portable wheelchair lift shall be furnished and installed by base bid contract GC-1 for Todd Elementary School

B. System Description:

1. The product described herein, is a portable lifting device intended for the exclusive use of individuals with disabilities. The lift shall be used only by individuals who are unable to negotiate stairs. The lift shall be self-contained, requiring no additional components or modifications of the using facility. The lift shall consist of a platform supported on an electro-hydraulic lifting mechanism with built-in casters for portability. The casters shall permit easy movement of the unoccupied lift over hard, level surfaces. With the casters removed, the lift shall rest firmly on any hard, level surface, and provide a stable base for operation of the lift. The lift shall be low profile (no machine tower or shroud) to maintain viewing lines. The lift shall provide independent use by individuals with disabilities and include all applicable operating and safety devices for compliance with ADA requirements. The lift shall have a slim profile platform frame to eliminate the need for a pit or access ramp on the lower landing side and facilitate easy entry into the lift directly at floor level by patrons. The lift shall provide adequate lifting force to raise the platform and occupant to a height suitable for access to most stages, platforms, or similar elevated surfaces.

C. This specification is intended to cover the complete installation of the Ascension Virtuoso Model 5460P Platform Wheelchair Lift.

1.02 PREPARATORY WORK

A. The following preparatory work to receive the lifts specified shall be part of the scope:

1. Provide substantial level floor as indicated on the lift contractor's shop drawings.

2. Confirm that there is an existing electrical outlet within 20’ of the location.

1.03 QUALITY ASSURANCE

A. Subcontractor's Qualifications:

1. Requirements of Regulatory Agencies:

a. Fabricate and install work in compliance with applicable jurisdictional authorities.

b. File shop drawings and submissions with local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on a timely basis as required.

c. Payment of operating licenses will be the responsibility of the Owner.

1.04 SUBMITTALS

A. Shop Drawings: The shop drawings shall show a complete layout of lifting equipment detailing dimensions and clearances as required.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Ascension Virtuoso Model 5460P vertical portable wheelchair lift, manufactured by Ascension, 3526 E. Fort Lowell Road., Tucson, AZ, 85716, Tel: 800-459-0400 or 520-881-3993, Fax: 520-881-4983, sales@wheelchairlift.com.

B. Acceptance of other products is subject to compliance with specified requirements and owner to architect approval.

2.02 PHYSICAL CHARACTERISTICS

A. Lifting capacity: 750 pounds.

B. Weight of lift: 1,025 pounds maximum.

C. Vertical speed: seven (7) fpm (feet per minute).

D. Vertical travel: 12” to 60”, infinitely adjustable.

2.03 DIMENSIONS

A. Platform size: 36” x 54” with 43” high gates and side panels.

B. Space requirements (operational, storage, and transport): 44” high (in the tie down position), 66” long and 48” wide.

C. No part of the lift shall stand over 44” high when the platform is on the ground.

2.04 MATERIALS

A. The platform, base frame, and lifting device shall be constructed from ASTM A 36, AISI A 36, AISI 1018, or AISI 1020 Steel.
B. The windows shall be fabricated from ¼" thick high impact strength clear thermoplastic.
C. The safety skirt shall be constructed from rigid plastic.

2.05 FINISH

A. All metal components shall be thoroughly cleaned to remove any foreign substance. Exposed metal surfaces shall be finished with an oven-baked powder coating.
B. Standard color is black; contact Ascension for custom color selection.

2.06 ELECTRICAL REQUIREMENTS

A. Electric power requirements shall be compatible with 120VAC, 60 hertz, single phase, 10-amp service. The lift shall be supplied with a three prong grounded electrical cord (20' in length). The lift shall contain a Ground Fault Circuit Interrupter (GFCI). The hydraulic pump shall be directly coupled to a capacitor start ½ hp motor. Other than the motor, all control and operating circuits shall be serviced by a 12 VDC solid state linear power supply. Electrical components shall be UL listed and CSA registered.

2.07 SAFETY DEVICES

A. The lift shall be constructed to meet the applicable requirements of ADAAG, ASME A17.1-1996 or older (PART XX, SECTION 2000), ASME A18.1, and ANSI A117.1 2003. The lift shall include the following safety features for protection of the passenger and general public.

1. Grounded electrical system.
2. 12 VDC operating controls.
3. Constant pressure operating switches.
4. Emergency stop button at passenger control station.
5. Electro-mechanical interlock to prevent accidental opening of lower landing gate.
6. Gate switches to prevent platform movement if either gate is open.
7. Lift car stop height switch.
8. Safety skirt that completely encloses and protects the area under the lift platform.
9. 43" high walls and gates.
10. Unobstructed view through transparent sides and gates.
11. Grab bar extending full length of inside wall.
12. Slip resistant surfaces on platform floor and dock plate.
13. Structural safety factors as specified in ASME A18.1 2003.
14. Self-closing gates.

2.08 PORTABILITY

A. Casters shall be easily attached to the platform for portability and stored in the base frame when not in use. Casters shall be 3 ½" in diameter and fabricated from hard rubber. The casters shall be capable of being installed without tools. When the casters are installed, the lift shall roll easily over any hard, smooth, level surface. The lift shall be capable of being moved by fork lift or truck.

2.09 OPERATING CHARACTERISTICS

A. Lift shall include three (3) constant pressure "UP/DOWN" switches, located outside of the platform at both ends and inside the platform.

B. The passenger control station shall be provided with a separate "PUSH TO STOP" emergency button. The emergency stop button shall lock when pushed and require manual reset before operation can resume.

C. The platform stop height shall be adjustable without the use of tools.

D. Opening the upper landing gate shall deploy a dock plate that rests on the upper landing surface. The dock plate shall provide a smooth transition between the platform and the upper landing. Closing the upper landing gate shall retract the dock plate.

E. The lower landing shall be provided with a mechanical interlock that prevents the gate from being opened whenever the platform is more than 2" above the full down position.

2.10 COMPRESSION CAPABILITY

A. The lift shall be capable of being compressed to 33" wide to facilitate relocation through a 36" wide doorway. Requires additional tool kit from Ascension. Contractor to provide tool kit to School District and turn over with Closeout Documents.

PART 3 - EXECUTION

3.01 EXECUTION

A. Examination:

1. All site dimensions shall be taken to ensure that tolerances and clearances have been maintained and meet local regulations.

B. Preparation:

1. Pre-inspect the construction and service requirements for work by others. These requirements will be included in drawings,

diagrams, engineering data sheets, and special instructions before the work commences.

3.02 INSTLLATION

A. Set up lift for operation as described in manufacturer's operating manual.

B. Install all components of the lift system that are specified in this section to be provided and that are required by jurisdictional authorities to license the lift.

C. All installation work of this section will be performed by trained employees of the lift contractor.

3.03 MAINTENANCE

A. Maintenance of the lift shall consist of regular cleaning as deemed necessary by the using facility. General inspection, maintenance, and lubrication shall be specified in the manufacturer's service manual.

3.04 WARRANTY

A. Manufacturer shall provide a ten (10) year drive train, three (3) year all other parts, one (1) year labor limited warranty.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15010 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. This Section contains General Provisions related specifically to the Mechanical Work.

1. Quality Assurance.
2. Terminology.
3. Protection.
4. Coordination and Sequencing.
5. General Completion.
6. Demolition.
7. Cutting and Patching.
8. Excavation for Mechanical Work.
9. Concrete for Mechanical Work.

B. Drawings and General Provisions of Contract, including General and Supplementary Conditions, apply to this section.

1.02 QUALITY ASSURANCE

A. Laws, Permits, Inspections.

1. Comply with latest revisions of New York State Uniform Fire Protection and Construction Code, NYSED Manual of Planning Standards, any Local Codes or Regulations that apply.
2. Underwriters Laboratories label required for all electrical materials carrying 50 volts or more.
3. Comply with New York State Energy Conservation Construction Code.
4. Comply to requirements of drawings and specifications that are in excess of governing codes.
5. Comply with section 1621 of the New York State Building Code for seismic requirements.
6. Do not install work as specified or shown if in conflict with governing code. Notify Engineer and request direction.
7. Pay all Inspection and Permit fees.
8. Provide Certificate of Inspection from all governing authorities.

B. Reference to technical society, organization, body or section made in accordance with the following abbreviations:

1. AIA American Institute of Architects
2. AMCA Air Moving and Conditioning Association, Inc.
3. ANSI American National Standards Institute.
4. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
5. ASME American Society of Mechanical Engineers
6. ASTM American Society of Testing Materials
7. AWSC American Welding Society Code
8. AWWA American Water Works Association
9. IEEE Institute of Electric and Electronics Engineers

10. NEC National Electric Code
11. NEMA National Electrical Manufacturer's Association
12. NFPA National Fire Protection Association
13. NYBFU New York Board of Fire Underwriters
14. NYCRR - Codes, Rules and Regulations of the State of New York.
15. NSF - National Sanitation Foundation
16. PDI - Plumbing and Drainage Institute.
17. SMACNA Sheet Metal and Air Conditioning Contractors National Association
18. UL Underwriters' Laboratories, Inc.

C. Contractor submission of equivalent or substitute items other than those specified is at Contractor convenience only. If a substitution or equivalent is accepted, the Contractor shall coordinate the installation of the substitute or equivalent and make all associated changes required. The Contractor also waives any claim for additional costs associated with the substitute / equivalent which becomes apparent before, during or after installation. The Contractor agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution / equivalent.

D. The Contractor shall, as part of his contract, furnish and install all equipment, materials, wiring accessories, and on-site installation of equipment as required by current standards of good practice.

E. All materials and equipment to be furnished and installed shall be new and of first quality and be free from all defects.

1.03 TERMINOLOGY

A. The following terminology and definitions are used on this project as related to the Mechanical Work.

1. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.
2. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
3. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
4. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
5. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

6. Sewers: Refer to underground connections from building to street mains. Sewers begin at points 5 feet outside building wall.
7. Service Connections: Refer to underground connections from 5 feet outside building wall to street mains.
8. Underground Lines: Refer to piping buried in earth inside and within 5 feet outside building.
9. Building Lines: Refer to all other lines.
10. For other definitions refer to latest issue of New York State Plumbing Code, and all revisions.

1.04 PROTECTION

A. Protect equipment from damage, including water, chemical, mechanical injury and theft.

B. Replace damaged equipment or components.

C. Close and waterproof between sleeves, openings, pipes and voids in walls, floors and foundations to prevent entrance of water or moisture.

D. Holes made in fire walls, partitions, fire stops, shall be patched to maintain fire rating integrity.

E. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris and moisture.

F. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

G. Protect flanges, fittings, and piping specialties from moisture and dirt.

H. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

I. If permanently installed air handler equipment/systems are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used in each unit and at each return air grille/opening, as determined by ASHRAE 52.2 Replace all unit filtration media with a Minimum Efficiency Reporting Value (MERV) of 13 immediately prior to occupancy and verify ductwork cleanliness; if ductwork is found contaminated, clean ductwork and associated air handling equipment and replace filtration media.

1.05 COORDINATION AND SEQUENCING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for chases, slots and openings in building structure during progress of construction, to allow for mechanical installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.

E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors shall be submitted and approved by the engineer.

G. Coordinate installation of identifying devices after completion of covering and painting, where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

H. Coordination with other trades: Right-of-Way as follows:

1. Light Fixtures.
2. Drain Pipes and Vents.
3. Ductwork.
4. HVAC Piping.
5. Domestic Water Piping.
6. Electrical Conduit.

I. Work in existing building.

1. Verify existing locations of pipe, ductwork equipment and conduit in field.
2. Extend existing systems as required for proper tie-in to new systems.
3. Leave existing equipment to be reused in satisfactory working order.
4. Remove from building all existing piping, ductwork, equipment and similar items which do not conform to new layout. Before disposing of these items, determine if Owner wishes to retain them.

J. Changeovers and continuity of services.

1. Make changeovers, tie-ins, removal, and perform similar work that affect operation of present building at times approved by Owner.
2. Make temporary connections required to keep present building systems and equipment in operation.
3. Prior to any shutdown of present building, have necessary materials at site.

1.06 GENERAL COMPLETION

A. Oiling Equipment.

1. Lubricate equipment and motors in accordance with manufacturer's requirements.

B. Instructions to Owner's Representative.

1. Give notice to Engineer when all systems are installed and operating.
2. Obtain name of Owner's Representative to receive instructions.
3. Schedule instructions of Owner's Representative by manufacturer's representative and instruct Owner in system installation and operation for:

a. Heating, Ventilating & Air Conditioning Equipment.
b. Fan equipment.
c. Pumps.
d. Temperature control.
e. Equipment lubrication.
f. Packaged systems.

C. Provide Operation and Maintenance manuals in accordance with the requirements of Division 1 "Project Closeout" Section. Provide an instructional video to the owner of the training / maintenance instruction sessions with the owner.

1.07 PAINTING AND FINISHING

A. Refer to "Painting" Section 09900 for field painting requirements.

B. Damage and Touch-up: Repair marred and damaged factory painted finishes with materials and procedures to match original factory finish.

1.08 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 15 and as indicated.

B. Where pipe, ductwork, insulation or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Abandoned Work: Cut and remove buried pipe abandoned in place, 2 inches beyond the face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from the project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation. Add cap off and pressure test prior to putting back in service.

1.09 CUTTING AND PATCHING

A. All cutting required to facilitate the proper installation of all work to be installed under Div. 15, shall be done by Div. 15 contractor.

B. Cut, channel, chase and drill floors, walls, partitions, ceilings and other surfaces necessary for mechanical installations in the maner specified and approved by the architect. Perform cutting by skilled mechanics of the trades involved.

C. Repair cut surfaces to match adjacent surfaces.

1.10 EXCAVATION FOR MECHANICAL WORK

A. Description of Work: Types of excavation for mechanical related work specified in this section include:

1. Underground mechanical utilities and services.
2. Underground tanks, casings and equipment enclosures.
3. Exterior water circulation and distribution systems.

B. Project Conditions.

1. Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Liabilities arising out of performance of work is responsibility of Contractor doing excavation.
2. Protect persons from injury at excavations by barricades, warnings, and illumination.
3. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install mechanical work on frozen excavation bases or subbases.

1.11 CONCRETE FOR MECHANICAL WORK.

A. Types of concrete for mechanical related work specified in this section include:

1. Lean concrete backfill to support mechanical work.
2. Encasement of mechanical work.
3. Mechanical equipment foundations and housekeeping pads.
4. Inertia bases for isolation of mechanical work.
5. Rough grouting in and around mechanical work.
6. Patching concrete cuts to accommodate mechanical work.
7. Thrust block.

1.12 REBATES

A. The Division 15 Contractor shall assist the Owner in applying for any available rebates from manufacturer's, utility companies, etc. on equipment or materials installed under the contract. Provide all required documentation and assist in the completion of applications as required to complete the rebate process. All proceeds from rebates remain the property of the Owner.

PART 2 – PRODUCTS

Reference Section 03300.

PART 3 - EXECUTION

3.01 EXCAVATION - GENERAL

A. Do not excavate for mechanical work until work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum.

B. Excavate with vertical sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross bracing to sustain sides of excavation. Remove sheeting and cross bracing during backfilling wherever such removal would not endanger work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.

C. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other mechanical work to provide minimum practical but adequate working clearances.

D. Depth for direct support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand excavate bottom cut to accurate elevations, undercut at pipe hubs.

E. Depth for subbase support: For large piping (6" pipe size and larger), tanks, and where indicated for other mechanical work, excavate for installation of subbase material in depth indicated or, if not otherwise indicated, 6" below bottom of work to be supported.

F. Depth for unsatisfactory soil or rock conditions: Where directed, (because of unsatisfactory conditions at bottom of indicated excavation), excavate additional depth as directed to reach satisfactory conditions. Backfill with subbase material, compacted as directed, to indicated excavation depth.

G. Store excavated material (temporarily) near excavation, in manner which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).

1. Dispose of excavated material which is either in excess of quantity needed for backfilling, or does not comply with requirements for backfill material.

    a. Remove unused material from project site, and dispose of in lawful manner.

3.02 WATER CONTROL

A. Maintain dry excavations for mechanical work, by removing water. Protect excavations from inflow of surface water. Pump inflow of ground water from excavations, protect excavations from inflow of ground water, by installing temporary sheeting and waterproofing as well as dewatering as required. Provide adequate barriers which will protect other excavations and below grade property from being damaged by water, sediment or erosion from or through mechanical work excavations. Need permit for dewatering – contractor to obtain and pay for.

3.03 BACKFILLING(REFERENCE 02200)

A. Do not backfill until installed mechanical work has been tested and accepted, wherever testing is indicated.

B. Install drainage fill where indicated, and tamp to uniform firm density.

C. Backfill with finely graded subbase material to 6" above wrapped, coated and plastic piping and tanks, and to centerline of other tanks.

D. Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials.

E. Backfill simultaneously on opposite sides of mechanical work, and compact simultaneously, do not dislocate work from installed positions.

F. Backfill excavations in 8" high courses of backfill material, uniformly compacted to the following densities (% of maximum density, ASTM D1557), using power-driven hand operated compaction equipment.

    1. Lawn and landscaped areas: 85% for cohesive soils, 90% for cohesionless soil.
    2. Paved areas and roadways: 90% for cohesive soils, 95% for cohesionless soils.

G. Backfill to elevations matching adjacent grades, at time of backfilling excavations for mechanical work. Return surfaces to original condition.

H. After covering piping with 6" layer of approved fill, employ General Contractor to backfill, compact excavations beneath:

1. New foundations.
2. Slabs on grade.
3. Areas to be paved by General Contractor.

3.04 CONCRETE BASES

A. Construct concrete equipment bases of dimensions required, but not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.

3.05 CONCRETE GENERAL

Reference Section 03300.

3.06 CONCRETE CURING AND PROTECTION

Reference Section 03300.

3.07 MISCELLANEOUS CONCRETE ITEMS

A. Fill in holes and openings left in concrete structures for passage of work by trade unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

3.08 CONCRETE SURFACE REPAIRS(REFERENCE 03300)

A. Repair and patch areas with epoxy or non-shrink grout immediately after removal of forms, when acceptable to Architect/Engineer.

B. Repair areas, except single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

C. Use epoxy-based mortar for structural repairs, where directed by Architect/Engineer.

D. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.09 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Quality Control: Owner's acceptable testing laboratory will perform sampling and testing during concrete placement, which may include the following, as directed by Engineer. This testing

does not relieve Contractor of responsibility of providing concrete in compliance with specifications. Contractor shall perform additional testing as necessary, at no expense to Owner, to ensure quality of concrete.

1. Sampling Fresh Concrete: ASTM.
2. Slump: ASTM, one test for each load at point of discharge.
3. Air Content: ASTM C 173, one for each set of compressive strength (specimens of freshly mixed concrete).
4. Compressive Strength: ASTM, one set for each 50 cu. yds. or fraction thereof of each class and type of concrete; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one retained for later testing if required.
5. Laboratory Cured Test Cylinders: ASTM.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15014 - CODES, STANDARDS, AND PERMITS

1.01 GENERAL

The entire installation shall be made in accordance with State rules and regulations and shall also conform with the Standards of the National Board of Fire Underwriters for this installation and the local Board of Fire Underwriters having jurisdiction. The installation shall also comply with air pollution requirements of the State of New York and Industrial Code Rule 4 of the State of New York Department of Labor, Board of Standards and Appeals, dated March 31, 1965, and all other ordinances having jurisdiction.

The Contractor shall submit to all authorities having jurisdiction all required applications and shall secure all necessary permits, tests, and inspections required for final approval.

Certain standard and staple materials are described by reference to standard specifications. These standards are as follows:

ASA-B9	Safety Code for Mechanical Refrigeration
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
CS	Commercial Standard
FS	Federal Specification
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
PDI	Plumbing and Drainage Institute
SMACNA	Sheet Metal and Air Conditioning Contractors Association
USASI	United States of America Standards Institute
UL	Underwriters' Laboratories
	New York State Uniform Fire Prevention and Building Code dated January 1, 1989
A.A.B.C.	Associated Air Balance Council
N.E.B.B.	National Environmental Balancing Bureau

All new equipment shall bear U.L. label and conform to the latest edition of the National Electric code.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15018 - MOTORS AND ELECTRICAL WORK

1. Internal electrical control devices that operate starters, controllers, etc. shall be furnished, installed, and wired under Division 15. Such devices shall be included but not necessarily limited to, devices connected to ducts, damper switches, float switches, electric thermostats, safety devices, limit switches, relays, push button controllers, selector switches, pilot lights, extra interlock contacts, etc.

2. Equipment starters and disconnects shall be provided by the mechanical contractor completely mounted and wired to internal controls and shall be wired to incoming and outgoing control connections. Should integral equipment starters, disconnects or control panels be shipped separately, the mechanical contractor shall be responsible for the proper installation and connections from equipment to same. Incoming and outgoing (line and load) power wiring to starters / disconnect switches shall be performed by the electrical contractor.

3. The integration of the existing temperature control system wiring and controls shall be the responsibility of the Contractor under Division 15. The Contractor shall be fully responsible for the satisfactory operation of new equipment with the temperature control system.

4. All control transformers, control devices, starters, and control wiring furnished shall be properly protected with fuse cutouts and fuses or circuit breakers to conform to the National Electric Code, latest edition. All work shall be performed by a licensed electrician.

5. Each piece of equipment shall be provided with permanent type laminated, black finish, white core, phenolic nameplate. Nameplates should indicate the name and number of the unit, voltage, and any interlock reference. Each starter furnished by the Contractor shall be provided with a permanent type laminated, black finish, white core phenolic nameplate. Nameplate shall indicate the name of the unit controlled and the voltage rating. Nameplate shall be secured with adhesives. Plastic tape type labels will not be accepted.

6. All equipment shall be provided with disconnect means (by Mechanical Contractor).

7. All wiring furnished and installed by the mechanical contractor shall be in strict accordance with the latest edition of the National Electrical Code and all State and Municipal Agencies having jurisdiction. Except as specified otherwise, minimum size wire shall be #14 AWG (control) and #12 AWG (power) and shall be run in rigid galvanized steel conduit except as noted hereinafter. All wire shall be Type THHN or as required by code. All conduit connections to motors shall be made with short lengths of neoprene jacketed galvanized flexible metallic conduit (liquitite).

8. All wire and cable shall be new, manufactured of soft drawn copper of not less than 98% conductivity, conforming to ASTM Specifications and the latest requirements of N.E.C. Wire, and cable shall have 600 volt insulation (unless otherwise noted or specified) of the type specified and shall be of the standard AWG sizes as called for on Drawings or specified.

9. The Contractor shall furnish all labor and material required for the installation of the systems. A brief description of the work is as follows:

   a. Furnish all electrical control wiring for the new equipment and controls.

   b. Contractor shall apply final finish to insure uniformity.

   c. All cutting, patching, and painting as required.

   d. All controls for units as hereinbefore specified and disconnect switches.

   e. Testing of all mechanical contractor installed wiring as directed.

   f. Contractor shall perform all work as stated on the documents for fire alarm fan shutdown for all new applicable equipment, unless noted otherwise.

   g. Contractor shall obtain an approved independent electrical inspection certificate, covering all work performed by an electrical inspection agency serving the locality of the project.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.

1. Submittals.
2. Welder certification.
3. Pipe joining materials and installation instructions common to piping systems.
4. Piping specialties: Escutcheons, dielectric fittings, sleeves and seals.
5. Identifying devices and labels.
6. Nonshrink grout for equipment installations.
7. Drip pans.
8. Fire stopping.
9. Pipe supports: Hangers, clamps, support spacing, building attachments, shields and saddles, flashing, miscellaneous materials, anchors.
10. Field fabricated metal and wood equipment supports.

B. Pipe and pipe fitting materials are specified in piping system sections.

1.02 RELATED DOCUMENTS

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

1.03 SUBMITTALS

A. General - Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for following piping specialties:

1. Mechanical sleeve seals.
2. Identification materials and devices.

C. Samples of color, lettering style and other graphic representation required for each identification material and device.

D. Shop drawings detailing fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

E. Coordination drawings for access panel and door locations.

F. Prepare coordination drawings according to Division 1 Section 01044-"Composite Drawings" to a 1/4 inch equals 1 foot scale or

larger. Detail major elements, components and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence and coordination of installations are important to the efficient flow of the Work. Include the following:

1. Proposed locations of piping, ductwork, equipment and materials. Include the following:

    a. Planned piping layout, including valve and specialty locations and valve stem movement.
    b. Planned duct systems layout, including elbows radii and duct accessories.
    c. Clearances for installing and maintaining insulation.
    d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
    e. Equipment service connections and support details.
    f. Exterior wall and foundation penetrations.
    g. Fire-rated wall and floor penetrations.
    h. Sizes and location of required concrete pads and bases.

G. Floor plans, elevations and details to indicate penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.

H. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

I. Submit weld proceedure specifications.

1.04 WELD AND WELDER CERTIFICATION

A. Welder certificates signed by Contractor certifying that welders comply with requirements of this Section.

B. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code - Steel".

1. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping".

1.05 Standards for Materials and Workmanship

A. All materials and workmanship shall, at a minimum be inaccordance with (in no order of precedence):

1. New York State Codes – latest edition as adopted by the Authority Having Jurisdiction, unless otherwise noted.

2. State and municipal Building Codes and related subcodes.

3. Occupational and Safety Act (OSHA) Requirements.

4. Rules and Regulations of the Authority Having Jurisdiction applicable to the work.

5. National Electrical Standards Association Standard for Good Workmanship in Electrical Construction (NECA-1)

6. Serving utility's rules and regulations for providing service.

7. Contract Drawings and Specifications.

8. Manufacturer recommended installation instructions, practices and procedures for the products being utilized or installed.

9. Where conflicts arise between the above, the more stringent requirement shall be adhered to.

PART 2 - PRODUCTS

2.01 PIPE AND PIPE FITTINGS

A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods. Joining methods and pipe installation shall be performed in complete accordance with section 1613 of the Building Code of New York State for building seismic type II, zone C.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.02 PIPE JOINING MATERIALS

A. Refer to individual piping system specification Sections in Division 15 for special joining materials not listed below.

B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8 inch maximum thickness, except where thickness or specific material is indicated.

a. Full-Face Type: for flat-face, Class 125 cast-iron and cast-bronze flanges.
b. Narrow-Face Type: for raised-face, Class 250 cast-iron and steel flanges.

2. ASME B16.20 for grooved, ring-joint, steel flanges. Note that grooved, ring joint piping / accessories may be used for sprinkler or condenser water piping systems only.
3. AWWA C110, rubber, flat face, 1/8 inch thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is indicated.

D. Solder Filler Metal: ASTM B 32.

1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95 percent) and silver (approximately 5 percent).
3. Alloy E: Tin (approximately 95 percent) and copper (approximately 5 percent).
4. Allow HA: Tin-antimony-silver-copper-zinc.
5. Alloy HB: Tin-antimony-silver-copper-nickel.
6. Alloy Sb5: Tin (95 percent) and antimony (5 percent).

E. Brazing Filler Metals: AWS A5.8.

1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

F. Welding Fill Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Flanged, Ductile-Iron Pipe Gasket, Bolts and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.

H. Couplings: Iron body sleeve assembly, fabricated to match outside diameters of plain-end, pressure pipes.

1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47, Grade 32510 or ASTM A 536 ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

2.03 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling and floor plates; deep-pattern type, where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube and insulation of insulated piping.
2. Outside Diameter: Completely cover opening.
3. Cast Brass: One-piece, with set-screw.

    a. Finish: Rough brass.
    b. Finish: Polished chrome plate.

4. Cast Brass: Split casting, with concealed hinge and set-screw.

    a. Finish: Rough brass.
    b. Finish: Polished chrome plate.

5. Stamped Steel: One-piece, with set screw and chrome plated finish.
6. Stamped Steel: One-piece with spring clips and chrome plated finish.
7. Stamped Steel: Split plate with concealed hinge, set-screw, and chrome plated finish.
8. Stamped Steel: Split plate with concealed hinge, spring clips and chrome plated finish.
9. Cast-Iron Floor Plate: One piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
2. Insulating Material: Suitable for system fluid, pressure and temperature.
3. Dielectric Unions: Factory-fabricated, union assembly, for 250 psig minimum working pressure at 180 deg F temperature.
4. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system pressures.
5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers and steel backing washers.

    a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.

6. Dielectric Couplings: Galvanized steel coupling, having inert and non-corrosive, thermoplastic lining, with threaded ends and 300 psig minimum working pressure at 225 deg F temperature.
7. Dielectric Nipples: Electroplated steel nipple, having inert and non-corrosive, thermoplastic lining, with combination of plain or threaded end types and 300 psig working pressure at 225 deg F temperature.

C. Mechanical Sleeve Seals: Modular, watertight, mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.

D. Sleeves: The following materials are for wall, floor, slab and roof penetrations.

1. Steel Sheet-Metal: 24 gage or heavier, galvanized sheet metal, round tube closed with welded longitudinal joint.
2. Steel Pipe: ASTM A53, Type E, Grade A, Schedule 40, galvanized, plain ends.
3. Cast-Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.

    a. Penetrating Pipe Deflection: In accordance with International Building Code (latest edition), Chapter 16: seismic requirements, without leakage.
    b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111 of housing and gasket size as required to fit penetrating pipe.
    c. Pipe Sleeve: AWWA C151, ductile-iron pipe.
    d. Housing-to-Sleeve Gasket: Rubber or neoprene, push-on type, of manufacturer's design.
5. Cast-Iron Sleeve Fittings: Commercially-made, sleeve having integral clamping flange, with clamping ring, bolts and nuts for membrane flashing.

    a. Underdeck Clamp: Clamping ring with set screws.

2.04 IDENTIFYING DEVICES AND LABELS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. Where more than single type is specified for listed application, selection is Installer's option, but provide single selection for each product category.

B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped; permanently fastened to equipment.

1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.
2. Location: An accessible and visible location.

C. Snap-On Plastic Pipe Markers: Manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, conforming to ASME A13.1.
D. Pressure-Sensitive Pipe Markers: Manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, conforming to ASME A13.1.
E. Plastic Duct Markers: Manufacturer's standard laminated plastic, color coded duct markers. Conform to following color code:

1. Green: Cold air.
2. Yellow: Hot air.
3. Yellow/Green: Supply air.
4. Blue: Exhaust, outside, return and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
6. Nomenclature: Include following:

    a. Direction of air flow.
    b. Duct service (supply, return, exhaust, etc.).
    c. Duct origin (from).
    d. Duct destination (to).
    e. Design cfm.

F. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock: Grade ES-2, black surface, black phenolic core, with white (letter color) melamine subcore, except when other colors are indicated.

1. Fabricate in sizes required for message.
2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
3. Punch for mechanical fastening.
4. Thickness: 1/16 inch, except as otherwise indicated.
5. Thickness: 1/8 inch, except as otherwise indicated.
6. Thickness: 1/16 inch, for units up to 20 square inches or 8-inches long; 1/8 inch for larger units.
7. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

G. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:

1. Green: Cooling equipment and components.
2. Yellow: Heating equipment and components.
3. Yellow/Green: Combination cooling and heating equipment and components.
4. Brown: Energy reclamation equipment and components.
5. Blue: Equipment and components that do not meet any of above criteria.
6. For hazardous equipment, use colors and designs recommended by ASME A13.1.
7. Nomenclature: Include following, matching terminology on schedules as closely as possible:

    a. Name and plan number.
    b. Equipment service.

c. Design capacity.
d. Other design parameters such as pressure drop, entering and leaving conditions, and rpm.

8. Size: Approximately 2-1/2 by 4 inches for control devices, dampers, and valves; and 4-1/2 by 6 inches for equipment.

H. Underground Type Plastic Line Marker.

1. Manufacturer's standard permanent, bright colored, continuous printed plastic tape, intended for direct burial service, not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried pipe.

I. Lettering and Graphics: Coordinate names, abbreviations and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system number as well as service such as "Boiler No. 3", "Air Supply No. 1H", or "Standpipe F12".

2.05 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi, 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

2.06 DRIP PANS

A. Provide drip pans fabricated from corrosion resistant sheet metal with watertight joints, and with edges turned up 2-1/2 inches. Reinforce top, either by structural angles or by folding over according to size. Provide hole, gasket, and flange at low point for watertight joint and 1-inch drain line connection.

2.07 FIRE STOPPING

A. Refer to Specification Section 15511 for details.

2.08 HORIZONTAL PIPING HANGERS AND SUPPORTS

A. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports. Supports and hangers in conformance with International Building Code (latest

edition), Chapter 16: seismic requirements shall be used. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper plated hangers and supports for copper piping systems. Provide spring hangers where piping is subject to vibration movement.

B. Adjustable steel clevises.

1. Material: Carbon steel, copper plated for copper piping.
2. Finish: Black or copper plated.
3. Adjustment: Hanger to be adjustable for vertical height of pipe without removing the pipe.

2.09 VERTICAL PIPING CLAMPS

A. Two bolt riser clamp.

1. Material: Carbon steel copper plated for copper piping.
2. Finish: Black or copper plated.

2.10 HANGER ROD AND SPACING

ROD SIZE AND SPACING SCHEDULE (In accordance with NYSBC 1621)

PIPE SIZE	ROD DIAMETER
2" and smaller	3/8"
2-1/2" thru 3-1/2"	1/2"
4" thru 5"	5/8"
6" and over	3/4"

TYPE	MAXIMUM SPACING
Steel	10’ -0"
Copper	6’- 0"

Note: Cast Iron - support at every hub or coupling 5 ft. maximum spacing.

2.11 BUILDING ATTACHMENTS

A. General: Except as otherwise indicated provide factory fabricated building attachments of one of the following types listed, selected by Installer to suit building substrate conditions. Select size of building attachments to suit hanger rods. Provide copper plated building attachments for copper piping systems. Provide the following where approved by International Building Code (latest edition), Chapter 16:

B. On Structural Steel:

1. For pipes 2" and smaller: C clamps with lock nuts similar to Grinnell figure 86.
2. For pipes 5" and larger: Use beam clamps similar to Grinnell figure 228 or 292.

C. On New Masonry:

1. Use concrete inserts similar to Grinnell figure 281.

D. On Existing Concrete:

1. Use expansion case similar to Grinnell figure 117.

E. On Wood:

1. Use coach screw rods Grinnell figure 111. Ceiling flanges Grinnell figure 153, or fabricated angle clips. Use wood drive screws or lag bolts as fasteners.

2.12 SHIELDS AND SADDLES (Where approved by International Building Code (latest edition), Chapter 16:)

A. General: For insulated piping.

B. Shields: 16 gauge galvanized metal.

Unsul Coustic Corp. "Insul-Shield"

C. Protection saddles:

1. Hardwood block
2. Steel saddle Grinnell 160 series

2.13 FLASHING MATERIALS

A. General: Provide flashings for each penetration of mechanical systems through roofs or waterproof membranes.

B. Molded Pipe Flashing: Compatible with single ply membranes with which it is used and manufactured by membrane manufacturer.

C. Copper flashing: Provide cold-rolled sheet copper (ANSI/ASTM B 370), of proper temper for applications shown and required forming, coated on one side with not less than 0.06 lbs. per sq. ft. of antimony (ANSI/ASTM B 101, Type I, Class A), weighing 1.06 lbs. per sq. ft., except as otherwise indicated.

D. Bituminous coating: FS TT-C-494, or MIL-C-18480, or SSPC-Paint 12, cold applied solvent type bituminous mastic coating for application in dry film thickness of 15 mils per coat.

2.14 MISCELLANEOUS MATERIALS

A. Metal framing: Provide products complying with NEMA STD ML 1.

B. Steel plates, shapes and bars: Provide products complying with ANSI/ASTM A 36.

C. Heavy duty steel trapezes: Fabricate from steel shapes selected for loads required, weld steel in accordance with AWS standards.

D. Pipe guides: Provide factory fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two section outer cylinder and base with a two section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

2.15 ANCHORS

A. Fabricate pipe anchors from 3 x 3 x 1/2" angle.

B. Use pipe protection saddles one size larger than piping.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General: All piping systems, components and their installation shall be in conformance with the International Building Code (latest edition), Chapter 16: for seismic requirements. Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15 specify piping installation requirements unique to the piping system.

B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordinate drawings.

C. Install piping at indicated slope.

D. Install components having pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.

H. Install piping tight to slabs, beams, joists, columns, walls and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

I. Install piping to allow application of insulation plus 1-inch clearance around insulation.

J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

K. Install fittings for changes in direction and branch connections.

L. Install couplings according to manufacturer's printed instructions.

M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wallboard partitions and suspended ceilings according to the following:

1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw and polished chrome-plated finish. Use split-casting escutcheons where required, for existing piping.
2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.
3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips and chrome-plated finish.
5. Piping in Utility Areas: Cast-brass or stamped-steel with set-screw or spring clips.

N. Sleeves are required for core drilled holes.

O. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs and where indicated.

1. Cut sleeves to length for mounting flush with both surfaces.

    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.

2. Build sleeves into new walls and slabs as work progresses.

3. Install large enough sleeves to provide 1/4 inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Sheet-Metal Sleeves: For pipes 6 inches and larger, penetrating gypsum-board partitions.
b. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Flashing is specified in Division 7 Section "Flashing and Sheet Metal".
c. Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.

4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants specified in Division 7 Section "Joint Sealants".

Q. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeve and mechanical sleeve seals. Size sleeve for 1 inch annular clear space between pipe and sleeve for installation of mechanical seals.

1. Install steel pipe for sleeves smaller than 6 inches.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger.
3. Assemble and install mechanical seals according to manufacturer's printed instructions.

R. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.

S. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.

T. Verify final equipment locations for roughing-in.

U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

V. Piping Joint Construction: Joint pipe and fittings as follows and as specifically required in individual piping system specification Sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS "Soldering Manual", Chapter 22 "The Soldering of Pipe and Tube".
4. Brazed Joints: Construct joints according to AWS "Brazing Manual", Chapter 28 "Pipe and Tube".

5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:

    a. Note the internal length of threads in fittings or valve ends and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
    b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
    c. Align threads at point of assembly.
    d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
    e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

W. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to "Quality Assurance" article.

X. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

1. Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment, according to manufacturer's printed instructions.

    a. Plain-End Pipe and Socket-Type Fittings: Socket-joining.

Z. Piping Connections: Except as otherwise indicated, make piping connections as specified below.

1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2 inches or smaller threaded pipe connection.
2. Install flanges, in piping 2 1/2 inches and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials or dissimilar metals.
4. Wet Piping Systems (Water and Steam): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.02 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom, where mounting heights are not indicated. Equipment platforms, vibration isolation and restraints shall be provided and installed where described and shall be in conformance with International Building Code (latest edition), Chapter 16:

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.03 LABELING AND IDENTIFYING

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Plastic markers, with application systems. Install on pipe insulation segment where required for hot non-insulated pipes.

2. Locate pipe markers as follows wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

a. Near each valve and control device.
b. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.
c. Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
d. At access doors, manholes and similar access points that permit view of concealed piping.
e. Near major equipment items and other points of origination and termination.
f. Spaced at a maximum of 50 feet intervals along each run. Reduce intervals to 25 feet in congested areas of piping and equipment.
g. On piping above removable acoustical ceilings, except omit intermediately spaces markers.

3. During back-filling/top-soiling of each exterior underground piping systems, install continuous underground type plastic line marker, located directly over buried line

at 6-inches to 8-inches below finished grade. Where multiple small lines are buried in common trench and do not exceed overall width of 16-inches, install single line marker. For tile fields and similar installations, mark only edge pipe lines of field.

B. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.

1. Lettering Size: Minimum 1/4 inch high lettering for name of unit where viewing distance is less than 2 feet, 1/2 inch high for distance up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.

C. Duct Systems: Identify air supply, return, exhaust, intake and relief ducts with duct markers, or provide stenciled signs and arrows, showing duct system service and direction of flow.

1. Location: In each space where ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet.

D. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.04 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Provide and install in conformance with International Building Code (latest edition), Chapter 16: Cut, fit and place miscellaneous metal supports accurately in location, alignment and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code - Steel".

3.05 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish

materials. Make tight connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.06 GROUTING

A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms for placement of grout, as required.

D. Avoid air entrapment when placing grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases to provide a smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's printed instructions

3.07 DRIP PANS

A. Locate drip pans under piping passing over or within 3 ft. horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, and weld rods to sides of drip pan.
Brace to prevent sagging or swaying. Connect 1-inch drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

3.08 FIRESTOPPING

A. See section 15511 for additional fire stopping requirements.

3.09 INSTALLATION OF BUILDING ATTACHMENTS

A. Install building attachments at required locations in concrete, in wood or on structural steel for proper piping support. Space attachments within maximum piping span length indicated. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed, fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.10 INSTALLATION OF HANGERS AND SUPPORTS

A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Supports / hangers shall conform to the requirements of International Building Code (latest edition), Chapter 16: Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Install hangers and supports of same type and style for grouped piping runs.

C. Support fire water piping independently of other piping.

D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.

E. Provisions for movement: International Building Code (latest edition), Chapter 16:

1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
2. Load distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
3. Pipe slopes: Install hangers and supports to provide indicated pipe slopes.

F. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.11 SHIELDS AND SADDLES FOR INSULATED PIPING

A. 4" and below use 16 gauge x 12 inch long shield with oversized hanger outside insulation.

B. 6" and above use hardwood protection saddle with 16 gauge x 18 inch long shield with oversized hanger outside insulation.

C. 6" and above use steel protection saddle. Fill void between shield and pipe with insulation. Cover with vapor barrier. Protect barrier with 16 gauge x 18 inch long shield with oversized hanger outside assembly.

3.12 INSTALLATION OF ANCHORS

A. Install anchors at proper locations to prevent stresses and to prevent transfer of loading and stresses to connected equipment.

B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure.

C. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.

D. Anchor spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.13 FLASHINGS

A. Manufacturer's recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.

B. Coat back side of flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent separation as recommended by manufacturer of metal.

C. On vertical surfaces, lap flashings minimum of 3".

D. On sloping surfaces, for slopes of not less than 6" in 12", lap unsealed flashings minimum of 6".

E. For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges minimum of 6" for embedment.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15100 - VALVES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of valves required by this section is indicated on drawings and/or specified in other Division 15 sections.

B. Types of valves specified in this section include the following:

1. Gate valves.
2. Globe valves
3. Drain valves.
4. Ball valves.
5. Butterfly valves (where specifically approved by engineer only).
6. Check valves.

a. Wafer Check (where specifically approved by engineer only).

1.03 QUALITY ASSURANCE

A. Marking of valves - comply with MSS SP-25.

B. Valve dimensions - for face-to-face and end-to-end dimensions of flanged or welding end valve bodies, comply with ANSI B16.10.

C. ASME Compliance: ASME 1331.9 for Building Services Piping.

D. Valve types. Provide valves of same type by same manufacturer.

1.04 SUBMITTALS

A. Product data - submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing manufacturer's figure number, size, location and valve features for each required valve.

B. Maintenance data - submit maintenance data and spare parts lists for each type of valve. Include this data in Maintenance Manual.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle valves and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged valves or components, replace with new.

B. Store valves and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide factory fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated, provide proper selection as determined by installer to comply with installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is engineer’s option.

B. Valve Features

1. Bypass- when shown provide manufacturer's standard bypass piping and valving.
2. Drain - when shown provide threaded pipe plugs complying with Division 15 "Hot & Chilled water piping" section.
3. Flanged - valve flanged complying with ANSI B16.1 (cast iron), ANSI B16.5, (steel), or ANSI B16.24 (bronze).
4. Threaded - valve ends complying with ANSI B2.1
5. Solder joint - valve ends complying with ANSI B16.18.
6. Trim - fabricate pressure containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry.
7. Renewable seat - design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.
8. Extended stem - increase stem length 2" minimum, to accommodate insulation applied over valve.

C. Valve Definitions

1. Mechanical actuator - factory fabricated gears, gear enclosure, external chain attachment and chain designed to provide mechanical advantage in operating valve.
2. Bonnet - part of gate or globe valve through which stem passes to valve body, and attached to valve body by screws, bolts union, or welding.
3. Solid wedge - one piece tapered disc in gate valve, designed for contact on both sides.
4. Outside screw and yoke (OS&Y) - stem and handwheel designed to rise out of bonnet or yoke as valve is operated from closed to open position.
5. Inside screw, non-rising stem - stem and handwheel designed to rotate without rising when valve is operated from closed to open position.
6. Tight shutoff - butterfly valve designed for flow regulation, and manufactured to be tight in closed position.

2.02 GLOBE VALVES

A. Packing - select valves designed for repacking under pressure when fully opened, equipped with packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened, and equipped with gland follower.

B. Composition discs - where required, provide suitable material for intended service. For stem throttling service, fit composition disc valve with throttling nut. For metal seated globe valves, provide hardened stainless steel disc and seat ring.

C. Comply with the following standards:

1. Cast iron valves - MSS SP-85.
2. Bronze valves - MSS SP-80.
3. Steel valves - ANSI B16.34.

D. For HVAC hot and chilled water service:

1. Threaded ends 2" and smaller - Class 150, bronze body, union bonnet, rising stem, composition disc.
2. Soldered ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc.
3. Flanged ends 2 1/2" and larger - Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc.

E. Manufacturer - subject to compliance with requirements, provide globe valves of one of the following:

1. Jenkins Bros, A Corp.
2. Kennedy Valve
3. Stockham Valves and Fittings, Inc.

2.03 DRAIN VALVES

A. For low pressure drainage service:

1. Threaded ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc, 3/4" hose outlet connection.
2. Soldered ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc, 3/4" hose outlet connection.

B. Manufacturer - subject to compliance with requirements, provide drain valves of one of the following:

1. NIBCO, Inc.
2. Watts

2.04 BALL VALVES

A. Comply with the following standards:

1. Cast iron valves - MSS SP-72.
2. Steel valves - ANSI B16.34.

B. For HVAC hot and chilled water service:

1. Threaded ends 2" and smaller - Class 125, bronze 2 piece body, full port, bronze ball, bronze stem.
2. Soldered ends 2" and smaller - Class 125, bronze 2 piece body, full port, bronze ball, bronze stem.

C. Manufacturer - subject to compliance with requirements, provide ball valves of one of the following:

1. Jenkins Bros.
2. Stockham Valves & Fittings
3. Watts

2.05 BUTTERFLY VALVES (only where specifically approved by the engineer)

A. General - comply with MSS SP-67. Valves to be tight shutoff.

Where butterfly valves are used as shutoffs for terminal or equipment removal or repair, select lug type valves. Select wafer type valves for other applications. Provide gear operators on butterfly valves 8" and larger.

B. For HVAC hot and chilled water service:

1. Lug type 3" and larger - Class 150, ductile iron body, lever operated, cadmium plated ductile iron disc, Type 316 stainless steel stem, EPT or EPDM seat.

C. Manufacturer - subject to compliance with requirements, provide butterfly valves of one of the following:

1. Demco Inc.
2. Jenkins Bros., A Corp.
3. Mark Controls Corp., MCC Centerline.
4. Stockham Valves and Fittings, Inc.
5. Crane Co., Valve Division

2.06 WAFER CHECK VALVES (only where specifically approved by the engineer)

A. General - provide wafer style, butterfly type, spring actuated check valves designed to be installed with gaskets between two standard Class 125 flanges. Construct iron body valves with pressure containing parts of materials conforming to ANSI/ASTM A-126, Grade B. Support hanger pins on both ends by removable side plugs.

B. For water service:

1. 2" and larger - Class 125, cast iron body, stainless steel trim, bronze disc, Buna-N seal.

C. Manufacturer - subject to compliance with requirements, provide wafer check valves of one of the following:

1. Bell & Gossett, ITT Fluid Handling Div.
2. Metraflex Co.
3. NIBCO, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General - except as otherwise indicated, comply with the following requirements:

1. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
2. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose end adapter for each valve that must be installed with stem below horizontal plane.

B. Insulation - where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation.

C. Applications subject to shock - install valves with bodies of metal other than cast iron where thermal or mechanical shock is

indicated or can be expected to occur.

D. Applications subject to corrosion - do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.

E. Mechanical actuators - install mechanical actuators with chain operators where indicated, and where valves 4" and larger are mounted more than 7'-0" above floor in mechanical rooms, boiler rooms, and where recommended by valve manufacturer because of valve size, pressure differential or other operating condition making manual operation difficult.

F. Selection of valve ends (pipe connections) - except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.

1. Copper tube size 2" and smaller - soldered joint valves except ball valves used in plumbing systems.
2. Steel pipe, size 2" and smaller - threaded valves.
3. Pipe size 2 1/2" and larger - flanged valves.

G. Valve system - select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.

H. Non-metallic disc - limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.

I. Renewable seats - select and install valves with renewable seats, except where otherwise indicated.

J. Fluid control - except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.

K. Installation of Check valves: Wafer check valves – install between two flanges in horizontal or vertical position for proper direction of flow.

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15135 - THERMOMETERS AND GAGES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Thermometers and gages specified in this section include the following:

1. Thermometers and fittings:
2. Pressure gages and fittings:

PART 2 - PRODUCTS

2.01 THERMOMETERS

A. Thermometers:

1. General: Provide and install adjustable, variable angle type thermometers of materials, capacities and ranges indicated.
2. Case: Die cast aluminum finished in baked epoxy enamel, glass front, 9 inches long.
3. Adjustable joint: 180 degree adjustment in vertical plane, 360 degree adjustment in horizontal plane, with locking device.
4. Tube and capillary: Blue liquid filled, magnifying lens, 1-percent scale range accuracy, shock mounted. (Mercury filled not acceptable).
5. Scale: Satin faced, non-reflective aluminum, permanently etched markings.
6. Stem: Copper plated steel, or brass, for separable socket.
7. Range: Conform to the following:

    a. Hot water: 30 to 240 degrees F with 2 degree F scale divisions.
    b. Chilled water: 30 to 180 degrees F with 2 degrees F scale divisions.

8. Manufacturer:

    a. Wika
    b. Trerice
    c. Weiss
    d. Or approved equal

B. Dial Thermommeters:

1. General – Provide dial bimetal type adjustable angle thermometers of materials, capacities and ranges indicated, designed and constructed for use in service indicted.
2. Case – Type 300 series stainless steel hermetically sealed.

3. Dial – White finished aluminum with black and blue marking.
4. Pointer – balanced aluminum with black finish.
5. Stem – type 300 series stainless steel 1/4"o.d.internal bimetal coil silicone dampened.
6. Range – conform to the following:

   a. Hot water 20° to 240° F. scale divisions.

7. Manufacturer – subject to compliance with requirements, provide glass thermometers of one of the following:

   a. Tel-Tru Mfg. Co.
   b. Trerice (H.O.) Co.
   c. Weiss Instrument Inc.

B. Thermometer wells:

1. General: Provide thermometer wells of brass or stainless steel, pressure rated to match piping system design pressure. Provide 2 inch extension for insulated piping. Provide cap nut with chain fastened permanently to thermometer well.
2. Manufacturer: Same as thermometers.

2.02 PRESSURE GAGES AND FITTINGS

A. Pressure gages:

1. General: Provide "AA" industrial rated liquid filled pressure gages of capacities and ranges indicated, designed and constructed for use in service indicated. All pressure gauges shall be liquid filled unless otherwise specified. Provide gauge cocks for all pressure gauges.
2. Type: General use, 1/2 percent accuracy, ANSI B 40.1 grade A, phosphor bronze bourdon type, bottom connection.
3. Case: Aluminum or brass, glass lens, 4 1/2 inch diameter.
4. Connector: Brass with 1/4 inch male NPT. Provide protective syphon when used for steam service.
5. Scale: White coated aluminum, with permanently etched markings.
6. Range: Conform to the following:

   a. Water - 0 - 100 psi.

7. Manufacturer - subject to compliance with requirements, provide pressure gages of one of the following:

   a. Ametek, U.S. Gage Div.
   b. Trerice
   c. Weiss

B. Pressure gage accessories:

1. Gage cocks: Brass cock with 1/4 inch female NPT on each end, and "T" handle brass plug.
2. Syphon: 1/4 inch straight coil constructed of brass tubing with 1/4 inch male NPT on each end.
3. Snubber: 1/4 inch brass bushing with corrosion resistant porous metal disc, through which pressure fluid is filtered. Select disc material for fluid served and pressure rating.
4. Manufacturer: Same as gages.

PART 3 - EXECUTION

3.01 INSTALLATION OF THERMOMETERS

A. General: Install temperature gages in vertical upright position, and tilted so as to be easily read by observer standing on floor.

B. Locations: Install in the following locations and elsewhere as indicated:

1. At inlet and outlet of each hydronic zone 3-way valve.
2. At inlet and outlet of each hydronic boiler and chiller.
3. At inlet and outlet of each hydronic coil in air handling units, and built-up central systems.
4. At inlet and outlet of each hydronic heat exchanger.
5. At inlet and outlet of each hydronic heat recovery unit.
6. At inlet and outlet of each thermal storage tank.
7. At outlet of domestic hot water heater.
8. Common boiler supply and return header.

C. Thermometer wells: Install in piping tee where indicated, in vertical upright position. Fill well with Thermal grease.

3.2 INSTALLATION OF PRESSURE GAGES

A. General: Install pressure gages in piping tee with pressure gage cock, located on pipe at most readable position.

B. Locations: Install in the following locations, and elsewhere as indicated:

1. At suction and discharge of each hydronic pump.
2. At discharge of each pressure reducing valve.
3. At water service outlet.
4. At inlet and outlet of water side for condensers, chillers, and cooling towers.
5. System makeup water line.
6. Accessible hihg point of hydronic piping systems.

C. Pressure gage cocks: Install in piping tee with snubber or syphon if steam.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15160 - EXPANSION COMPENSATION

PART 1 - GENERAL

1.1 SUMMARY OF ITEMS INCLUDED

A. Expansion compensation products required for this project shall be provided and installed in accordance with section 1621 of the New York State Building Code.

B. Expansion compensation products specified in this section include:

1. Fabricated Expansion Loops.

2. Flexible Ball Pipe Joints.

3. Expansion Compensators.

1.2 QUALITY ASSURANCE

A. Refer to Section 01400 "Quality Control", for requirements pertaining to substitute materials and equipment.

B. Comply with standards of the Expansion Joint Manufacturer's Association (EJMA).

1.3 SUBMITTALS

A. Product Data: Submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of expansion compensation product. Submit schedule showing manufacturer's figure number, size, and location on project.

B. Shop Drawings: Submit shop drawings for fabricated expansion loops indicating location, dimensions, pipe sizes and location and method of attachment of anchors.

C. Maintenance Data: Submit maintenance data and spare parts list for each type of expansion compensation product. Include this data in Maintenance Manual.

PART 2 - PRODUCTS

2.1 EXPANSION LOOPS

A. General: Fabricate expansion loops as dimensioned and located on the Drawings and elsewhere as determined by installer to provide for adequate control of expansion of the installed piping system. Cold spring the loop prior to connecting to the anchored piping.

2.2 FLEXIBLE BALL PIPE JOINTS

A. General: Provide flexible ball pipe joints where indicated for piping systems, with materials and pressure/temperature ratings selected by Installer to suit intended service. Design joints for 360 degree rotation and with minimum of 30 degree angular

flexing movement for sizes 1/4" to 6", 15 degrees for sizes 8" to 30". Provide 2 composition gaskets for each joint.

B. Certify carbon steel joints for environmental shock testing in accordance with MIL-S-4456 or MIL-S-901C.

C. Comply with Section II of ASME Boiler and Pressure Vessel Code and ANSI B31.1 Power Piping for materials and design of pressure containing parts and bolting.

D. Test each assembly with steam at working pressure of piping system for zero leaks before shipment.

E. Manufacturer: Subject to compliance with requirements, provide flexible ball pipe joints of the following:

1. Gustin-Bacon Div., Aeroquip Corp.

2.3 EXPANSION COMPENSATORS

A. Low Pressure: 70 psi, 3/4 inch to 3 inch copper pipe, 2 ply phosphor bronze bellows, brass shroud, male copper tube end.

B. High Pressure: 150 psi, 3/4 inch to 3/ inch steel pipe, 2 ply seamless stainless steel bellows, steel shroud and male thread end or psi, 3/4 inch to 3 inch copper pipe all bronze construction male thread or sweat ends.

C. Manufacturer: Subject to compliance with requirements, provide expansion compensators of one of the following:

1. Flexonics Div., UOP, Inc.
2. Keflex, Mfg. Div.
3. Metraflex Co.
4. Vibration Mountings and Controls, Inc.

2.4 PIPE ALIGNMENT GUIDES

A. General: Provide pipe alignment guides on both sides of expansion joints and elsewhere as indicated. Construct with 3 or 4 finger spider traveling inside a guiding sleeve, with provision for anchoring to building substrate.

B. Manufacturer: Subject to compliance with requirements, provide pipe alignment guides of the following:

1. Flexonics Div., UOP, Inc.
2. Keflex Mfg. Div.
3. Metraflex Co.

2.5 PIPE ANCHORS

A. General: Fabricated anchor, coupling with steel angle clips, teflon lined clamp sleeve, or shaped anchor for welding to pipe.

B. Manufacturer: Subject to compliance with requirements, provide anchors of the following:

1. Flexonics Div., UOP, Inc.
2. Keflex Mfg. Div.

PART 3 - EXECUTION

3.1 EXPANSION LOOPS

A. General: Fabricate expansion loops as indicated, in locations indicated, and elsewhere as determined by Installer for adequate expansion of installed piping system. Subject loop to cold spring which will absorb 50 percent of total expansion between hot and cold conditions. Provide pipe anchors and pipe alignment guides as indicated, and elsewhere as determined by Installer to properly anchor piping in relationship to expansion loops.

3.2 EXPANSION COMPENSATION FOR RISERS AND TERMINALS

A. General: Install connection between piping mains and risers with at least 5 pipe fittings including tee in main. Install connections between piping risers and terminal units with at least 4 pipe fittings including tee in riser.

3.3 PIPE ALIGNMENT GUIDES AND ANCHORS

A. General: Install alignment guides on both sides of each expansion joint or loop. Provide anchors secured to building structure as required.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15215 - VIBRATION ISOLATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.

B. This section is a Division 15 Basic Materials and Methods section, and is a part of each Division 15 section making reference to vibration isolation products specified herein. Vibration isolation devices shall conform to the seismic requirements of section 1613 of the New York State Building Code. Isolators shall allow the amount of movement required by this code and shall be equipped with limit stops as required by this code.

1.02 DESCRIPTION OF WORK

A. Extent of vibration isolation work required by this section is indicated on drawings and schedules, and/or specified in other Division 15 sections.

B. Types of vibration isolation products specified in this section include the following:

1. Fiberglass Pad and Shapes
2. Neoprene Pads
3. Cork/Neoprene Pads
4. Equipment Rails
5. Fabricated Equipment Bases
6. Roof Curb Isolators
7. Isolation Hangers
8. Riser Isolators
9. Riser Support Isolators
10. Flexible Duct Connectors
11. Flexible Pipe Connectors

C. Vibration isolation products furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 15 sections.

D. Refer to other sections of these specifications for equipment foundations, hangers, sealants, gaskets and other work related to vibration isolation work.

1.03 QUALITY ASSURANCE

A. Product qualification - provide each type of vibration isolation unit produced by specialized manufacturer, with not less than 5 years successful experience in production of units similar to those required for project.

1. Except as otherwise indicated, obtain support isolation

1.04 SUBMITTALS

A. Product data - submit manufacturer's specifications, detailed drawings, performance characteristics data and installation instructions for each type of unit required.

1. Include data for each type and size of unit, showing isolation efficiency, stiffness, natural frequency and transmissibility at lowest operating speed of equipment.
2. Where required, include independent test agencies certified report of test results for each type of unit.
3. For spring units, show wire size, spring diameter, free height, solid-compression height, operating height, fatigue characteristics and ratio of horizontal to vertical stiffness.
4. For spring and pad type units, show basis of spring rate selection for range of loading weights.
5. Include performance certifications where required.

B. Shop drawings - submit shop drawings showing structural design and details of inertia bases, steel beam bases and other custom fabricated work not covered by manufacturer's submitted data.

1. Furnish templates to fabricators of equipment bases, foundations and other support systems, as needed for coordination of vibration isolation units with other work.

C. Submit shop drawings indicating scope of vibration isolation work and locations of units and flexible connections. Include support isolation points for piping and ductwork including risers, air housings and inertia bases.

1. Include schedule of units, showing size or manufacturer's part number, and weight supported and resulting deflection of each unit.

PART 2 - PRODUCTS

2.01 ISOLATION MATERIALS AND SUPPORT UNITS

A. Fiberglass pads and shapes - glass fiber of not more than 0.18 mil diameter, produced by multiple-flame attenuation process, molded with manufacturer's standard fillers and binders through 10 compression cycles at 3 times rated load bearing capacity, to achieve natural frequency of not more than 12 Hertz, in thicknesses and shapes required for use in vibration isolation units.

B. Neoprene pads - oil resistant neoprene sheets, of manufacturer's standard hardness and cross ribbed pattern, designed for neoprene in shear type vibration isolation, and in thicknesses required.

C. Cork/Neoprene pads - close grained composition cork sheet, laminated between 2 sheets of ribbed oil resistant neoprene, in thicknesses required.

D. Vibration isolation products furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 15 sections.

E. Refer to other sections of these specifications for equipment foundations, hangers, sealants, gaskets and other work related to vibration isolation work.

F. Equipment rails - where rails or beams are indicated for use with isolator units to support equipment, provide steel beams complying with ANSI/ASTM A36, with minimum depth of 6" or 0.08 x span of beam between isolators (whichever is greater). Provide welded bracket at each end of beams, and anchor each end to spring isolator unit. Provide bolt holes in beams matching anchor bolt holes in equipment. Provide beams of section modulus indicated or, if not indicated, selected for normal-weight equipment loading to limit static load stress to 16,000 psi.

1. Except as otherwise indicated, position equipment on equipment rails so that load will be equally supported by isolator units.

G. Fabricated equipment bases - where supplementary bases are indicated for use with isolator units to support equipment (base not integral with equipment), provide welded unit, fabricated of structural steel shapes, plates and bars complying with ANSI/ASTM A36, as shown. Provide welded support brackets at points indicated, and anchor base to spring isolator units.
Except as otherwise indicated, arrange brackets to result in the lowest possible mounting height for equipment. Provide bolt holes in base matching anchor bolt holes in equipment.

1. Where indicated, provide auxiliary steel base for support of motor, mounted on equipment base with slotted anchor bolt holes for adjustment of motor position.
2. Where sizes of base framing members are not indicated, fabricate base with depth of structure not less than 0.10 x longest span of base, rigidly braced to support equipment without deflections or distortions which would be detrimental to equipment or equipment performances.

G. Roof-curb isolators - fabricated frame units sized to match roof curbs as shown, formed with isolation springs between extruded aluminum upper and lower sections, which are shaped and positioned to prevent metal-to-metal contact. Provide continuous airtight and waterproof seal between upper and lower extrusions. Include provisions for anchorage of frame unit to roof curb, and for anchorage of equipment to unit.

H. Isolation hangers - hanger units formed with brackets and including manufacturer's standard compression isolators of type indicated. Design brackets for 5 times rated loading of units. Fabricate units to accept misalignment of suspension members, and for use with either rod or strap type members and including acoustical washers to prevent metal-to-metal contacts.

1. Provide vibration isolation spring with cap and pad type isolator, securely retained in unit.
2. Provide neoprene pad, securely retained in unit.
3. Provide fiberglass pad or shape, securely retained in unit, with threaded metal top plate.
4. Provide removable spacer in each unit, to limit deflection during installation to rated-load deflection.

I. Riser isolators - manufacturer's standard pad type isolator bonded to steel plate, formed for welding to pipe sleeve extension.

J. Riser support isolators - manufacturer's standard pad type isolator laminated between two formed steel plate members, one for welding to pipe sleeve extension and other for welding to pipe riser.

K. Flexible duct connectors - laminated flexible sheet of cotton duct and sheet elastomer (butyl, neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated. Form connectors with full faced flanges and accordian bellows to perform as flexible isolation unit, and of manufacturer's standard length for each size unless otherwise indicated. Equip each unit with galvanized steel retaining rings for airtight connection with ductwork.

L. Flexible pipe connectors:

1. For non-ferrous piping, provide bronze hose covered with bronze wire braid with copper tube ends or bronze flanged ends, brase-welded to hose.
2. For ferrous piping, provide stainless steel hose covered with stainless steel wire braid with NPT steel nipples or 150 psi ANSI flanges, welded to hose.
3. Rubber flexible pipe connectors - provide of rubber and butyl construction with integral full faced duck and butyl flanges, internally steel wire reinforced, and furnished complete with steel retaining rings. Select with temperature and pressure ratings to suit intended service.
4. Manufacturer - subject to compliance with requirements, provide vibration isolation products of one of the following:

    a. Korfund Dynamics Corp.
    b. Mason Industries, Inc.
    c. Vibration Eliminator Co., Inc.
    d. Vibration Mountings and Controls, Inc.

PART 3 - EXECUTION

3.01 PERFORMANCE OF ISOLATORS

A. General - comply with minimum static deflections recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers, including definitions of critical and noncritical locations, for selection and application of vibration isolation materials and units as indicated.

B. Manufacturer's recommendations - except as otherwise indicated, comply with manufacturer's recommendations for selection and application of vibration isolation materials and units.

3.02 APPLICATIONS

A. General - except as otherwise indicated, apply the following types of vibration isolators at indicated locations or for indicated items of equipment. Selection is Installer's option where more than one type is indicated.

B. Neoprene pad type isolators - install where the following equipment is indicated:

1. Floor mounted air handling units, in noncritical locations.

C. Equipment rails and spring isolators - install where the following floor mounted equipment is indicated:

1. Air handling units, 7 1/2 H.P. and larger.
2. Centrifugal fans, 7 1/2 H.P. and larger.

D. Fabricated equipment base and spring isolators - install where the following equipment is indicated:

1. Centrifugal fans.
2. Reciprocating refrigeration compressor, in noncritical locations.

E. Roof curb isolators - install where the following equipment is located on roof curbs over critical locations:

1. Air handling units.
2. Rooftop air conditioning units.
3. Fan or blower units, of more than 1.5 H.P.

F. Isolation hangers - install where the following suspended equipment is indicated:

1. Package air handling units.
2. Pipe over 1" pipe size, located in mechanical equipment rooms and each run connected to vibration isolation mounted equipment for a distance of 100 diameters but not less than 50' - 0".
3. Ductwork (except flexible ductwork), located in mechanical equipment rooms, and each run connected to vibration isolation mounted equipment for a distance of 50' - 0".
4. Sound traps in ductwork.
5. Ductwork, where air velocity is 3000 fpm or greater.

G. Riser isolators - install where the following risers pass through floors and roofs, provide support type where riser support is required:

1. Pipe risers.
2. Pipe risers, within 50' - 0" of connection with vibration isolation mounted equipment.
3. Pipe risers, in critical locations.
4. Pipe risers, 2" pipe size and larger, in critical locations.
5. Ductwork risers, in critical locations.
6. Ductwork risers, where air velocity is 3000 fpm or greater.
7. Ductwork risers, within 50' - 0" of connection with vibration isolation mounted equipment.

H. Flexible duct connectors - install at the following ductwork connections:

1. Connections with vibration isolation mounted air handling equipment.
2. Connections with fixed wall louvers for air intake and exhausts.
3. Where ductwork, 1.0 square foot and greater, changes directions in critical locations.

I. Flexible pipe connectors - install in piping systems at the following location:

1. Connections, 3/4" pipe size and larger, with vibration isolation mounted equipment.

3.03 INSTALLATION

A. General - except as otherwise indicated, comply with manufacturer's instructions for installation and load application to vibration isolation materials and units. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading, and are not short circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary protection against overloading during installation.

B. Anchor and attach units to substrate and equipment as required for secure operation and to prevent displacement by normal forces, and as indicated.

C. Adjust leveling devices as required to distribute loading uniformly onto isolators. Shim units as required where leveling devices cannot be used to distribute loading properly.

D. Locate isolation hangers as near overhead support structure as possible.

E. Weld riser isolator units in place as required to prevent displacement from loading and operations.

F. Bond flanges of flexible duct connectors to ducts and housings to provide airtight connections. Seal seams and penetrations to prevent air leakage.

G. Flexible pipe connectors - install on equipment side of shutoff valves, horizontally and parallel to equipment shafts wherever possible.

3.04 DEFLECTION MEASUREMENTS

A. Upon completion of vibration isolation work, prepare report showing measured equipment deflections for each major item of equipment as indicated.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15250 - MECHANICAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of mechanical insulation work required by this section is indicated on Drawings and by requirements of this section.

B. Types of insulation and accessories specified in this section include the following:

1. Type P-1, Sectional molded glass fiber pipe insulation.
2. Type P-2, Sectional rigid foam glass pipe insulation.
3. Type P-3, Flexible elastomeric cellular pipe insulation.
3. Type P-5, Aluminum jacketing for piping
4. Type P-6, Hydrophobic 'pourable' underground pipe insulation
5. Type D-2, Flexible glass fiber blanket-aluminum foil facing.
6. Type D-4, Aluminum jacketing for ductwork.

1.02 QUALITY ASSURANCE

A. Fire Hazard Classification: In accordance with ASTM E-84.
B. NFPA 255 and UL 723, for insulation systems, including insulation, adhesives and coverings, not to exceed the following:

1. Flame spread 25.
2. Fuel contributed 50.
3. Smoke developed 50.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers specification sheets, installation instructions, fire and smoke ratings. Submit schedule matching insulation type to mechanical systems and equipment.

PART 2 - PRODUCTS

2.01 INSULATION - TYPE P1

A. Sectional Molded Glass Fiber Pipe Insulation: Minimum density 4.5 pounds per cubic foot. Factory applied jacket consists of white, flame retardant jacket of .001 inch minimum aluminum foil, laminated to glass fiber reinforced kraft paper with a flame retardant snuffer type adhesive.
Jacket has minimum 1-1/2 inch longitudinal sealing lap. Minimum circumferential sealing strips, 3 inches wide.

B. Fittings Valves and Flanges: Molded, precut, or segmental insulation equal in thickness to adjoining pipe insulation. Alternate, hydraulic-setting insulating cement. Surface finish

pre-molded PVC fitting cover system. Alternate: fitting mastic, fiberglass, reinforcing strips and top coat of fitting mastic.

C. Manufacturers:

1. Certain Teed
2. Knauf Fiberglass
3. Schuler
4. Owens-Corning
5. U.S.G.

2.02 INSULATION - TYPE P2

A. Sectional, Rigid, Foamed Glass Pipe Insulation: Minimum density 8.5 pounds per cubic foot.

B. Fittings, Valves, and Flanges: Molded or segmental foamed glass insulation equal in thickness to adjoining pipe insulation.

C. Exposed and Concealed Pipe: If exposed to weather, finish additionally with .016 inch embossed aluminum jacket, secured with 3/4 inch by .015 inch aluminum strappings and seals.

D. Fittings, Valves, and Flanges: Insulate with preformed or mitered segments of foamed glass, wired, or taped in place and finished with 2 coats of vinyl fitting mastic with glass fabric reinforcement between coats.

E. Manufacturer: Pittsburgh Corning Corp.

2.03 INSULATION TYPE P-3

A. Black flexible closed cell foamed elastomeric pipe insulation with inner and outer surface skin, extruded tubing. Water permeability .17 to .28 perm-inch; water absorption 3 to 10 percent.

B. Manufacturers:

1. Armstrong
2. Rubatex Corp.

2.04 ALUMINUM JACKETING FOR PIPING - TYPE P5

A. Jacketing: Aluminum roll, Type 3003, 0.016 inch thick, 36 inches wide with moisture barrier for cold applications, without moisture barrier for hot applications.

B. Fittings: Aluminum, preformed for tees, valves, 90 degree and 45 degree elbows: Childers ELL JAC or Premetco International.

2.05 HYDROPHOBIC 'POURABLE' FOR UNDERGROUND PIPING - TYPE P6

A. Pourable: 100% Calium Carbonate approximately 60-62 lbs/ sq ft bulk density with 4-6 mil thick polyethylene top vapor barrier.

B. Manufacturer:

1. Dritherm International, Inc.

2.06 INSULATION - TYPE D2

A. Flexible glass fiber duct blanket. Minimum density: 1 pound per cubic foot.

B. Facing: Aluminum foil, minimum .001 inches thick, reinforced with glass fiber yarn mesh and laminated to 40 pound permanently treated, fire-resistant kraft.

C. Manufacturers:

1. Certain Teed
2. Knauf Fiberglass
3. Schuller
4. Owens-Corning
5. U.S.G.

2.07 ALUMINUM JACKETING FOR DUCTWORK D-4

A. Jacketing: Aluminum preformed, Type 3003, 0.016 inch thick rolls with moisture barrier for cold applications, without moisture barrier for hot applications. [Childers] [Premetco International].

B. Stainless Steel Strip: AISI Type 301, 0.015 inches thick, 1/2 inch wide, No. 5 edge, annealed, embossed with "NON-ASBESTOS".

C. Strapping Seals: AISI Type 302, stainless steel, 1/2 inch wide. Interlaken 44.

D. Adhesive: Silicone rubber sealant. General Electric RTV. Dow Corning. Polymer One Sealant.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Apply insulation in accordance with the Schedule of Insulation at the end of this Section.

B. Use only insulation and finish materials including adhesives, cements, and mastics which conform to the requirements of all local codes and ordinances.

C. Fire resistant adhesive is highly flammable in liquid form. Eliminate welding, smoking, or other sources of ignition during application.

D. Apply insulation after all piping pressure tests, as described in Piping Installation Procedure, have been completed.

E. Clean surfaces of loose scale, dirt, oil, and other foreign matter and dry prior to insulating.

F. Apply insulation to completely cover piping surface. Do not insulate over weld certification stamps.

G. "Exposed" as used in this section means exposed to view. "Concealed" means concealed to view such as in furred chases or above suspended ceiling. Penthouse and equipment rooms are considered exposed locations.

H. Fill surface imperfections in the insulation such as chipped edges, small joints or cracks, and small voids or holes with appropriate insulation material and smooth with skim coat of hydraulic-setting insulating cement. Vapor barriers shall be continuous and unbroken at hanger installations.

I. Fit inside diameter of insulation sections or segments to outside curvature of pipe or previous insulation layer.

J. Where standard insulation shapes are not available, cut, score, or miter segments of appropriate block to fit contour of pipe. Stagger joints of adjoining segments. Fit insulation carefully and secure with No. 20 gage galvanized annealed steel wire. Finish with a smoothing coat of hydraulic-setting insulating cement.

K. Insulate valves, strainer, fittings, and flanges with identical material, density, thickness, and surface finish as the piping insulation. All edges shall be filled with filler and finished with a smoothing coat of hydraulic-setting insulating cement.

L. Insulate the entire surface of fittings and strainers. Insulate valves up to and including bonnets, unless authorized otherwise by Project Engineer. Do not cover removable valve bonnets.

M. Insulate strainers to permit removal of the basket without disturbing the insulation of the strainer body. Strainer covers shall be molded and taped to upper section of insulation.

N. Bevel the ends of pipe insulation adjacent to flanges to permit bolt removal. Provide a collar of sectional block insulation over the flanges and extend a minimum of 2 inches over the adjacent pipe insulation. Fasten with staples to permit easy removal. Prior to applying collar fill annular spaces with loose insulation.

O. Insulate all piping through sleeves.

P. Where pipelines pass through masonry walls or floors, completely fill the space between outside of pipe or insulation and the inside of the sleeve or framed opening with fibrous mineral wool or fiberglass pipe insulation.

Q. When it is unavoidable and hangers for cold lines must be installed directly on the pipe, insulate and finish the entire hanger and the rod for a length of not less than 12 inches above the pipe.

R. For hot lines supported on rollers, provide pipe covering protection saddles and fill the hollow interior of saddles with insulating cement or fibrous glass.

S. Insulate Dresser-type couplings and other gasketed joints in refrigerant systems in a manner to allow removal of insulation, without damage, for repair and leak-checking of couplings and gasketed joints.

T. Apply insulation to completely cover metal surfaces.

U. Cut, score, or miter insulation to fit shape and contour of ductwork and equipment. Where surfaces are flat, cylindrical, or regularly curved, use premolded blocks or segments.

V. Where required, provide permanently fastened angles or plates to support insulation.

W. Apply insulation on cover plates, heads and access openings as separate sections, with insulation cut back for access to boltheads and other fasteners.

X. Do not insulate over nameplates. Cut back insulation and line the insulation edges with 24 gage galvanized steel.

Y. Surface Finish.

1. Apply surface finish to present a tight, smooth appearance.
2. Do not apply sealant or cement until all previous applications of cement and adhesives have thoroughly dried.
3. Extend surface finish to protect all insulation surfaces. Prevent raw edges or ends of insulation from being exposed.

3.02 APPLICATION OF TYPE P1 INSULATION

A. Exposed and Concealed Pipe: Staple longitudinal lap unless factory pre-sealed laps are supplied or adhesive is used, with 9/16 inch coated staples, 2 inches on center, butt adjoining sections firmly together. Apply butt-joint strips, making sure coated or dull side is out. Center the strip for a snug fit and fasten with 2 staples, one each approximately 1/2 inch from each edge.

B. Exposed and Concealed Fittings, Valves, Flanges: Insulate with molded, pre-cut or segmental insulation equal in thickness to adjoining pipe insulation. Alternate: Hydraulic-setting

insulating cement same thickness as adjoining insulation. Alternate: Pre-molded PVC fitting cover system.

C. Surface Finish (Indoor)

1. Exposed and Concealed Pipe: No additional finish required.

2. Exposed and Concealed Fittings, Valves, Flanges: Apply a skim coat of insulating cement to produce a smooth surface. After cement is dry, apply a light coat of fitting mastic. While mastic is still wet, wrap the fitting with fiberglass reinforcing cloth strips overlapping the preceding layer by 1 to 2 inches and adjoining pipe by 2 inches, and embedding the cloth into the mastic. When dry, apply a second coat of mastic over the entire fitting to a minimum wet thickness of 3/64 inch. Alternate: Apply one piece pre-molded PVC fitting covers with galvanized coated tack fasteners.

Tape circumferential joint between insulation and premolded fitting cover with 2 inch pressure sensitive polyvinyl tape. Note: Wipe all joints clean before applying tape. Alternate: Apply 8 ounce canvas between 2 coats of lagging cement.

3.03 APPLICATION OF TYPE P2 INSULATION

A. Exposed and Concealed Pipe: Seal lap of vapor barrier jacket with fire-resistant adhesive. Staple longitudinal lap with three 9/16 inch coated staples, applying lagging cement over staples. Adjoining sections of pipe insulation are to be butted tightly together and the vapor barrier continued by sealing the circumferential joint with butt joint strips adhered with fire-resistant adhesive.

B. Exposed and Concealed Fittings, Valves, Flanges: Insulate with molded or segmental foamed glass insulation equal in thickness to adjoining pipe insulation and secured with No. 20 gage galvanized annealed steel wire.

C. Surface Finish (Indoor)

1. Exposed and Concealed Pipe: No additional finish required.

3.04 APPLICATION OF TYPE P3 INSULATION

A. Slit insulation lengthwise. Coat longitudinal seams and joints with adhesive and install it on pipe. Miter insulation at elbows and glue.

B. Fully cover seams and butt joints with adhesive to assure a complete seal to maintain insulation efficiency and vapor barrier.

C. Do not stretch insulation to obtain longer lengths.

D. Unless otherwise specified, completely insulate common applications (such as hose stations, drinking fountains, etc.) for chilled and hot water.

E. On cold applications, insulate valves, unions, and pipe installed with direct contact clamp hangers, butt insulation to hanger both sides and install oversized materials over hanger. Lap 1 to 2 inches minimum onto the smaller sized material.

F. On cold applications wrap all gages, petcocks, etc. with Cork Insulation Tape.

3.05 APPLICATION OF TYPE P5 INSULATION

A. Provide a 1/2 inch to 3/4 inch safety edge on all exposed longitudinal seams (except corrugated aluminum jacketing).

B. Longitudinal lap to be a minimum of 2 inches, located on horizontal centerline. Overlap butt joints a minimum of 3 inches.

C. Install 1/2 inch wide stainless steel strips located on the edge of butt joint, and then on 12 inch centers thereafter. Use two strapping seals. The first to keep the strap tight and the second to cover and secure the cut end of the strap.

D. Use aluminum butt straps where jacket cannot be overlapped (gored fittings and flanges). Use 1/2 inch wide stainless steel strips to hold butt straps.

E. Seal seams, joints or openings in the jacket that cannot be sealed by overlapping the aluminum jacket or by butt straps with silicone rubber.

F. Jacket both 45 degree and 90 degree elbows through 10 inches with preformed aluminum jackets. For fittings 12 inches and larger, use mitred fittings.

G. Jacket other fittings or valves with sheet aluminum fabricated as necessary. Use aluminum jacketing only for end caps.

H. Install "S" clips on vertical piping to hold jacket in place.

I. Lap Directions, Horizontal Lines: Circumferential laps on exterior jacketing shall face east or south. Longitudinal laps shall face down (upper and lower) located on horizontal center line.

J. Lap Directions, Vertical Lines: Interior or exterior jackets shall be overlapped shingle style (upper over lower). Exterior longitudinal laps shall face east or south.

3.06 APPLICATION OF TYPE P6 INSULATION

A. GENERAL: Install hydrophobic pourable underground piping insulation in strict compliance with manufacturers installation

guidelines and specifications. Provide and install all manufactures required forms, spacers, pipe supports, etc including polyfilm top vapor barrier and minimum 1’-6” backfill. (note: minimum depth of pipe to be 3’-0”)

3.07 APPLICATION OF TYPE D4 INSULATION

A. For round duct, fasten aluminum jacket in place with stainless steel strips. For rectangular duct, apply strips (corner beads) and sheet material secured with screws or pop rivets. Ducts greater than 24 inches shall have cross breaks.

B. Jacketing sequence shall be bottom, sides, then top.

C. Overlap seams a minimum of 2 inches.

D. After bands are secure, use stainless steel or aluminum screws or pop-rivets on seams where necessary.

E. Apply jacket shingle style on risers (upper jacket over lower) to provide drainage. Use stainless steel strip to secure jacketing.

F. Seal breaks and seams in aluminum jacket with silicone rubber sealant.

3.08 SCHEDULE OF PIPING INSULATION

Service	Size	Type	Thickness
Heating Hot Water	Thru 1-1/2"	P1	1-1/2"
Heating Hot Water	2" & over	P1	2"
Steam	Thru 1-1/2"	P1	2-1/2"
Steam	2” & over	P1	3”
Steam condensate	Thru 1-1/2"	P1	1-1/2"
Steam condensate	2” & over	P1	2”
Air Handling Unit Drain Line (Condensate)	All	P1	1/2" (a)
Refrigerant (piping)	Thru 2"	P2	1"
Refrigerant (piping)	Over 2"	P2	2"
Pipe Supports (b)	All	P3	Varies (b)
Chilled Water	Thru 6”	P1	2” *

(*underground piping ‘pourable’ insulation minimum thickness=6”all around top/bottom/sides of pipe)

a. All insulation thickness services shall be 1 inch thickness when applied outdoors-above ground. (Consider heating cables).
b. Refer to D1.2.0, Insulation Protection at Pipe Support.

3.09 SCHEDULES OF DUCT INSULATION

Insulation Service	Type	Thickness
Concealed/Exposed Supply Ducts,etc (Refer to section 15290)	D2	2"

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15290 – DUCT INSULATION - INTERIOR

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

A. This section includes duct and plenum insulation.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 15 Section "Ductwork" for duct lining.

1.03 DEFINITIONS

A. Hot Surfaces: Normal operating temperatures of 100 deg F or higher.

B. Dual-Temperature Surfaces: Normal Operating temperatures that vary from hot to cold.

C. Cold Surfaces: Normal operating temperatures less than 75 deg F.

D. Thermal Conductivity (k-value): Measure of heat flow through a material at a given temperature difference; conductivity is expressed in units of Btu x inch/h x sq. ft. x deg F.

E. Density: Is expressed in lb/cu. ft.

1.04 SUBMITTALS

A. General: Submit the following in accordance with General Conditions of the Contract and Division 1 specification sections.

B. Product and data for each type of duct insulation identifying k-value, thickness, and accessories.

C. Material certificates, signed by the manufacturer, certifying that materials comply with specified requirements where laboratory test reports cannot be obtained.

D. Material test reports prepared by a qualified independent testing laboratory. Certify insulation meets specified requirements.

1.05 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

1.06 SEQUENCING AND SCHEDULING

A. Schedule insulation application after testing of duct systems.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering 'GREENGUARD' certified products that may be incorporated in the Work include, but are not limited to the following:

1. Glass Fiber:

a. CertainTeed Corporation.
b. Knauf Fiberglass GmbH.
c. Manville.

2.02 GLASS FIBER

A. Material: Inorganic glass fibers, bonded with a thermosetting resin.

B. Jacket: All-purpose, factory-applied, laminated glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil having self-sealing lap.

C. Board: ASTM C 612, Class 2, semi-rigid jacketed board.

1. Thermal Conductivity: 0.23 Btu x inch/h x sq. ft. x deg F average maximum at 75 deg F mean temperature.

2. Density: 3 pcf average maximum.

D. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets. (maximum 25% compression installed)

1. Thermal Conductivity: 0.23 Btu x inch/h x sq. ft. x deg F average maximum at 75 deg F mean temperature.

E. Adhesive: Produced under the UL Classification and follow-up service.

1. Type: Non-flammable, water-based.
2. Service Temperature Range: Minus 20 to 180 deg F (Minus 29 to 82 deg C).

F. Vapor Barrier Coating: Waterproof coating recommended by insulation manufacturer for outside service.

2.03 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Woven glass fiber fabrics, plain weave, pre-sized a minimum of 8 ounces per sq. yd.

1. Tape Width: 4 inches
2. Cloth Standard: MIL-C-20079H, Type I.
3. Tape Standard: MIL-C-20079H, Type II.

B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:

1. Stainless Steel: Type 304, 0.020 inch thick.
2. Aluminum: 0.0070 inch thick.

C. Wire: 14-gauge nickel copper alloy, 16-gauge, soft-annealed stainless steel, or 16-gauge, soft annealed galvanized steel.

D. Corner Angles: 28-gauge (0.3 mm), 1 inch by 1 inch (25 mm by 25 mm) aluminum, adhered to 2 inches by 2 inches (51 mm by 51 mm) kraft paper.

E. Anchor Pins: Capable of supporting 20 pounds each. Provide anchor pins and speed washers of sizes and diameters as recommended by the manufacturer for insulation type and thickness.

2.04 SEALING COMPOUNDS

A. Vapor Barrier Compound: Water-based, fire-resistive composition.

1. Water Vapor Permeance: 0.08 perm maximum.
2. Temperature Range: Minus 20 to 180 deg F.

B. Weatherproof Sealant: Flexible-elastomer-based, vapor-barrier sealant designed to seal metal joints.

1. Water Vapor Permeance: 0.02 perm maximum.
2. Temperature Range: Minus 50 to 250 deg F.
3. Cooler: Aluminum.

PART 3 - EXECUTION

3.01 PREPARATION

A. Surface Preparation: Clean, dry and remove foreign materials such as rust, scale, and dirt.

3.02 INSTALLATION

A. Refer to schedules at the end of this section for materials, forms, jackets, and thicknesses required for each duct system.

B. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

C. Install vapor barriers on insulated ducts and plenums having surface operating temperatures below 60 deg.

D. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

E. Install insulation with smooth, straight, and even surfaces.

F. Seal joints and seams to maintain vapor barrier on insulation requiring a vapor barrier.

G. Seal penetrations for hangers, supports, anchors, and other projections in insulation requiring a vapor barrier.

H. Seal Ends: Except for flexible elastomeric insulation, taper ends at 45 degree angle and seal with lagging adhesive. Cut ends of flexible elastomeric cellular insulation square and seal with adhesive.

I. Apply water based adhesives and coatings at the manufacturer's recommended coverage-per-gallon rate.

J. Keep insulation materials dry during application and finishing.

K. Install board insulation as follows:

1. Adhesive and Band Attachment: Secure board insulation tight and smooth with at least 50 percent coverage of water based adhesive. Install bands spaced 12 inches apart. Protect insulation under bands and at exterior corners with metal corner angles. Fill joints, seams, and chipped edges with vapor barrier compound.

2. Speed Washers Attachment: Secure insulation tight and smooth with speed washers and welded pins. Space anchor pins 18 inches apart each way and 3 inches from insulation joints. Apply vapor barrier coating compound to insulation in contact, open joints, breaks, punctures, and voids in insulation.

L. Blanket Insulation: Install tight and smooth. Secure to ducts having long sides or diameters as follows:

1. Smaller Than 24 Inches: Bonding water based adhesive applied in 6-inch (150-mm) wide transverse strips on 12-inch centers.

2. 24 inches and Larger: Anchor pins spaced 12 inches (300 mm) apart each way. Apply bonding adhesive to prevent sagging of the insulation.
3. Overlap joints 3 inches.

4. Seal joints, breaks, and punctures with vapor barrier compound.

3.03 JACKETS

A. Foil and Paper Jackets (FP): Install jackets drawn tight. Install lap or butt strips at joints with material same as jacket. Secure with adhesive. Install jackets with 1-1/2 inches (40 mm) laps at longitudinal joints and 3 inches (75 mm) wide butt strips at end joints.

1. Seal openings, punctures, and breaks in vapor barrier jackets, and exposed insulation with vapor barrier compound.

3.04 APPLICATIONS

A. General: Materials and thicknesses are specified in schedules at the end of this Section.

B. Duct Systems: Insulate all new interior ductwork.

3.05 DUCT SYSTEMS INSULATION SCHEDULE

A. All interior supply and return ducts:

Material	Type	Installed R-value	Vapor Barrier Req'd	Field-Applied Jacket
Glass Fiber	Blanket	6.0	Yes	None

B. All outdoor air intake ducts and outdoor air plenums:

Material	Type	Installed R-value	Vapor Barrier Req'd	Field-Applied Jacket
Glass Fiber	Blanket	8.0	Yes	None

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15291 – DUCT INSULATION - EXTERIOR

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

A. This section includes exterior supply and return ductwork and plenum insulation.

1.03 DEFINITIONS

A. Hot Surfaces: Normal operating temperatures of 100 deg F or higher.

B. Dual-Temperature Surfaces: Normal Operating temperatures that vary from hot to cold.

C. Cold Surfaces: Normal operating temperatures less than 75 deg F.

D. Thermal Conductivity (k-value): Measure of heat flow through a material at a given temperature difference; conductivity is expressed in units of Btu x inch/h x sq. ft. x deg F.

E. Density: Is expressed in lb/cu. ft.

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 specification sections.

B. Product and data for each type of duct insulation identifying k-value, thickness, and accessories.

C. Samples of each type of insulation. Identify each sample describing product and intended use. Submit 12 inches square sections of each sample materials.

D. Material certificates, signed by the manufacturer, certifying that materials comply with specified requirements where laboratory test reports cannot be obtained.

E. Material test reports prepared by a qualified independent testing laboratory. Certify insulation meets specified requirements.

1.05 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Exterior Insulation: Flame spread value of 25 or less and a smoke developed value of 50 or less.

1.06 SEQUENCING AND SCHEDULING

A. Schedule insulation application after cleaning and sealing of the new ductwork and testing of duct systems sealing; ductwork to be air and water tight to prevent tempered air exfiltration and water infiltration to SMACNA seal class 'A'.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering 'GREENGUARD'/'ENERGY-STAR' certified products that may be incorporated in the Work include, but are not limited to the following:

1. Rigid Foam Insulation:

a. Owens Corning – Foamular 250.
b. Dow – Styrofoam Highload 40.
c. GreenGuard Type VI.

2. Protective Membrane:

a. MFM Building Products Corp.–FlexClad 250 – 36"-52836 25mils
b. Polyguard Products–Alumaguard / Alumaguard All Weather

2.02 RIGID FOAM – based on Owens Corning 'Foamular 250'

A. Material: Extruded closed cell polystyrene (XPS).

B. Board: ASTM C 578, Type IV, rigid board.

1. Thermal Conductivity: 0.20 Btu x inch/h x sq. ft. x deg F average maximum at 75 deg F mean temperature.

2. Thermal Resistance(R):5.0 per inch at75 deg F mean temperature.

C. Adhesive: Produced under the UL Classification.

1. Type: Non-flammable, water-based.
2. Application Temperature Range: 40°F to 90°F.

2.04 PROTECTIVE MEMBRANE – based on MFM – FlexClad 250 – 36”-52836 25mils

A. Material: Outer layer – embossed UV-resistant white weathering surface, multiple layers of high-density cross linked polyethylene and rubberized asphalt adhesive layer. Total thickness = 25 mils.

B. Flame Spread: 0 (ASTM E 84-97a)

C. Smoke Density: 5 (ASTM E 84-97a)

D. Vapor Permeance = 0.01 perms (E-96-95)

E. Adhesive = Modified Asphalt

2.04 ACCESSORIES AND ATTACHMENTS

A. Membrane Tape: (based on MFM ‘Peel & Seal’)

1. Tape Width: minimum 4 inches white finish
2. Vapor Permeance: <0.01 (ASTM E96)
3. Thickness: 25 mil minimum.

B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:

1. Stainless Steel: Type 304, 0.020 inch thick.
2. Aluminum: 0.0070 inch thick.

C. Wire: 14-gauge nickel copper alloy, 16-gauge, soft-annealed stainless steel, or 16-gauge, soft annealed galvanized steel.

D. Edge/Corner/Close-off Angles: 28-gauge, 1 inch by 1 inch aluminum, adhered with membrane tape.

E. Anchor Pins (**for primary insulation attachment and for protective membrane covering on ductwork 24” wide and greater**): Welded copper-coated steel pin for capacitor-discharge welding with a minimum 1 1/2" diameter galvanized speed washer capable of supporting/holding 100 pounds for direct pull perpendicular to the attached surface. Provide anchor pins and speed washers of sizes and diameters as may be otherwise recommended by the manufacturer for insulation type and thickness.

F. Spray Adhesives: based on MFM Spray Adhesive for protective membrane and Ductmate Protack/HV for insulation.

2.04 DUCT SEALING COMPOUNDS

A. Duct Sealant Compound: (based on ‘Ductmate’ Everseal) Water-based, non-flammable composition.

1. Water Resistant, No VOC’s and UV Resistant.
2. Service Temperature Range: Minus 25 to 200 deg F.

B. Weatherproof Sealant: Flexible synthetic latex based, vapor/air barrier sealant designed to seal metal joints and seams.

PART 3 – EXECUTION

3.01 PREPARATION

A. Surface Preparation: Clean, dry and remove foreign materials such as rust, scale, and dirt including existing mastic coating on existing ductwork, existing fiberglass insulation, existing anchor pins, etc. Apply duct sealant compound to **all** joints and seams including all anchor pin holes, access plates, etc. (Reference SMACNA seal class 'A').

3.02 INSTALLATION

A. Refer to schedules at the end of this section for materials, forms, jackets, and thicknesses required for each duct system.

B. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state; follow manufacturer's installation guidelines.

C. Install vapor barriers on insulated ducts and plenums having surface operating temperatures below 60 deg.

D. Apply insulation material, accessories, protective membrane and finishes according to the manufacturer's printed instructions.

E. Install insulation with smooth, straight, and even surfaces. **NOTE: after top of duct insulation is installed, additional top of duct insulation is to be installed and pitched at a minimum of 1/4" per foot to prevent puddling on the top of the ductwork.**

F. Seal joints and seams to maintain vapor barrier on insulation requiring a vapor barrier (i.e. exterior ductwork).

G. Seal penetrations for hangers, supports, anchors, and other projections in insulation requiring a vapor barrier.

H. Seal Ends: Taper ends at 45 degree angle and seal with membrane tape and or spray adhesive.

I. Apply water based adhesives and coatings at the manufacturer's recommended coverage-per-gallon rate.

J. Keep insulation materials dry during application and finishing.

K. Install rigid foam board insulation as follows:

1. Adhesive and Band Attachment: Secure board insulation tight and smooth with at least 50 percent coverage of water based adhesive. Install bands, where required, spaced 12 inches apart. Protect insulation under bands and at exterior corners and edges with metal corner angles. Cover joints, seams, gaps and chipped edges with membrane tape.
2. Speed Washers Attachment: Secure insulation tight and smooth with speed washers and welded pins. Space anchor pins 12 inches apart each way and 3 inches from insulation

joints. Apply membrane tape to insulation in contact, open joints, breaks, punctures, and voids in insulation.

3. Apply protective membrane strickly adhering to the manufacturers installation instructions including 'pinning' on ductwork 24" wide and greater.

3.03 APPLICATIONS

A. General: Materials and thicknesses are specified in schedules at the end of this Section.

B. Duct Systems: Unless otherwise indicated, insulate the following duct systems:

1. Exterior exposed supply and return ductwork.

3.06 DUCT SYSTEMS INSULATION SCHEDULE

EXTERIOR EXPOSED HVAC SUPPLY/RETURN DUCTS AND PLENUMS

MATERIAL	FORM	THICKNESS IN INCHES	VAPOR BARRIER REQ'D	FIELD-APPLIED JACKET/ MEMBRANE
RIGID FOAM	BOARD	2	YES (JOINTS AND SEAMS)	YES

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15510 - HOT/CHILLED WATER PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of hot and / or chilled water piping systems work is indicated on drawings and schedules, and by requirements of this section.

B. Applications for hot/chilled water piping systems include the following:

1. Hot/chilled water piping systems for hot/chilled water heating/cooling terminal units.

2. Hot/chilled water piping systems for hot/chilled water coils in air handling units.

C. Refer to appropriate Division 15 sections for insulation required in connection with hot/chilled water piping systems.

1.03 QUALITY ASSURANCE

A. ANSI Compliance: Comply with applicable American National Standards pertaining to products and installation of hot/chilled water piping systems.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's data for hot/chilled water piping systems, materials and products.

B. Shop Drawings: Submit scaled layout drawings of installed hot/chilled water pipe and fittings including, but not necessarily limited to, pipe sizes, locations, elevations and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between piping and proximate equipment.

PART 2 - PRODUCTS

2.01 HOT/CHILLED WATER PIPING MATERIALS AND PRODUCTS

A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings and capacities as indicated. Where not indicated, provide proper

selection as determined by engineer to comply with installation requirements.

B. Provide materials and products complying with ANSI B31.1 Code for Power Piping where applicable, base pressure rating on hot/chilled water piping systems maximum design pressures. Provide sizes and types matching piping and equipment materials used in hot/chilled water piping systems. Where more than one type of material or product is indicated, selection is engineer's option.

2.02 BASIC IDENTIFICATION

A. General: Provide identification complying with Division 15 Basic Materials and Methods section "Mechanical Identification."

2.03 BASIC PIPE, TUBE AND FITTINGS

A. General: Provide pipe, tube and fittings complying with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings," in accordance with the following listing:

1. Hot/chilled water AND low pressure steam piping:

a. Pipe size 2" and smaller: Black steel pipe.

1) Pipe weight: Schedule 40.
2) Fittings: Class 125 cast iron threaded.

b. Pipe size 2-1/2" and larger: Black steel pipe.

1) Pipe weight: Schedule 40.
2) Fittings: Wrought steel buttwelding.

2.04 BASIC PIPING SPECIALTIES

A. General: Provide piping specialties complying with Division 15 Basic Materials and Methods section "Piping Specialties."

2.05 BASIC SUPPORTS, ANCHORS AND SEALS

A. General: Provide supports, anchors and seals complying with Division 15 Basic Material and Methods section "Supports, Anchors, and Seals." Supports and anchors provided shall meet the requirements of section 1613 of the New York State Building Code; horizontal and vertical runs of pipe shall be securely supported in accordance with the New York State Building Code including seismic requirements

2.06 BASIC VALVES

A. General: Provide valves complying with Division 15 Basic Materials and Methods section "Valves," in accordance with the following listings:

1. Sectional Valves:

a. 2" and smaller: Ball valves (hot/chilled water only).

b. 2-1/2” and larger: rising stem or O.S.&Y. type.
c. 2-1/2: and larger: Butterfly valves (when specifically approved by the engineer only).

2. Shutoff Valves:

a. 2" and smaller: Ball valves (hot/chilled water only)
b. 2-1/2" and larger: Rising stem or O.S.&Y. valves. Butterfly valves may be used only after specific approval by the engineer.

3. Heating/Cooling Terminal Outlet Valves:

a. 2" and smaller: Balance valve (hot/chilled water only)
b. 2-1/2" and larger: Rising Stem.

4. Drain Valves:

a. 2" and smaller: Ball valves.

5. Check Valves:

a. All sizes: Silent wafer type check valve.

2.07 BASIC EXPANSION COMPENSATION

A. General: Provide expansion compensation products complying with Division 15 Basic Materials and Methods section "Expansion Compensation," in accordance with the following listing:

1. Flexible ball pipe joints (hot/chilled water only) Use fabricated piping loops for low pressure steam or linear bellows type rated for steam service.
2. Pipe alignment guides and anchors.

2.08 BASIC THERMOMETERS AND GAUGES

A. General: Provide meters and gauges complying with Division 15 Basic Materials and Methods section "Thermometers and Gauges," in accordance with the following listing:

1. Temperature gauges and fittings.
2. Pressure gauges and fittings.
3. Flow measuring gauges.

2.09 HYDRONIC SPECIALTIES

A. General: Provide hydronic specialties complying with Division 15 section "Hydronic Specialties," in accordance with the following listing:

1. Balance valves.
2. Balance cocks.
3. Vent valves.
4. Flow control valves.
5. Diverting fittings.

6. Air separators.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

A. General: Install mechanical identification in accordance with Division 15 Basic Materials and Methods section "Mechanical Identification."

3.02 INSTALLATION OF HOT/CHILLED WATER WATER DISTRIBUTION PIPING

A. General: Install water distribution piping in accordance with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings."

B. Install eccentric reducers where pipe is reduced in size in direction of flow, with tops of both pipes and reducer flush.

C. Install piping with 1" minimum rise in 40' pipe run (0.2%) in direction of flow.

D. Install piping level with no pitch.

E. Connect branch feed piping to mains at horizontal center line of mains, connect run-out piping to branches at horizontal center line of branches.

F. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

3.03 INSTALLATION OF PIPING SPECIALTIES

A. Install piping specialties in accordance with Division 15 Basic Materials and Methods section "Piping Specialties."

3.04 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

A. Install supports, anchors and seals in accordance with Division 15 Basic Materials and Methods section "Supports, Anchors and Seals", and project drawings and details.

3.05 INSTALLATION OF VALVES

A. Install valves in accordance with Division 15 Basic Materials and Methods section "Valves."

B. Sectional valves: Install on each branch and riser, close to main, where branch or riser serves two or more heating terminals or equipment connections and elsewhere as indicated.

C. Shutoff valves: Install on inlet and outlet of each mechanical equipment item and on inlet of each heating/cooling terminal and elsewhere as indicated.

D. Heating/cooling terminal outlet valves: Install on outlet of each heating/cooling terminal and elsewhere as indicated.

E. Drain valves: Install on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system and elsewhere where indicated or required to completely drain hot/chilled water piping system.

F. Check valves: Install on discharge side of each pump and elsewhere as indicated.

3.06 INSTALLATION OF EXPANSION COMPENSATION PRODUCTS

A. Install expansion compensation products in accordance with Division 15 Basic Materials and Methods section "Expansion Compensation."

3.07 INSTALLATION OF THERMOMETERS AND GAUGES

A. Install thermometers and gauges in accordance with Division 15 Basic Materials and Methods section "Thermometers and Gauges."

3.08 INSTALLATION OF HYDRONIC SPECIALTIES

A. General: Install hydronic specialties in accordance with Division 15 "Hydronic Specialties" section.

3.09 EQUIPMENT CONNECTIONS

A. General: Connect hot/chilled water piping system to mechanical equipment as indicated and comply with equipment manufacturer's instructions where not otherwise indicated. Install shutoff valve and union on supply and return, drain valve on drain connection.

B. Hot/chilled water terminals: Install hot/chilled water terminals with heating/cooling terminal outlet valve and union on outlet, union, shutoff valve on inlet. Install automatic air vent valve on element in accordance with manufacturer's instructions. Locate valves and balancing cocks behind valve access doors for ease of maintenance. Where indicated, install automatic temperature control valve with unions between all ports of the control valve.

3.10 CLEANING, FLUSHING AND INSPECTING

A. General: Include coils, etc. See Division 15 "Pipe Tube and Fittings".

3.11 TESTING AND BALANCING

A. General: See Division 15 "Testing, Adjusting and Balancing.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15511 – FIRE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

A. Only tested fire stop systems shall be used in specific locations as follows:

1. Penetrations for the passage of ductwork, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Safing slot gaps between edge of floor slabs and curtain walls.

C. Openings between structurally separate sections of wall or floors.

D. Gaps between the top of walls and ceilings or roof assemblies.

E. Expansion joints in walls and floors.

F. Openings and penetrations in fire-rated partitions or walls containing fire doors.

G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03300 - Cast-In-Place Concrete Work
2. Section 07900 - Caulking
3. Section 04200 – Unit Masonry
4. Section 09200 - Lath and Plaster
5. Section 09250 - Gypsum Wall Board
6. Section 15050 - Basic Materials and Methods
7. Section 15250 - Mechanical Insulation

1.05 REFERENCES

A. Test Requirements: ASTM E-814-02, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:

a. Fire stop Devices (XHJI)
b. Fire Resistance Ratings (BXUV)
c. Through-Penetration Fire stop Systems (XHEZ)
d. Fill, Voids, or Cavity Material (XHHW)
e. Forming Materials (XHKU)

2. Alternate "Omega Point Laboratories Directory" (updated annually)

C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems" (July 1998.)

D. Test Requirements: ASTM E 1966-01, "Standard test method for Fire Resistive Joint Systems"

E. Inspection Requirements: ASTM E 2174 – 01, "Standard Practice for On-site Inspection of Installed Fire Stops."

F. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

G. ASTM E-84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.

H. All major building codes: ICBO, SBCCI, BOCA, and IBC.

I. NFPA 101 - Life Safety Code

J. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.

B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Hilti, Inc., Tulsa, Oklahoma (or equal)
   800-879-8000

2.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are

acceptable:

1. Hilti CP 680 Cast-In Place Firestop Device
   a. Add Aerator adaptor when used in conjunction with aerator (“sovent”) system.

2. Hilti CP 681 Tub Box Kit for use with tub installations.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 604 Self-leveling Firestop Sealant
3. Hilti CP 620 Fire Foam
4. Hilti CP 606 Flexible Firestop Sealant
5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601s Elastomeric Firestop Sealant
2. Hilti CP 606 Flexible Firestop Sealant
3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti CP 677 Speed Plugs
2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Fire stop Sealant
2. Hilti CP 618 Fire stop Putty Stick
3. Hilti CP 620 Fire Foam
4. Hilti CP 601s Elastomeric Fire stop Sealant

5. Hilti CP 606 Flexible Fire stop Sealant

I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti CP 618 Fire stop Putty Stick

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Fire stop Putty Pad

K. Fire stop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 642 Fire stop Collar
2. Hilti CP 643 Fire stop Collar
3. Hilti CP 645 Wrap Strips

L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti CP 637 Trowelable Fire stop Compound
2. Hilti FS 657 FIRE BLOCK
3. Hilti CP 620 Fire Foam

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Fire stop Sealant
3. Hilti CP 606 Flexible Fire stop Sealant
4. Hilti CP 604 Self-Leveling Fire stop Sealant

O. Provide a fire stop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

P. Provide a fire stop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which fire stop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate location and proper selection of cast-in-place Fire stop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place fire stop devices without interferences.

3.03 INSTALLATION

A. Regulatory Requirements: Install fire stop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL fire stop systems that might hamper the performance of fire dampers as it pertains to duct work.

3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing fire stop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess fire stop materials and soiling as work progresses.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15530 - REFRIGERATION PIPING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of refrigeration piping systems work is indicated on drawings and schedules, and by requirements of this section.

B. Applications for refrigeration piping systems include the following:

1. Refrigerant suction line piping between compressors and cooling coils.
2. Refrigerant liquid line piping between liquid receivers and cooling coils.
3. Refrigerant discharge line piping between compressors and condensers.
4. Refrigerant condenser drain line piping between condensers and liquid receivers.

C. Insulation for refrigeration piping is specified in applicable Division 15 sections, and is included as work of this section.

D. Refer to appropriate Division 15 sections for insulation required in connection with refrigeration piping, not work of this section.

1.03 QUALITY ASSURANCE

A. Materials and equipment shall be provided by one of the manufacturers listed in Part 2 - Products. Materials and equipment from other manufacturers may be accepted if proven equal to those specified. This contractor is liable for and shall pay for all architectural and engineering review and redesign costs for substitute materials and equipment. This contractor also is liable for all costs of changes in the work required by substitute equipment.

B. The length of time the manufacturer has been in business, the location and capability of complete repair facilities, availability of repair parts and annual maintenance contracts all will be considered in determining equality.

C. Refer to General Conditions Section GC31, "Submissions",for requirements pertaining to substitute materials and equipment.

D. Installer - a firm with at least 3 years of successful installation experience on projects with refrigeration piping system work similar to that required for project.

E. ANSI code compliance - comply with applicable provisions of ANSI B31.5, "Refrigeration Piping" and extend applicable lower pressure limits to pressures below 15 psig.

F. Safety code compliance - comply with applicable portions of ANSI/ASHRAE 15, "Safety Code for Mechanical Refrigeration".

G. Brazing - comply with applicable requirements of ANSI B31.5, "Refrigeration Piping", pertaining to brazing of refrigeration piping for shop and project site locations.

1.04 SUBMITTALS

A. Product data - submit manufacturer's data for refrigeration piping systems materials and products.

B. Brazing certification - certify brazing procedures, brazers and operators in accordance with ASME standards (ANSI B31.5).

C. Shop drawings - submit scaled layout drawings of installed refrigeration pipe and fittings including, but not necessarily limited to, pipe sizes, locations, elevations and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between piping and proximate equipment.

PART 2 - PRODUCTS

2.01 REFRIGERATION PIPING MATERIALS AND PRODUCTS

A. General - provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by engineer and manufacturer of equipment to comply with installation requirements. Provide materials and products complying with ANSI B31.5 Code for Refrigeration Piping where applicable, base pressure rating of refrigeration piping system maximum design pressures. Provide sizes and types matching piping and equipment connections, provide fittings of materials which match pipe materials used in refrigeration piping systems. Where more than one type of materials or products are indicated, selection is engineers' option.

2.02 BASIC IDENTIFICATION

A. General - provide identification complying with Division 15 Basic Materials and Methods section in accordance with the following listing:

1. Refrigeration piping - plastic pipe markers.

2.03 BASIC PIPE, TUBE AND FITTINGS

A. General - provide pipe, tube and fittings complying with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings", in accordance with the following listing:

1. Pipe size 2" and smaller - black steel pipe.

   a. Pipe weight - Schedule 40.
   b. Pipe weight - Schedule 80.
   c. Fittings - forged steel, socket welding.
   d. Fittings - wrought steel, buttwelding.

2. Pipe size 2 1/2" and larger - black steel pipe.

   a. Pipe weight - Schedule 40
   b. Pipe weight - Schedule 80.
   c. Fittings - wrought steel, buttwelding.

3. Tube size 3" and smaller - copper tube.

   a. Wall thickness - Type K, hard drawn temper.
   b. Wall thickness - Type L, hard drawn temper.
   c. Fittings - wrought copper, solder joints.
   d. Joints - soldered, silver lead solder, ANSI/ASTM B 32, Grade 96 TS.
   e. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.

4. Tube size 4 1/8" and smaller - copper tube.

   a. Wall thickness - type ACR, hard drawn temper.
   b. Fittings - wrought copper, solder joints.
   c. Joints - soldered, silver lead solder, ANSI/ASTM B 32, Grade 96 TS.
   d. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.

5. Tube size 3/4" and smaller - copper tube.

   a. Wall thickness - type ACR, soft annealed temper.
   b. Fittings - cast copper alloy for flared copper tubes.
   c. Joints - flared.

6. Tube size 7/8" through 4 1/8" - copper tube.

   a. Wall thickness - type ACR, soft annealed temper.
   b. Fittings - wrought copper, solder joints.
   c. Joints - soldered, silver solder, ANSI/ASTM B 32, Grade 96 TS.
   d. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.

2.04 BASIC PIPING SPECIALTIES

A. General - provide piping specialties complying with Division 15 Basic Materials and Methods section "Piping Specialties", in accordance with the following listing:

1. Pipe escutcheons.
2. Pipe sleeves.

2.05 BASIC SUPPORTS, ANCHORS AND SEALS

A. General - provide supports, anchors and seals complying with Division 15 Basic Materials and Methods section "Supports, Anchors and Seals", in accordance with the following listing:

1. Adjustable steel clevises, adjustable roller hangers, and adjustable pipe roll stands for horizontal piping hangers and supports.
2. Two bolt riser clamps for vertical piping supports.
3. Concrete inserts, C-clamps, and steel brackets for building attachments.
4. Protection shields for insulated piping support in hangers.
5. Copper flashings for piping penetrations.

2.06 SPECIAL REFRIGERATION VALVES

A. General - special valves required for refrigeration piping systems include the following types:

1. Globe and check valves:

a. Globe shutoff valves - forged brass, packed, back seating, winged seal cap, 300 degrees F (149 C) temperature rating, 500 psi working pressure.

b. Check valves - forged brass, accessible internal parts, soft synthetic seat, fully guided brass piston and stainless steel spring, 250 degrees F (121 C) temperature rating, 500 psi working pressure.

c. Available manufacturers - subject to compliance with requirements, manufacturers offering globe and check valves which may be incorporated in the work include, but are not limited to, the following:

d. Manufacturer - one of the following:

1) Henry Valve Co.
2) Parker Hannifin Corp, Refrigeration & Air Conditioning Div.
3) Sporlan Valve Co.

2. Solenoid valves:

a. 2-way solenoid valves - forged brass, designed to conform to ARI 760, normally closed, teflon valve seat, NEMA 1 solenoid enclosure, 24 volt, 60 Hz., UL listed, 1/2" conduit adapter, 250 degrees F (121 C) temperature rating, 400 psi working pressure.

1) Manual operator - provide manual operator to open valve.

b. Available manufacturers - subject to compliance with requirements, manufacturers offering solenoid valves which may be incorporated in the work include, but are not limited to, the following:

c. Manufacturer - one of the following:

1) Alco Controls Div. Emerson Electric Co.
2) Automatic Switch Co.
3) Sporland Valve Co.

2.07 REFRIGERATION ACCESSORIES

A. Refrigerant strainers - brass shell and end connections, brazed joints, monel screen, 100 mesh, UL listed, 350 psi working pressure.

B. Moisture liquid indicators - forged brass, single port, removable cap, polished optical glass, solder connections, UL listed, 200 degrees F (93 C) temperature rating, 500 psi working pressure.

C. Refrigerant filter driers - steel shell, ceramic fired desiccant core, solder connections, UL listed, 500 psi working pressure.

D. Refrigerant filter driers - corrosion resistant steel shell, steel flange ring and spring, wrought copper fittings, ductile iron cover plate with steel cap screws, replaceable filter drier core, 500 psi working pressure.

E. Evaporator pressure regulators - provide corrosion resistant, spring loaded, stainless steel springs, pressure operated, evaporator pressure regulator, in size and working pressure indicated, with copper connections.

F. Refrigerant discharge line mufflers - provide discharge line mufflers as recommended by equipment manufacturer for use in service indicated, UL listed.

G. Available manufacturers - subject to compliance with requirements, manufacturers offering refrigeration accessories which may be incorporated in the work include, but are not limited to, the following:

H. Manufacturer - one of the following:

1. Alco Controls Div. Emerson Electric Co.
2. Henry Valve Co.
3. Sporlan Valve Co.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

A. General -install mechanical identification in accordance with Division 15 Basic Materials and Methods section "Mechanical Identification"

3.02 INSTALLATION OF REFRIGERATION PIPING

A. General - install refrigeration piping in accordance with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings", and in compliance with equipment manufacturer's recommendations.

3.03 INSTALLATION OF PIPING SPECIALTIES

A. Install piping specialties in accordance with requirements of Division 15 Basic Materials and Methods section "Piping Specialties".

3.04 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

A. Install supports, anchors, and seals in accordance with requirements of Division 15 Basic Materials and Methods section "Supports, Anchors and Seals".

3.05 INSTALLATION OF SPECIAL REFRIGERATION VALVES

A. General - install refrigeration valves where indicated, and in accordance with manufacturer's instructions. Remove accessible internal parts before soldering or brazing, replace after joints are completed.

1. Solenoid valves - install in refrigerant piping as indicated with stem pointing upwards.

    a. Wiring of solenoid valves is specified in applicable Division 16 sections and is included as work of this section.
    b. Wiring of solenoid valves is specified in applicable Division 16 sections, not work of this section.

3.06 INSTALLATION OF REFRIGERATION ACCESSORIES

A. Refrigerant strainers - install in refrigerant lines as indicated and in accessible location for service.

B. Moisture liquid indicators - install as indicated on refrigerant liquid lines, in accessible location.

C. Refrigerant filter dryers - install in refrigerant lines as indicated, and in accessible location for service.

D. Evaporator pressure regulators - install in refrigerant suction lines or evaporator outlets as indicated. Adjust, if required, for proper evaporator pressure.

E. Refrigerant discharge line mufflers - install as indicated, in horizontal or downflow portion of hot-gas lines, immediately after leaving compressor, not in riser.

3.07 EQUIPMENT CONNECTIONS

A. General - connect refrigerant piping to mechanical equipment in manner shown, and comply with equipment manufacturer's instructions where not otherwise indicated.

3.08 FIELD QUALITY CONTROL

A. Refrigerant piping leak test - prior to initial operation, clean and test refrigerant piping in accordance with ANSI B31.5, "Refrigeration Piping". Perform initial test with dry nitrogen, using soap solution to test all joints. Perform final test with 27" vacuum and then 200 psi using halide torch. System must be entirely leak free.

B. Repair or replace refrigerant piping as required to eliminate leaks and retest as specified to demonstrate compliance.

END OF SECTION

DIVISION 15–MECHANICAL

15600–LESS THAN 2 TON VRF SYSTEM INDOOR EVAPORATOR UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Indoor Evaporator Units for 2 to 5 Ton Capacity Variable Refrigerant Flow (VRF) systems.

1.2 RELATED SECTIONS

A. Division 15 Mechanical Specifications

1.3 REFERENCES

A. United Electric Company designs and builds its Magic Aire products to comply and perform to the following standards as applies:

1. Insulation and adhesive shall meet NFPA–90A requirements for flame spread and smoke generation.
2. AMCA 210, ASHRAE 51: Airflow
3. ARI 410: Coil Capacity – Hydronic
4. ARI 210: Coil Capacity – DX
5. ANSI/UL – 1995: Safety Agency Listing of base or standard equipment is ETL, ETL file #491893
6. Material Specifications Standards:
   a. ASTM A525, A527: Sheet Metal
   b. ASTM B68, B75, B88, B251: Copper Tubing per
   c. ASTM B209: Aluminum
7. Major Components Standards:
   a. NEMA per UL/CSA: Motors
   b. UL/CSA: Wire
   c. UL/CSA: Electrical
   d. ASHRAE 52: Filters per UL,
   e. UL 181, UL 723 (25/50), ASTM E–84: Fiberglass Insulation
   f. ASTM B117:Paint per
   g. UL–1995: Electric Heater, factory installed assembly (HB)
   h. UL–1996: Electric Heater, field–installed accessory (BM,BV)

1.4 SUBMITTALS

Confirm product application requirements in sufficient detail to specify product as it is to be manufactured.

1) **QUALITY ASSURANCE**

2) Coil(s) shall be factory tested for leakage at minimum of 500 psig air pressure under water.
3) Valve Package shall be factory tested to withstand 50 psi pressure degradation with no losses.

1.6 DELIVERY, STORAGE, AND HANDLING

1) Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
2) Inspection: Inspect all items for transit damage or any indication of re-pack. Follow manufacturer directions for filing freight claims.
3) Storage: Store materials in a dry, sheltered area, protected from damage and in accordance with manufacturer's instructions.
4) Handling: Handle and lift products in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

Part 2–PRODUCT(S) – Indoor Units (Multi V Systems)

2.1 Ceiling Cassette – 4 Way (2′ x 2′) General

A. Unit shall be manufactured by LG.

B. Unit shall be designed to be installed for indoor application.

C. Unit shall be designed to mount recessed in the ceiling and has a surface mounted panel on the bottom of the unit.

D. The unit shall be available in a 2′ x 2′ chassis.

E. Acceptable Manufacturers:

1. LG

2. Approved Equivalent

2.2 Casing/Panel

A. Unit case shall be manufactured using galvanized steel plate.

B. The unit panel and grille shall be made of a white Acrylonitrile Butadiene Styrene (ABS) polymeric resin.

C. The panel shall have a tapered trim edge, and a hinged, spring clip (screw-less) return air filter-grille door.

D. Unit shall be provided with metal ears designed to support the unit weight on four corners.

E. Ears shall have pre-punched holes designed to accept field supplied all thread rod hangers.

F. Unit shall be supplied with snap off access panels to facilitate leveling of unit without removing the panel.

2.3 Cabinet Assembly

A. Unit shall have four supply air outlets and one return air inlet.

B. The supply air outlet shall be through four directional slot diffusers each equipped with dual independent oscillating motorized guide vanes designed to change the airflow direction.

C. The panel vanes shall have a discharge range of motion of 10° - 85° in an up/down direction with capabilities of locking the vanes.

D. The unit shall have a guide vane algorithm designed to sequentially change the predominant discharge airflow direction in a counterclockwise pattern.

E. Dual guide vanes shall provide airflow in all directions.

F. Unit shall be equipped with factory installed temperature thermistors for:

1. Return air

2. Refrigerant entering coil

3. Refrigerant leaving coil

G. Unit shall have a factory assembled, piped and wired electronic expansion valve (EEV) for refrigerant control.

H. Unit shall have a built-in control panel to communicate with other indoor units and to the outdoor unit.

I. The unit shall have factory designated branch duct knockouts on the unit case.

J. The unit shall have provision of fresh air ventilation through a knock-out on the cabinet.

K. The branch duct knockouts shall have the ability to duct up to 1/2 the unit airflow capacity.

L. The branch duct cannot be ducted to another room.

M. Unit shall have the following functions as standard:

1. Self-diagnostic function

2. Auto addressing

3. Auto restart function

4. Auto changeover function (Heat Recovery system only)

5. Auto operation function

6. Child lock function

7. Forced operation

8. Dual thermistor control

9. Sleep mode

10. Dual set point control

11. Multiple aux heater applications

12. Filter life timer

13. External on/off input

14. Wi-Fi compatible

15. Multiple fan operation settings

16. Multiple airflow control modes

17. Leak detection logic

2.4 Fan Assembly

A. The unit shall have a single, direct-drive turbo fan made of high strength ABS HT-700 polymeric resin.

B. The fan impeller shall be statically and dynamically balanced.

C. The fan motor is Brushless Digitally commutated (BLDC) with permanently lubricated and sealed ball bearings.

D. The fan motor shall include thermal, overcurrent and low RPM protection.

E. The fan/motor assembly shall be mounted on vibration attenuating rubber grommets.

F. The fan speed shall be controlled using microprocessor based direct digitally controlled algorithm that provides a minimum of four pre-programed fan speeds in the heating mode and fan only mode and five speeds in the cooling mode. The fan speed algorithm provides a field selectable fixed speed.

G. A field setting shall be provided to vary air throw pattern to compensate for high ceiling installations.

H. In cooling mode, the indoor fan shall have the following settings: Low, Med, High, Super high, Power Cool, and Auto.

I. In heating mode, the indoor fan shall have the following settings: Low, Med, High, Super high and Auto.

J. Unit shall have factory installed dual motorized louvers to provide flow of air in up and down direction for uniform airflow.

2.5 Filter Assembly

A. The return air inlet shall have a factory supplied removable, washable filter.

~~B.~~ The filter access shall be from the bottom of the unit without the need for tools.

2.6 Coil Assembly

A. Unit shall have a factory built coil comprised of aluminum fins mechanically bonded on copper tubing.

B. The copper tubing shall have inner grooves to expand the refrigerant contact surface for high efficiency heat exchanger operation.

C. Unit shall have a 5mm dia., three row coil, with 18 columns and 22 fins per inch.

D. Unit shall have a factory supplied condensate drain pan below the coil constructed of EPS (expandable polystyrene resin).

E. Unit shall include an installed and wired condensate drain lift pump capable of providing minimum 27.5 inch lift from bottom surface of the unit.

F. The drain pump shall have a safety switch to shut off the unit if condensate rises too high in the drain pan.

G. Unit shall have provision of 45° flare refrigerant pipe connections.

H. The coil shall be factory pressure tested at a minimum of 550 psig.

I. All refrigerant piping from outdoor unit to indoor unit shall be field insulated. Each pipe should be insulated separately. Thickness and heat transfer characteristics shall be determined by the design engineer and shall meet all code requirements.

2.7 Microprocessor Control

A. The unit shall have a factory installed microprocessor controller capable of performing functions necessary to operate the system.

B. The unit shall be able to communicate with other indoor units and the outdoor unit using a field supplied minimum of 18 AWG, two core, stranded, twisted and shielded communication cable.

C. The unit controls shall operate the indoor unit using one of the five operating modes:

1. Auto changeover (Heat Recovery System only)

2. Heating

3. Cooling

4. Dry

5. Fan only

D. The unit shall be able to operate in either cooling or heating mode for testing and/or commissioning.

E. The unit shall be able to operate with the fan turned off during system cooling thermal off.

F. The unit shall have adjustable, multi-step cooling and heating mode thermal on/off temperature range settings.

G. The system shall include a product check function to access and display indoor unit type and capacity from a wired programmable thermostat controller.

H. Unit shall have a field settable method to choose auto fan speed change operation based on mode of operation, on/off fan operation based on mode of operation, or continuous minimum set fan speed operation.

2.7.1 Electrical

A. The unit electrical power shall be 208-230/1/60 (V/Ph/Hz).

B. The unit shall be capable of operating within voltage limits of +/- 10% of the rated voltage.

2.7.2 Controls

A. Unit shall use controls provided by the manufacturer to perform all functions necessary to operate the system effectively and efficiently and communicate with the outdoor unit over an RS-485 daisy chain.

2.7.3 Optional Accessories

1. Unit shall have the following optional accessories available:

a) Premium panel with air purification kit

b) Floor temperature sensor

c) Human detection sensor

d) Ventilation flange and kit

2.8 Seismic Installations

A. Provide with submittal: 1) OSHPD Special Seismic Certification Preapproval (OSP) documents for certified product list of VRF equipment to be installed in high seismic risk areas. 2) Equipment installation documents in conformance with CBC 2013, 2016 and 2019 California Building Code and IBC 2012, 2015 and 2018 International Building Code.

2.9 Warranty

A. Please refer to the respective outdoor unit for applicable warranty.

PART 3 – EXECUTION

3.1. EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, Best Practices and all applicable building codes.

3.3. CONNECTIONS

A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

B. Piping installation requirements are specified in division 15 mechanical & division 15a plumbing specifications. Drawings indicate general arrangement of piping, fittings and specialties.

C. Duct installation and connection requirements are specified in Division 15 of this document.

D. Electrical installation requirements are specified in Division 16 of this document.

3.4. FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A / E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.5. START-UP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 15 "Testing, Adjusting and Balancing" and comply with provisions therein.

3.6. DEMONSTRATION AND TRAINING

A. Engage a factory authorized service representative to train owner's maintenance personnel to adjust, operate and maintain the entire unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

END OF SECTION

DIVISION 15 - MECHANICAL
SECTION 15610 - Magic Aire Fan Coil Unit

Size Range: **200 to 1200 Nominal CFM**
Magic Aire Model CE

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. Horizontal, 2-pipe or 4-pipe, room fan coil unit with painted finish cabinet for exposed installation or ducting.

1.02 QUALITY ASSURANCE

A. Unit shall be tested in accordance with ARI Standard 440 and base unit ETL certified. Each coil shall be factory tested for leakage at 450 psig air pressure with coil submerged in water. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation. All equipment wiring shall comply with NEC requirements.

1.03 DELIVERY, STORAGE AND HANDLING

A. Each unit shall be individually packaged from point of manufacture. Unit shall be handled and stored in accordance with the manufacturer's instructions.

Part 2 — Product

2.01 EQUIPMENT

General:

Factory-assembled, horizontal, blow-thru type fan coil for exposed ceiling or ducted installations. Unit shall be complete with water coil(s), fan(s), motor(s), drain pan, and all required wiring, piping, controls and special features.

A. Base Unit:

1. Casing to consist of heavy gauge galvanized steel insulated with 1/2" fiberglass Tufskin insulation. Units shall pass 500 hour salt spray test as described in ASTM B-117.

2. Cabinet shall include a removable bottom access panel with stamped return-air grille or ducted return air, filter rack and 1-in. fiberglass throwaway filter. The panel shall be fastened with slotted head, positive-locking quarter-turn fasteners. The cabinet shall be coated with a Polar Ice baked finish.

3. The drain pan shall be constructed of galvanized steel extending the entire length and width of the coil(s) and shall be pitched for drainage. The drain connection shall be $^{3}/_{4}$" FPT.

B. Fans:

Direct-driven, double-width fan wheels with forward curved blades shall be statically and dynamically balanced. The housing shall be constructed of heavy gauge galvanized steel with die-formed inlet cones. Fan wheels shall be constructed of galvanized steel.

C. Coils:

1. Standard base unit shall be equipped with a 3-row, 4-row or 5-row coil for installation in a 2 or 4-pipe system. Hydronic coil options include split heating/cooling coils in combinations not exceeding 5 rows.

2. Factory installed electric resistance heating coils in may be 1.5 to 10kW depending on unit size and voltage.

3. All coils shall have 3/8-in. copper tubes and aluminum fins. Coil fins are mechanically bonded to tube joints. The copper tubes comply with the ASTM B-75. The fin thickness is 0.0045-in and tube thickness is 0.014-in. All coils are tested with air under water.

4. Unit with electric heat shall have electric resistance heaters mounted on the entering air side of the water coil. Heaters shall include high limit cutout with auto reset and contactor.

5. When fan motor and electric heater are selected at the same voltage and connected to a single power source, a junction box and fuse shall be factory furnished and installed to protect the motor and control circuit.

D. Controls and Safeties:

Unit shall be furnished with an optional 3-speed, 4-position fan switch on a wall plate for field mounting. The fan motor(s) shall be equipped with integral automatic temperature reset for motor protection.

E. Operating Characteristics:

1. A unit with single hydronic coil installed in a 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system.

2. A unit with two hydronic coils installed in a 4-pipe system shall be capable of providing heating and cooling, controlled as determined by field-provided and installed valves and controls.

3. Electrical Requirements:
The unit power supply shall be single phase, 60 Hz. The standard unit is 120 volt, but 208/240V and 277V options are available.

F. Motor(s):
Fan motors shall be 3-speed; permanent split capacitor type, with sleeve type bearings and factory-sealed oil reservoirs to ensure lubrication.

END OF SECTION

DIVISION 15 - MECHANICAL
SECTION 15620 - Magic Aire
High Efficiency Direct Drive Air Handling Unit
HVAC Guide Specifications
Size Range: 400 to 4000 Nominal CFM
Model HCA

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. Horizontal, Direct Drive, 2-pipe or 4-pipe (or electric heat as available), room fan coil unit with painted finish cabinet for exposed installation or ducting.

1.02 QUALITY ASSURANCE

A. Unit shall be tested in accordance with ARI Standard 440 and ETL listed to US and Canadian safety standard UL 1995 current version. Each coil shall be factory tested for leakage at 600 psig air pressure with coil submerged in water. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation. All equipment wiring shall comply with NEC requirements. Product family is certified to standard AHRI 430 Performance Rating of Central Station Air Handling Unit Supply Fans, which utilizes AMCA 210 laboratory test standard.

1.03 DELIVERY, STORAGE AND HANDLING

A .Each unit shall be individually packaged from point of manufacture. Unit shall be handled and stored in accordance with the manufacturer's instructions.

Part 2 — Product

2.01 EQUIPMENT

General:
Factory-assembled, horizontal, draw-thru type fan coil for exposed or concealed installations, ducted or free discharge with plenum. Unit shall be complete with water or DX cooling coil, water heating coil, fan(s), motor(s), drain pan, and all required wiring, piping, controls and special features
.

A. Base Unit:

1. Units shall be fabricated of galvanized or galvannealed steel, 19gauge, exterior panels with 19gauge interior panels. Internal insulation is 1" fiberglass with1.5 pound density, providing effective acoustical and thermal control and fire safety. Cabinet shall include removable blower and filter access panels on both sides, return duct flange, filter rack and 2-in. fiberglass throwaway filter or 2-in. pleated MERV 8 filter or 4-in. pleated MERV 13 filter. Filter rack is field-adjustable for either 2-in. or 4-in. filter depth. Cabinet exterior has a baked on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117. Optional: coated inner liner panels have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117.
2. The drain pan shall extend the entire length and width of the coil, with primary and auxiliary connections that are ¾" FPT.
   i) [as available] Standard – double-sloped polymer with PVC male connections.
   ii) Optional – Double sloped 20ga 304 stainless steel. Drain pan shall have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117.

B. Fans:

Direct-driven, double-width fan wheel with forward curved blades, statically and dynamically balanced. The housing shall be constructed of heavy gauge galvanized steel with die-formed inlet cones. Fan wheels shall be constructed of galvanized steel.

C. Coils**:**

1. Standard base unit shall be equipped with a 4 or 6-row CW, or 3 or 4-row DX coil, for installation in a 2 or 4-pipe system.
2. Hot water heating coils in a 4 pipe system shall be 1-row or 2-row, slab style perpendicular to airflow, factory installed. Coil fin spacing shall be 10 or 12 fins per inch (FPI). Tube diameter shall be 3/8" OD or ½" OD.
3. Steam coils are tube-in-tube steam distributing type coils with copper tubes and aluminum fins, single row, with copper or red brass headers and connections; vent/vacuum breaker connection provided, vacuum breaker assembly/valve is field-provided and installed. Fins are minimum 0.0045-in and fin spacing is 8FPI (standard capacity option) or 12 FPI (high capacity option). Coil operating pressure is 6psig max steam pressure.
4. Factory-installed electric resistance heater shall be 1.0 to 21.0kW, depending on unit size and voltage, mounted on unit discharge opening. Heaters shall include manual reset and automatic reset high limit switches, heat contactor, airflow proving switch, fan contactor and fusing as required.
5. Cooling coil options include a 3-row or 4-row DX coil with TXV or without TXV (R22 or R-410A).
6. All coils shall have copper tubes and aluminum fins. Coil fins are mechanically bonded to tubes. The copper tubes comply with ASTM B-75. The fin thickness is 0.0045-in. All coils are tested with air under water.
7. Water coils are tested in accordance with AHRI 410.
8. DX coils are rated for use with R-410A refrigerant per UL 1995 requirements. 3/8" dia. tube coils are rated for R-410A heat pump operation; ½" dia. tube coils are rated for R-410A cooling service only.

D. Controls and Safeties**:**

1. Fan Controls: Unit shall be furnished with 24V fan controls to allow control by field-provided and installed 24V thermostat or BAS. Options include:
   i) ECM-Premium motor controls: 4 user-selectable operating speeds, each adjustable with on-board potentiometer; will allow adjustment during fan operation with blower doors closed
   ii) ECM-Premium motor controls: variable speed driven by customer-provided 0-10VDC fan signal
2. Optional factory-wired selections:
   i) Integral door disconnect switch
   ii) [as available] Fan current switch (dry contacts)
   iii) Condensate overflow switch
   iv) [as available] Low Limit Thermostat

E. Operating Characteristics**:**

1. A unit with single hydronic coil installed in a 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system and as determined by field-provided and installed valves and controls.
2. A unit with two hydronic coils installed in a 4-pipe system shall be capable of providing heating and cooling, controlled as determined by field-provided and installed valves and controls.
3. A unit with single DX coil installed in a standard split system shall be capable of providing cooling when field-supplied and installed condensing unit is in cooling mode. Also capable of heating when heat pump condensing unit is operating in heating mode.
4. In all arrangements, the temperature controls are field-provided and installed and can interface with the unit per section "Controls and Safeties."

F. Electrical Requirements:

1. Sizes 04 through 20 (400 through 2000 cfm): The unit power supply shall be 60 Hz, with standard construction 115V/1-phase. Other factory options are 208/240V/1-phase or 277V/1-phase.
2. Sizes 30 and 40 (3000 and 4000 cfm) The unit power supply shall be 60 Hz, with standard construction 208/240V/3-phase or optional construction 460V/3-phase.

G. Motor(s):

1. Sizes 04 through 20 (400 through 2000 cfm): Fan motors are ECM-Premium, electrically commutated motor (ECM), up to 40% more efficient than permanent split-capacitor type induction motors, with control options that allow variable speed or on/off fan control.
2. Sizes 30 and 40 (3000 and 4000 cfm): Fan motors are ECM-Premium Symax, electrically commutated motor (ECM), up to 40% more efficient than permanent split-capacitor type induction

motors, with control options that allow variable speed or on/off fan control. Size 30 motor is single-shaft, size 40 motor is dual-shaft.

H. Field Installed Accessories:

A. Mixing Box: Return air and outside air damper assemblies constructed of steel channel frames with 19 gauge galvanized steel blades, die formed stiffeners with stops, vinyl (or equivalent) blade-edge seals to minimize leakage, zinc plated hardware, quiet and non-binding brass pivot points, bronze oilite bearings and corrosion-resistant steel shafts. Mixing box shall be fully insulated with 1-in. thick, 1.5-lbs/ft3, Exact-O-Kote® IAQ insulation containing an EPA-registered immobilized antimicrobial agent tested in accordance with ASTM G21 and G22 . Optional – economizer control kit including Belimo ® Zip econ controller and damper actuator, suitable for field mounting for fully-modulating control, compliant with California Title 24 requirements.

DIVISION 15–MECHANICAL

15650–6 TO 42 TONS CAPACITY VRF SYSTEM OUTDOOR UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Outdoor Units, also called condensing unit or air cooled condensing units, consisting of condenser fans, heat rejection coils, variable speed compressors, and controls housed in a cabinet. Units are designed to reject heat from hot refrigerant by circulating ambient air over finned coils which contain the hot refrigerant. Fluids is a refrigerant. Electric Heat may also be offered in unit for low ambient air conditions for operation. Outdoor Condensing Units are used in both heating and/or cooling applications.

1.2 RELATED SECTIONS

A. Division 15 Mechanical Specifications.

1.3 REFERENCES

A. United Electric Company designs and builds its Magic Aire products to comply and perform to the following standards as applies:

1. Insulation and adhesive shall meet NFPA–90A requirements for flame spread and smoke generation.
2. AMCA 210, ASHRAE 51: Airflow
3. ARI 410: Coil Capacity – Hydronic
4. ARI 210: Coil Capacity – DX
5. ANSI/UL – 1995: Safety Agency Listing of base or standard equipment is ETL, ETL file #491893
6. Material Specifications Standards:
   a. ASTM A525, A527: Sheet Metal
   b. ASTM B68, B75, B88, B251: Copper Tubing per
   c. ASTM B209: Aluminum
7. Major Components Standards:
   a. NEMA per UL/CSA: Motors
   b. UL/CSA: Wire
   c. UL/CSA: Electrical
   d. ASHRAE 52: Filters per UL,
   e. UL 181, UL 723 (25/50), ASTM E–84: Fiberglass Insulation
   f. ASTM B117:Paint per
   g. UL–1995: Electric Heater, factory installed assembly (HB)
   h. UL–1996: Electric Heater, field–installed accessory (BM,BV)

1.4 SUBMITTALS

Confirm product application requirements in sufficient detail to specify product as it is to be manufactured.

A. **QUALITY ASSURANCE**
B. Coil(s) shall be factory tested for leakage at minimum of 500 psig air pressure under water.
C. Valve Package shall be factory tested to withstand 50 psi pressure degradation with no losses.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
B. Inspection: Inspect all items for transit damage or any indication of re-pack. Follow manufacturer directions for filing freight claims.
C. Storage: Store materials in a dry, sheltered area, protected from damage and in accordance with manufacturer's instructions.
D. Handling: Handle and lift products in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

PART 2–PRODUCTS – Outdoor Units (Variable Refrigerant Flow Systems)

1.01 **Multi V™ 5 Heat Recovery and Heat Pump System(s) – (6 to 42 tons nominal**

A. Acceptable Manufacturers:

1. LG
2. Approved Equivalent

B. Product Design

1. LG Multi V 5 heating and cooling system shall be an air cooled system allowing user to configure in the field a heat pump or a heat recovery system consisting of one to three outdoor unit modules, conjoined to make a 6–42 ton single refrigerant circuit.

a) Heat recovery systems, employing three pipes, shall be connected to Heat recovery (heat recovery) unit(s) and indoor unit(s). Multi-port heat recovery units shall allow simultaneous heating and cooling of individual zone(s) at various capacities as required to satisfy their zone requirements.

b) Heat pump systems shall require two pipes, simultaneous heating and cooling shall not be supported. The heat recovery system shall consist of three pipes, liquid, suction and hot gas pipes. Heat recovery systems operating at 0°F that cannot deliver single phase superheated refrigerant vapor at a minimum of 162°F while operating in the heating mode shall not be acceptable.

2. All three-phase VRF heat pump and heat recovery outdoor units shall be from the same product development generation. Mixing of outdoor units from different development generations is not acceptable.

C. Operating Conditions

1. Outdoor Unit shall be capable of continuous compressor operation between the following operating ambient air conditions, operation outside of these conditions are possible and may involve non-continuous operations.

2. Operating Ambient Air Conditions:

a) Cooling: 5°F DB to 122°F DB <With optional low ambient kit from -9.9°F DB to 122°F DB>

b) Heating: -22°F WB to 61°F WB

c) Cooling Based (ODU reversing valve in cooling position) Synchronous: 14°F DB to 81°F DB (Heat Recovery Operation Only)

d) Heating Based (ODU reversing valve in heating position) Synchronous: 14°F WB to 61°F WB (Heat Recovery Operation Only)

D. Electrical

e) All air source heat pump and heat recovery frame(s) shall be designed and electrically protected to maintain stable continuous compressor operation when provided with <460/60/3> power with the following specifications:

i. <460/60/3>

1. Voltage tolerance 414V - 528V

ii. Voltage imbalance of up to two percent.

iii. Power surge of up to 5kA RMS Symmetrical.

E. General Features

1. The air-conditioning system shall use R410A refrigerant.

2. Each system shall consist of one, two or three air source outdoor unit modules conjoined together in the field to result in the capacity specified elsewhere in these documents.

3. Dual and triple frame configurations shall be field piped together using manufacturer's designed and supplied Y-branch kits and field provided interconnecting pipe to form a common refrigerant circuit.

4. System shall have following frame configurations vs. capacity.

a) 6 to 20 ton units shall be a single frame only.

b) 22 to 34 ton units shall be dual frame only.

c) 36 to 42 ton heat recovery units shall be triple frame only

5. System shall employ self-diagnostics function to identify any malfunctions and provide type and location of malfunctions via fault alarms.

6. Field Provided Refrigerant Piping

a) The refrigerant piping system shall be constructed using field provided ACR copper rated for the use with refrigerant R410A, de-hydrated pipe field engineered and assembled with manufacturer supplied Heat recovery unit(s) and Y- branches, as may be required, connected to multiple (ducted, non-ducted or mixed combination) indoor units to effectively and efficiently control the heat pump operation or simultaneous heating and cooling operation of the heat recovery VRF system. Other pipe materials, if used, shall perform, at a minimum, as well as that specified above, shall not have any adverse reactions, for example galvanic corrosion or branch to branch differential pressure drop, with any other components or materials also in use in the system and shall be installed per manufacturer's instructions.

b) The unit shall be shipped from the factory fully assembled including internal refrigerant piping, inverter driven compressor(s), controls, temperature sensor, humidity sensor, contacts, relay(s), fans, power and communications wiring as necessary to perform both Heat Pump and Heat Recovery operations.

c) Each outdoor unit refrigeration circuit shall include, but not limited to, the following components:

i. Refrigerant strainer(s)

ii. Check valve(s)

iii. Inverter driven, medium pressure vapor injection, high pressure shell compressors

iv. Liquid refrigerant cooled inverter PCB

v. Oil separator(s)

vi. Accumulator /controlled volume receiver(s)

vii. 4-way reversing valve(s)

1. Vapor injection valve(s)

viii. Variable path heat exchanger control valve(s)

ix. Oil balancing control

x. Oil Level sensor(s)

xi. Electronic expansion valve(s)

1. Sub-cooler (s)

2. Vapor Injection Valve(s)

xii. High and low side Schrader valve service ports with caps

1. Service valves

7. Field Insulation:

a) All refrigerant pipe, y-branches, elbows and valves shall be individually insulated with no air gaps. Insulation heat transfer resistance shall not be less than the minimum called for by the local building code, local energy code or as a minimum per manufacture installation requirements. In no case shall the insulation be installed in a compressed state at any point in the system.

i. All joints shall be glued and sealed per insulation manufactures instructions to make a vapor tight assembly.

8. Microprocessor:

a) Factory installed microprocessor controls in the outdoor unit(s), heat recovery unit(s), and indoor unit(s) shall perform functions to optimize the operation of the VRF system and communicate in a daisy chain configuration between outdoor unit and heat recovery unit(s) and indoor unit(s) via RS485 (shielded twisted wire pair) network. Control devices shall also be available to control other building systems as required from the VRF control system. DIO/AIO capabilities shall be available as well as a central controller to perform operation changes, schedules and other duties as required by this specification. Addition of separate building control system shall not be required. Other control devices and sequences shall be as specified in other sections of this project specification.

9. Inverter PCB Cooling:

a) Cooling of the inverter PCB shall be conducted by way of high pressure, sub-cooled liquid refrigerant via heat exchanger attached to the inverter PCB. The full capacity flow of refrigerant shall pass though the heat exchangers to maximize the cooling effect of the PCBs and to aid in the evaporation process and capacity of the outdoor coil during the heating mode. The recovered heat of the PCBs must be used to enhance the overall heating process, other uses or dissipation of heat to ambient shall not be permitted.

10. Compressor Control:

a) Fuzzy control logic shall establish and maintain target evaporating temperature (Te) in cooling mode and condensing temperature (Tc) in heating mode by Fuzzy control logic to ensure the stable system performance.

11. Initial Test Run (ITR) (Heating or Cooling) / Fault Detection Diagnosis (FDD) Code:

    a) This control mode shall monitor and display positive or negative results of system initial startup and commissioning. Heating or Cooling ITR mode will be automatically selected. It shall monitor and provide performance metrics for the following, but not be limited to, refrigerant charge validation, auto-charge operation verification, refrigerant cycle stability, connection ratios, indoor unit status, error status, and number of indoor units connected. This commissioning specific control mode shall not replace the system error monitoring control system during normal operation.

12. BMS Integration:

    a) The VRF system shall be able to integrate with Building Management Systems via BACnet™ IP gateway. This gateway converts between BACnet™ IP or Modbus TCP protocol, and RS-485 LGAP (LG Aircon protocol) allowing third party control and monitoring of the LG A/C system, or LonWorks™ gateways. See controls specification for points list.

13. Wi-Fi Communication:

    a) The outdoor unit microprocessor shall be capable of being monitored via an optional Wi Fi wireless communications dongle or embedded Wi Fi transmitter. Wi-Fi shall allow service or maintenance personal access to the complete operating system, via LGMV mobile, without need of tools other than smart phone or tablet. Active live system review, collection of all system data for a field determined duration presented in a .csv file format or collection of all operating conditions, including all indoor units, valves, sensors, compressor speeds, refrigerant pressures, etc., by snapshot of conditions and placing that snapshot into a power point slide to be reviewed at another time. Systems that require computers, hard wire only connection or other devices to collect, review or record operating conditions shall not be allowed.

14. Indoor Unit Connectivity:

    a) The system shall be designed to accept connection up to <64> indoor units of various configuration and capacity, depending on the capacity of the system.

15. Power and Communication Interruption:

    a) The system shall be capable of performing continuous operation when an individual or several indoor units are being serviced; communication wire cut or power to indoor unit is disconnected from power for a minimum of a 24 hour period. Systems that alarm and/or shut down because of a lack of power to any number of indoor units shall not be acceptable.

16. Connection Ratios:

a) The maximum allowable system combination ratio for all VRF systems shall be 130% and the minimum combination ratio shall be 50%.

17. Comfort Cooling Mode:

a) Comfort cooling shall be initiated via a field setting at the outdoor unit during commissioning or anytime thereafter. Comfort cooling shall allow user to select all or some of the indoor units of a system to automatically modify each of the indoor unit's superheat target set point based on the impending total cooling load of on the indoor unit, the rate of change of the zone temperature relative to set point and optionally, if specified, the rate of change of the zone humidity level.

18. The outdoor unit shall be provided with a factory installed fusible plug or rupture disc. The fusible plug connection shall be threaded for easy connection with a field provided vent pipe to safely discharge the system's refrigerant charge away from the outdoor unit if a building fire causes an extreme pressure condition in the outdoor unit refrigerant circuit employ for safety a threaded fusible plug.

19. Refrigerant Flow Control

a) An active refrigerant -in-circulation control system consisting of a refrigerant storage container, interconnecting refrigerant piping control valves, pressure transducers, microprocessor control, and software to continuously monitor necessary refrigeration cycle operating parameters to maintain stable cycle operation between minus (-)22°F and 122°F ambient conditions. The refrigerant system operating conditions shall be checked by the algorithm at three minute intervals and if needed automatically and dynamically remove and store refrigerant to the storage tank or inject refrigerant from the tank into the refrigerant circuit.

i. The algorithm shall adjust refrigerant charge automatically:

1. As the outdoor air temperature changes;

2. System mode of operation changes;

3. The path of refrigerant flow through the outdoor coil is modified;

4. The system's target suction and head pressure control values are adjusted.

b) Subcooler: The VRF outdoor unit shall include a factory provided and mounted sub-cooler assembly consisting of a shell and tube-type sub-cooling heat exchanger and EEV providing refrigerant sub-cooling modulation control by fuzzy logic of EEV and by mode of operation to provide capacity and efficiency as required. Brazed plate heat exchangers shall not be allowed for this function.

c) Advanced Smart Load Control: The air source unit shall be provided with Smart Load Control (SLC) enhanced energy saving algorithm that reduces compressor lift during off-peak operation to further reduce system energy consumption when weather and load conditions permit.

ii. The SLC algorithm shall be monitoring in real time, the rate of change of the outdoor ambient air temperature, either the outdoor ambient air relative humidity or the indoor air relative humidity [field selectable], and the rate of change of the building load.

iii. The SLC algorithm shall foresee pending changes in the building load, outdoor temperature and humidity (or indoor humidity) and proactively reset head and/or suction pressure targets in anticipation of the reduction/increase in building load.

iv. The SLC algorithm shall provide no fewer than three (3) field selection options to maximize the control of the VRF system operation during morning warm-up or cool-down following night-setback reset. The selection shall be set by the commissioning agent (or at any other time thereafter). Selectable algorithm choices include:

2. Maximize energy savings

3. Balance the rate of temperature change with energy consumed.

4. Quickly cool/heat the building.

20. Refrigerant Volume Management

a) Active Refrigerant Charge

i. The VRF system shall be able to operate at any and all published conditions year round in cooling or heating mode without the need of adding or removing refrigerant from the system.

ii. The air source unit shall be provided with an isolated vessel, interconnecting piping, valves and sensors to store refrigerant and actively pass refrigerant to (or from) the refrigerant circuit in real time as necessary to maintain stable refrigeration cycle operation.

iii. The air source unit microprocessor shall be provided with an algorithm that monitors the VRF system head pressure, suction pressure, subcooling, superheat, compressor speed, high and low side temperatures and the load on the system at three minute intervals and if needed, automatically and dynamically remove and store refrigerant to the storage tank or inject refrigerant from the tank into the refrigerant circuit.

b) Manual Seasonal Refrigerant Charge Adjustments

(Applicable for VRF systems without Active Refrigerant Charge)

iv. Alternates: Systems that **CANNOT** passively and automatically modify the active refrigerant charge using the method(s) stated in the section *Active Refrigerant Charge* shall clearly state so in bold capital letters in the proposal that this feature is not included.

5. VRF systems that cannot perform active refrigerant control may submit their proposal as an Alternate. However all Alternate proposals must BUT include as part of the equipment price the cost of to provide bi-annual refrigerant charging services for 15 years. Service shall be performed by the factory authorized agent only. Service shall include refrigerant, parts, labor, truck and/or trip charges, and any miscellaneous fees necessary to analyze the current state of the system and perform the refrigerant charge adjustment. Service must occur one month before the winter season and one month before the summer season.

v. If the VRF system requires a charge adjustment more frequently to maintain stable operation, the VRF manufacturer shall provide additional services at no additional charge.

vi. The 15 year period shall begin on the date the equipment is commissioned or the date the building occupancy permit was issued for the area(s) served by the system – whichever date is later.

vii. This service shall be underwritten, warranted, and administered by the VRF equipment manufacturer – not the local distributor or applied representative.

viii. The selected service provider shall be mutually agreeable between the building owner (or owners agent) and must be licensed, insured, and trained to work on the VRF system. No third party service (subcontracted service) providers will be acceptable.

ix. If the service provider is not an employee of the VRF manufacturer, the service provider shall be reimbursed for services rendered directly from the manufacturer. Labor rate for services shall be paid at the prevailing union wage rate in place at the time of service.

21. VRF Systems with Onboard Alternate Operating Mode Selection Capability

a) All VRF systems equipped with field selectable Alternate Operating Modes via DIP Switch or other means, for example but not limited to, High Heat, High Ambient Cooling, High Sensible, or Enhanced Efficiency selections. Performance using the proposed field selected Alternate Operating Mode shall be tested using AHRI Standard 1230 and published in the AHRI Directory.

b) Acceptable Alternate Operating Modes must ship with all models of the VRF product offering and must be factory embedded. Custom factory or field modifications to factory provided algorithms created to meet scheduled requirements are not acceptable.

c) Provide a copy of instructions required to set the Alternate Operation Mode with the initial submittal.

d) For systems that provide field selectable Alternate Operating Modes, ALL technical data provided in the submittal data sheets showing product rated condition performance data, must also provide separate data sheets that show product performance data at each of the field selectable Alternate Operating Modes available. Capacity, power input, and acoustic performance data for each mode offered shall be reported separately. Mixing of ODU, IDU, or VRF system performance capability operating in one mode with for example the power consumption, sound power rating, or electrical requirements of the same system operating in another mode is not acceptable.

F. Field Supplied Refrigerant Piping Design Parameters

1. The outdoor unit shall be capable of operating at an elevation difference of up to 360 feet above or below the lowest or highest indoor unit respectively without the requirement of field installed subcooler or other forms of performance enhancing booster devices.

2. The outdoor unit shall be capable of operating with up to 3280 equivalent length feet of interconnecting liquid line refrigerant pipe in the network.

3. The outdoor unit shall be capable of operating with up to 656 actual feet or 738 equivalent length feet of liquid line refrigerant pipe spanning between outdoor unit and farthest indoor unit.

4. The piping system shall be designed with pipe expansion and contraction possibilities in mind. Required expansion devices shall be field designed, supplied and installed based on proper evaluation of the proposed piping design. In addition to these requirements, the piping system installation must conform to the VRF equipment manufacturer's published guidelines.

5. The installation of pipe hangers, supports, insulation, and in general the methods chosen to attach the pipe system to the structure must allow for expansion and contraction of the piping system and shall not interfere with that movement.

6. The elevation difference between indoor units on <heat pump systems> shall be 131 feet.

7. The elevation differences for <heat recovery systems> shall be:

a) Heat recovery unit to connected indoor unit shall be 49 feet

b) Heat recovery unit to heat recovery unit shall be 98 feet

c) Indoor unit to indoor unit connected to same heat recovery unit shall be 49 feet

d) Indoor unit to indoor unit connected to separate parallel piped heat recovery units shall be 131 feet.

8. The acceptable elevation difference between two series connected heat recovery units shall be 16 feet.

G. Defrost Operations

1. The outdoor unit(s) shall be provided with a minimum of 4 independent field adjustable defrost cycle algorithms to maximize the effectiveness of the defrost cycle to the local weather conditions. Intelligent Defrost shall melt accumulated frost, snow and ice from the outdoor unit heat exchanger. The defrost cycle length and sequence shall be based on outdoor ambient temperatures, outdoor unit heat exchanger temperature, and various differential pressure variables. Intelligent Heating Mode, when outdoor unit humidistat is engaged, shall extend the normal heating sequences by adjusting the outdoor unit coil target temperature to be above the ambient dew point temperature delaying the need for defrost operations, so long as heating demand is being met.

2. Smart Heating: This feature shall be capable of eliminating several defrost actions per day based on outdoor air temperature and humidity conditions. Smart heating shall extend the heating operation cycle by delaying the frost formation on the outdoor coil by adjusting the surface temperature to keep it above the current outdoor ambient dew point. The algorithm shall delay while maintaining indoor space temperature.

3. Defrost Mode Selection: The outdoor unit shall be provided with a minimum of three field selectable defrost operation modes: Normal, Fast, or Forced.

a) Normal Defrost: Operation intended for use in areas of the country that experience adverse winter weather with periods of heavy winter precipitation and extremely low temperatures. This strategy shall maximize the systems heating performance and maintain operational efficiency. When the ambient temperature is either: a) above 32°F or b) below 32°F with the humidity level below 60% RH, Intelligent Defrost shall continue heating regardless of ice build-up on the coil until the quality of the heated air (i.e. discharge air temperature) decreases. At temperatures below 4°F, a defrost cycle shall occur every two hours to optimize system heating efficiency.

b) Fast Defrost: Operation intended for use in areas of the country with mild winter temperatures and light to moderate humidity levels. The strategy minimizes defrost cycle frequency allowing frozen precipitation to build longer in between cycles. Minimum time between defrost cycles shall be 20 minutes. Intelligent Defrost shall choose between split coil/frame and full system methods based on current weather conditions to minimize energy consumption and maximize heating cycle time.

c) Forced Defrost: Operation shall be available for the service provider to test defrost operations at any weather condition and to manually clear frozen water from the outdoor coil surfaces.

4. Defrost Method Selection: The outdoor unit shall be provided with two field selectable defrost operation methods: Split Coil/Frame and Full System. Split Coil/Frame option provides continuous heating of the occupied space during defrost operation.

a) Split Coil/Frame method shall be available when Normal Defrost mode is selected. Split Coil method shall be available on all Heat Pump and Heat recovery single-frame VRF systems. Split Frame defrost shall be available on all Heat Pump and Heat recovery multi-frame outdoor units.

b) Split Coil method shall remove ice from the bottom half of the outdoor unit coil first for a maximum time of six minutes, then the top half for a maximum of six minutes. Next the bottom coil shall be heated again for an additional three minutes to remove any frozen water that may have dripped onto the lower coil during the top coil defrost operation.

c) When Split Coil/Frame method is selected, a Full System defrost shall occur every 1-9 (field selectable) defrost cycles to assure 100% of the frozen precipitation has been removed to maintain efficient performance.

d) Full System method shall be available as a field selectable option. All outdoor units located in areas of the country where large volumes of frozen precipitation are common, the commissioning agent shall be able to select the Full System only defrost method.

5. Indoor Unit Fan Operation During Defrost

a) During partial defrost operation indoor units operating in cooling or dry mode shall continue normal operation.

b) During partial defrost operation, indoor units that are commissioned with fans set for continuous operation shall maintain normal fan speed unless the leaving air temperature drops, then the fan speed will be reduced to low speed for the remainder of the defrost cycle.

c) During full system defrost operation indoor unit fans will cycle off and remain off during the remainder of the defrost cycle.

H. Oil Management

1. The system shall utilize a high pressure oil return system to ensure a consistent film of oil on all moving compressor parts at all points of operation. Oil is returned to compressor through a separate high pressure oil injection pipe directly into the oil sump. Oil returned to the compressor via the suction port of the compressor shall not be allowed.

2. Each compressor shall be provided with a high efficiency independent centrifugal cyclone type oil separator, designed to extract oil from the oil/refrigerant gas stream leaving the compressor.

3. The system shall have an oil level sensor in the compressor to provide direct oil level sensing data to the main controller. The sensor shall provide data to main outdoor unit PCB to start oil return mode and balance oil levels between multiple compressors.

4. The system shall only initiate an oil return cycle if the sensed oil level is below oil level target values as determined by the microprocessor. The system shall display an error if the oil sensor signals low oil level for a period of 130 minutes or longer.

5. A default oil return algorithm shall automatically initiate the oil return mode if the system detects a failure of the oil sump sensor. A fault code shall be reported by the system.

6. Timed oil return operations or systems that do not directly monitor compressor oil level shall not be permitted.

7. Indoor Unit Fan Operation during Oil Return Cycle

    a) During oil return cycle indoor units operating in cooling or dry mode shall continue normal operation.

    b) During oil return, indoor units that are commissioned with fans set for continuous operation shall maintain normal fan speed unless the leaving air temperature drops, then the fan speed will be reduced to low speed for the remainder of the oil return cycle.

    c) During oil return cycle indoor unit fans will cycle off and remain off during oil return cycle while operating in all modes.

I. Fan and Motor Assembly

1. 6 ton frames shall be equipped with one direct drive variable speed propeller fan with Brushless Digitally Controlled (BLDC) motor with a vertical air discharge.

2. 8 to 20 ton frames shall be equipped with two direct drive variable speed propeller fan(s) with BLDC motor(s) with a vertical air discharge.

3. The fan(s) blades shall be made of Acrylonitrile Butadiene Styrene (ABS) material and incorporate biomimetic technology to enhance fan performance and reduce fan generated noise.

4. The fan(s) motor shall be equipped with permanently lubricated bearings.

5. The fan motor shall be variable speed with an operating speed range of 0-1150 RPM cooling mode and 0-1150 RPM heating mode.

6. The fan shall have a guard to help prevent contact with moving parts.

7. The cabinet shall have option to redirect the discharge air direction from vertical to horizontal with the addition of optional factory provided air guides.

8. The fan controller shall have a DIP switch setting to raise external static pressure of the fan up to 0.32 inch of W.C. to accommodate ducted installations.

9. The fan control shall have a function setting to remove excess snow automatically.

10. The fan control shall have a function setting to remove access dust and light debris from the outdoor unit and coil.

J. Cabinet

1. Outdoor unit cabinet shall be made of 20 gauge galvanized steel with a weather and corrosion resistant enamel finish. Outdoor unit cabinet finish shall be tested in accordance with ASTM B-117 salt spray surface scratch test (SST) procedure for a minimum of 1000 hours.

2. Cabinet weights and foot prints shall vary between 430 lbs., 7.61 sq. ft. (1.27 sq. ft. per ton), for 6 ton cabinet to 666 lbs., 10.14 sq. ft. (.51 sq. ft. per ton), for 20 ton cabinet for single cabinet configurations. The front panels of the outdoor units shall be removable type for access to internal components.

3. A smaller service access panel, not larger than 7” x 7” and secured by a maximum of (2) screws, shall be provided to access the following:

    a) Service tool connection

    b) DIP switches

    c) Auto addressing

    d) Error codes

    e) Main microprocessor

    f) Inverter PCB

4. The cabinet shall have piping knockouts to allow refrigerant piping to be connected at the front, right side, or through the bottom of the unit.

5. The cabinet shall have a factory installed coil guard.

K. Outdoor Unit Coil

1. Outdoor unit coil shall be designed, built and provided by the VRF outdoor unit manufacturer.

2. The outdoor unit coil for each cabinet shall have lanced aluminum fins with a maximum fin spacing of no more than 17 Fins per Inch (FPI). All the outdoor unit coils shall be a 2 or 3 rows consisting of staggered tubes for efficient air flow across the heat exchanger

3. Outdoor unit coil shall be comprised of aluminum fins mechanically bonded to copper tubing with inner surfaces having a riffling treatment to expand the total surface of the tube interior

4. The aluminum fin heat transfer surfaces shall have factory applied corrosion resistant Black Fin coating. The copper tubes shall have inner riffling to expand the total surface of the tube interior.

a) ISO 21207 Salt Spray Test Method B – 1500 hours

b) ASTM B–117 Acid Salt Test – 900 hours

c) The Black Fin coating shall be certified by Underwriters Laboratories and per ISO 21207. The above conditions shall establish the minimum allowable performance which all alternates must comply.

5. Variable Path Heat Exchanger: System shall have a variable flow and path outdoor heat exchanger function to vary the refrigerant flow and volume and path. Control of the variable path circuits shall be based on system operating mode and operating conditions as targeted to manage the coil heat transfer capacity and efficiency. The variable path heat exchanger technology shall be provided to maintain stable refrigeration cycle operation during mild weather conditions and maintain a robust hot vapor temperature system head pressure that delivers "gas–furnace leaving air temperature" from the indoor unit at sub–zero outdoor air temperature down to minus (–) 22°F.The outdoor unit coil, all indoor units and pipe network shall be field tested to a minimum pressure of 550 psig.

L. Compressor(s)

1. Compressor shall be designed and assembled by the VRF manufacturer specifically for use in the air source VRF product line. Third party manufactured, branded, or designed to the VRF system's OEM specifications by a third party manufacturer shall not be acceptable.

2. Compressor shall be a hermetic, high–side shell (HSS), commercial grade, compliant scroll direct–drive design.

a) Compressor Design: The compressor design shall be of the high pressure shell scroll type where the internal pressure below the suction valves of the compressor shall be at the same high pressure and high temperature. The motor shall be cooled by high pressure gas at temperatures above saturation conditions and minimize the mixing of refrigerant liquid with oil in the sump. The system shall employ a high pressure oil return method returning recovered oil from the oil separator directly into the oil sump of the compressor; oil shall not be allowed to return via the suction line. Bearing surfaces are continually coated with oil. The compressor shall employ an Aero–bearing constructed with high lubricity materials increasing operation time in case of low sump oil level. Compressor shall have a nominal operating range from 12Hz to 150 Hz.

3. The fixed and oscillating compressor scroll components shall be made of high grade (GC25) or denser steel material. All scrolls shall be heat treated and tempered.

4. The oscillating scroll shall be finely machined and polished. PVE refrigerant oil shall be used as the sole liquid used to maintain a seal between the high and low sides of the compression chamber. Compressors that requires the use of any type of mechanical or wearable sealant material between the moving surfaces of the compression chamber is NOT ACCEPTABLE.

5. Vapor Injection: System shall have a medium pressure gas vapor injection function employed in the heating and cooling modes to increase system capacity when the outdoor ambient temperatures are low and lower compressor lift when temperatures are high. The compressor vapor injection flow amount shall be controlled by the vapor injection sub-cooling algorithm reset by discharge gas temperatures of the compressor.

6. Bearing surfaces shall be coated with Teflon® equal. Bearings shall be lubricated using a constant flow of PVE refrigerant oil to the bearing surfaces The film of oil separating the crankshaft journals and bearing surfaces shall be consistent at all times the crankshaft is in motion and shall be maintained irrelevant of crankshaft rotational speed.

7. An internal, integrated, mechanically driven gear pump shall draw oil from the compressor sump reservoir, pressurize the oil and inject the oil directly to the crankshaft journals maintaining a consistent film of oil between all moving parts. Auxiliary, indirect, or electronically driven pumps are not acceptable.

8. The viscosity property of the PVE oil in the compressor sump shall be maintained irrelevant or compressor operation and the surrounding ambient temperature.

    a) The compressor shall be equipped with an external thermally protected electric crankcase heater that is automatically activated only when the ambient temperature is below freezing and the compressor is not running to maintain the temperature of the oil in the sump above the refrigerant boiling point.

    b) During stable operation, irrelevant of ambient air temperature outside the water source unit, the temperature of refrigerant vapor in contact with the surface of the oil in the compressor sump shall be maintained above 140°F to prevent foaming and to eliminate refrigerant from mixing with the oil degrading the viscosity of the oil in the sump.

    c) <Low side shell (LSS) type compressors that use suction vapor to cool the compressor motor shall not be acceptable.>

9. The compressor motor shall be designed to operate at high temperatures.

    a) The motor winding insulation shall be designed to operate continuously at a minimum temperature of 180°F without deterioration.

    b) The motor cooling system shall be designed to maintain acceptable operational temperature at all times and in all conditions using high pressure, hot refrigerant vapor as motor coolant.

    c) <Low side shell (LSS) and compressors that use low pressure, low temperature refrigerant gas to cool the motor are not acceptable.>

10. Inverter Compressor Controller(s)

a) Each compressor shall be equipped with a dedicated inverter compressor drive. The control of multiple compressors using a single drive is not acceptable.

b) The inverter drive shall vary the speed of the compressor crankshaft between zero (0) Hz and 140 Hz.

c) The inverter driver controller shall be matched with the physical properties of the compressor. The drive shall be manufactured by the VRF air source unit manufacturer. The inverter drive and matching compressor shall have been thoroughly tested as a matched pair. The inverter drive shall be programmed to avoid operating the compressor at any speed that results in harmonic vibration, nuisance noise, or mechanical damage to either the driver or the compressor with power provided that is within the tolerance specification.

d) The compressor inverter drive assembly and software must be designed, manufactured, and supplied by the VRF product manufacturer. Third party branded inverter driver hardware and/or driver software or inverter driver hardware and/or software provided by a third party manufacturer to meet OEM specifications of the VRF water source manufacturer will not acceptable.

e) All inverter drive hardware or software manufactured in, is a product of, or sourced from China, or using a broker or third party provider as an intermediary that obtains the product from CHINA shall not be acceptable.

11. Compressor(s)

a) Each 6, 8, 10 ton frames shall be equipped with a single hermetically sealed, inverter driven, High Side Shell (HSS) scroll compressor.

b) 12, 14, 16, 18 and 20 ton frames shall be equipped with dual hermetically sealed, inverter driven, High Side Shell (HSS) scroll compressors.

c) Each inverter driven, HSS scroll compressor shall be capable of operating from 12 Hz up to 150 Hz in any and all modes (cooling, heating or simultaneous modes).

d) The compressor shall be designed for a separate port for oil to be directly returned to the compressor oil sump.

e) The compressor bearing(s) shall have Teflon™ coating and shall be an aero type design using High lubricity materials.

f) The compressor(s) shall be protected with:

i. High Pressure switch

ii. Over-current /under current protection

iii. Oil sump sensor

iv. Phase failure

v. Phase reversal

vi. Compressor shall be capable of receiving injection of medium pressure gas at a point in the compression cycle where such injection shall allow a greater mass flow of refrigerant at lower outdoor ambient and achieving a higher heating capability. The VRF outdoor unit shall have published performance data for heating mode operation down to -22°F on both heat pump and heat recovery systems.

g) Standard, non-inverter driven compressors shall not be permitted nor shall a compressor without vapor injection or direct sump oil return capabilities.

M. Operational Sound Levels

1. The compressor(s) shall be mounted on rubber isolation grommets. Compressor shall ship with removable clamps that secure the compressor in place while transported. The installing contractor shall remove and discard (or optionally adjust the clamps to allow the isolator to properly function) the clamps prior to commissioning the water source unit.

2. Each single frame outdoor unit shall be rated with an operational sound pressure level not to exceed as listed on below chart when tested in an anechoic chamber under ISO 3745 standard at the highest field selectable heating operating modes available. Such documentation shall be presented in all submittals, manufactures who elect to rate their equipment at other than tested in an anechoic chamber under ISO 3745 standard at the highest field selectable heating operating modes available and the highest field selectable conditions shall not be allowed.

3. A field setting shall be available to program the outdoor unit to reduce sound levels at night, when desired, to a selectable level while still able to meet building load requirement. This mode is available in both cooling and heating modes.

N. Sensors

1. Each outdoor unit module shall have:

a) Suction temperature sensor

b) Discharge temperature sensor

c) Oil level sensor

d) High Pressure sensor

e) Low Pressure sensor

f) Outdoor temperature sensor

g) Outdoor humidity sensor

h) Outdoor unit heat exchanger temperature sensors

O. Wind Load Installations for Outdoor Units

1. Provide Florida wind Load Installation Drawings that meet the requirements of the 2017 Florida Building Code, 6th Edition and ASCE Standard 7-2010 with submittal.

P. Seismic Installations

1. Provide with submittal: 1) OSHPD Special Seismic Certification Preapproval (OSP) documents for certified product list of VRF equipment to be installed in high seismic risk areas. 2) Equipment installation documents in conformance with CBC 2013, 2016 and 2019 California Building Code and IBC 2012, 2015 and 2018 International Building Code.

Q. Warranty

1. Limited Warranty Period

a) STANDARD ONE-YEAR PARTS WARRANTY FOR A QUALIFIED SYSTEM – The Part(s) of a qualified System, including the compressor, are warranted for a period (the "Standard Parts Warranty Period") ending on the earlier to occur of one (1) year after the date of original installation, or eighteen (18) months from the date of manufacture.

b) ADDITIONAL SIX (6) YEAR COMPRESSOR PART WARRANTY – The Compressor is warranted for an additional six (6) year period after the end of the applicable Standard Part Warranty Period (the "Compressor Warranty Period").

2. Extended Warranty

a) The Standard Warranty Period and the Compressor Warranty Period are extended to a total of ten (10) years (the "Extended Warranty Period") for qualified Systems that have been (a) commissioned by a party that has completed the current Training Requirements, (b) such commissioning is pursuant to LG's current published instructions, and (c) the System commissioning results and supporting documents are entered correctly into LG's online commissioning system. Commissioning of a System requires one (1) hour of LG Monitoring View (LGMV) data. Commissioning results must be entered into LG's online commissioning system within sixty (60) days of System startup.

PART 3 – EXECUTION

3.1. EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, Best Practices and all applicable building codes.

3.3. CONNECTIONS

A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

B. Piping installation requirements are specified in division 15 mechanical & division 15a plumbing specifications. Drawings indicate general arrangement of piping, fittings and specialties.

C. Duct installation and connection requirements are specified in Division 15 of the project manual.

D. Electrical installation requirements are specified in Division 16 of this document.

3.4. FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A / E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.5. START-UP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 15 "Testing, Adjusting and Balancing" and comply with provisions therein.

3.6. DEMONSTRATION AND TRAINING

A. Engage a factory authorized service representative to train owner's maintenance personnel to adjust, operate and maintain the entire unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

END OF SECTION

DIVISION 15 – MECHANICAL
SECTION 15701 – HOT WATER CONVECTOR UNITS

PART 1 – GENERAL

A. The contractor shall furnish and install Rittling Convectors with required mounting components and accessories to meet size, capacity and characteristics as required on the Equipment Schedule or on the plans. Units shall be installed in a neat and workmanlike manner in accordance with specifications and manufacturer recommendations. All material shall be manufactured by Zehnder Rittling or approved equivalent.

B. The heating element is designed for either two-pipe steam or two-pipe hot water systems. The coil is manufactured using non-ferrous 1/2" nominal copper tubing and aluminum fins which are die cut with a thickness of no less than 0.010". The fins have integral collars, which provide maximum heat transfer between the tubes and the fins. The tubes are mechanically bonded to the fins to ensure permanent contact.

1. The entire fin assembly shall be encased in a heavy gauge galvanized steel frame with spacers locked at regular intervals to provide added protection to the finned element.

2. Headers are cast brass with 3/4" FNPT tapings. Standard configuration is supplied with both inlet and outlet connections facing downward. Optional reverse tapping is available with one connection facing upward and the other connection facing downward.

3. Assembled heating elements shall be hydrostatically tested to 1700 PSI prior to leaving the factory.

C. Enclosures shall be of the size and style as shown on the plans. The cabinet fronts shall be manufactured from 16-gauge cold rolled steel. Cabinet front shall be flanged on top and sides for added rigidity. The cabinet shall be reinforced and braced where necessary to provide additional stiffness. The liners shall be manufactured from 20-gauge cold rolled steel. 18-gauge cold rolled steel heating element support brackets shall be spot welded to the inside ends of the liners. Heating element support brackets allow for pitch adjustments of up to 1¼" for return of condensation in steam systems and as required by piping arrangements. Cabinet fronts are to be attached to liners using Tamper proof Allen Head fasteners

1. Convector shall be provided with an air inlet/air discharge configuration as listed below. Must specify for each unit.
   a. Louvered inlet and/or outlet that are die-formed to allow directional flow of air with the maximum amount of free open area. The louvered openings are fabricated to be “pencil proof.”
2. Convector cabinets shall be provided with the following configurations:
   a. Type PL – This convector is designed for full recess into the wall. The front inlet and outlet are advantageous where wall space is limited. The liner is recessed completely into the wall leaving only the front panel exposed. Louvered inlet and outlet as standard.

D. All enclosures and accessories shall be degreased and chemically phosphatized before application of a durable, attractive electrostatic epoxy powder coating. Color to be selected from standard Zehnder Rittling color chart.

E. Accessories and Options
1. Access doors shall be flush mounted with doors hinged at the top and use a tamper proof Allen head fastener.
2. Convectors shall be provided with 1/2" thick faced fiberglass insulation on cabinet fronts, liners and sides.
3. Units shall be manufactured in accordance with conformance to ISO 9001:2008 standards.

DIVISION 15–MECHANICAL
15777–UNIT VENTILATORS

PART 1— GENERAL

1.1 Section Includes

A. Magic Aire unit ventilators are designed for floor (vertical) or ceiling (horizontal) mounting. Units shall incorporate chilled water or direct expansion cooling and hot water, steam or electric heat as specified. Units are available with Direct Digital Controls (DDC) that provide stand-alone operation or can be incorporated into a LonWorks or BACNet network. Indoor air quality is assured with dehumidification and ventilation options.

1.2 Related Sections

A. Division 15 Mechanical Specifications

1.3 References

A. United Electric Company designs and builds its Magic Aire products to comply and perform to the following standards:

1. Units shall be tested and certified in accordance with AHRI Standard 840.
2. Unit shall be constructed and listed in accordance with ETL and ETL, Canada standards (ANSI/UL 1995-2011, fourth edition) (CAN/CSA C22.2 NO 2 36-95).
3. Unit insulation and adhesive shall meet the requirements for flame spread rating of lower than 25 per ASTM E84 and smoke generation rating of lower than 50 per ASTM E84. Only closed cell insulation shall be used. The use of fiberglass insulation is not acceptable.
4. Each coil shall be factory tested for leakage at 350-psig air pressure with coil submerged in water.

1.4 Submittals

A. Confirm product application requirements in sufficient detail to specify product as it is to be manufactured. Critical characteristics include:

1. Family of Product
2. CFM
3. External Static Pressure (ESP) include dirty filter factor
4. Elevation / Altitude
5. Horizontal / Vertical
6. Cooling: Chilled Water or DX = R410A
7. Entering Water Temp and GPM
8. DX: Sat Cond Temp, Sat Evap Temp, Entering DB/WB
9. Heating: Hot Water / Steam / Electric Heat
10. Heating: pre-heat or re-heat position
11. Filter: Basic Throw-away, Renewable, Permanent

12. Supply Voltage and phase
13. Other items, unique requirements, or accessories
14. Provide latest Lead-Times at time of submittal.

1.5 Delivery, Storage, Handling

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Inspection: Inspect all items for transit damage or any indication of re-pack. Follow manufacturer directions for filing freight claims.

C. Storage: Store materials in a dry, sheltered area, protected from damage and in accordance with manufacturer's instructions.

D. Handling: Handle and lift products in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

PART 2— PRODUCTS

2.1 Manufacturer

A. Basis of design Magic Aire (United Electric Company) Fan Coils, 501 Galveston Street, Wichita Falls, TX 76301. Phone (940) 397-2100. Web Site www.magicaire.com.

1. Or Approved Equivalent

B. Alternates are considered for approval if submitted in advance with complete ratings and accessory detail.

C. Alternates shall meet equivalency to the requirements of the contract drawings and specifications/project manual.

2.2 Unit Ventilator

A. The unit shall be a factory-assembled bolt-together unit ventilator.

B. Contained within the unit enclosure shall be factory-installed motor, wiring, blowers, coil(s), bearing, outdoor/return air damper, optional face/bypass damper and optional controls.

C. Unit shall have a draw-thru design for uniform air distribution across the coil and even discharge temperatures.

2.3 Construction and Components

A. Construction:

1. Unit frame shall be constructed of 14 gauge galvanized steel components that form a rigid foundation and resist corrosion.
2. Unit composed of three main sub-assembled modules: Blower Module, Coil Module and Damper Module. Modules shall be removable without disassembling the unit.
3. Modules shall be externally insulated using at least 3/8” closed cell insulation.
4. Unit back shall be insulated using at least 3/8” closed cell

insulation.

5. Exterior access panels shall be constructed of heavy gauge galvanized steel of at least 16 gauge material that have been cleaned and pretreated before painting to maximize corrosion resistance. Exterior service access panels shall be retained by tamper-resistant fasteners. Panels are electrostatically coated with polyester powder baked on textured paint.

B. MAUV (Vertical unit):

1. Unit standard depth of 16 5/8 in. (21 7/8 in. depth optional), 30-in. tall cabinet with three standard 16-gauge exposed front panels, and service access panels with tamper-resistant hex socket head threaded fasteners and retainer chains for safety and ease of service. 14-gauge panels are optional.
2. Cabinet models shall have standard textured baked powder finished panels. Cabinet tops shall be at least 16-gauge and charcoal bronze as standard with a steel bar-stock discharge grille (non-adjustable). Optional Mesh Screen shall be available with spacing no more than .25" in order to prevent objects from entering unit (pencil proof). Optional textured baked powder paint colors to match panels will be available for cabinet top. Unit top shall be easily removed for routine maintenance.
3. External access panels shall be easily removed from outside of the unit for easy access to filters and routine maintenance. End panel corners shall be welded and ground smooth for appearance and durability.
4. Unit shall include a leveling leg on each side of the bottom kick plate to compensate for floor irregularities.

C. MAUH (Horizontal unit):

1. Rated 750 to 1500 CFM units shall have standard bar-stock steel linear discharge grille, anodized aluminum double deflection discharge grille, or discharge duct collar only. Double deflection discharge grille blades shall be fully adjustable both vertically and horizontally to all maximum flexibility of adjustment of air flow direction.
2. Rated 2000 CFM units shall have an anodized aluminum double deflection discharge grille or optional discharge duct collar.
3. Unit shall have two hinged bottom access panels for easy access to filters and routine maintenance.
4. Retaining chains shall be furnished for both panels to ensure maximum safety.

2.4 Components:

A. Coils:

1. Chilled water and combination chilled/hot water coils shall be constructed of mechanically expanded copper tubing, minimum wall 0.013 in. inside, aluminum fins, with a minimum thickness of 0.025 in. The fin surface shall be enhanced to the maximum degree by incorporated a raised lance design.
2. Hot water coils shall be constructed of mechanically expanded copper tubing with a minimum wall of 0.016 in., inside aluminum fins shall have a minimum thickness of 0.045 in. Coils shall have a factory-mounted auto reset low limit (freeze stat) device mounted on the leaving side of the heating coil. The device shall be single-pole, double-throw and shall activate at 38 F if the capillary device senses a temperature change along any 6 in. of the device.
3. Direct expansion (DX) coils shall be furnished with a thermal expansion valve (TXV) sized to accommodate the condensing unit selected to meet the load.
4. Steam coils shall be the freeze resistant double tube, distribution type utilizing a tube-in-tube design with a long life copper header. Non-distributing type coils are not acceptable. Ferrous materials in the header are also not acceptable.
5. All coils shall be pressure tested at no less than 350 psig at the factory to ensure that they are leak tight.
6. Electric heat elements shall be the open wire type. They shall be mounted in individual heavy gauge galvanized steel frames and suspended in ceramic insulators.
7. Dual capillary type thermal sensing elements, one automatic reset and one manual reset, shall be employed to protect the unit from overheating in the event of abnormal operation.
8. Each circuit above 48 amps shall be protected by its own fuses rated for the duty and voltage to which they are applied
9. The unit must be constructed such that troubleshooting or adjustment of the controls can be done while the unit is operating normally.

B. Pipe Tunnel: Rated 500 to 1500 CFM vertical units and rated 750 to 1500 CFM horizontal units shall have an integral pipe tunnel that can be used for piping across the unit. This tunnel shall be insulated, with 3/8” closed cell insulation, from the unit and accessible from each end compartments to allow maximum flexibility of crossover piping installation.

C. Drain Pans:
    1. Unit drain pan shall be double sloped welded

galvanized steel or stainless steel to prevent standing water.

2. Drain pan will be coated to prevent external condensation during cooling.
3. Drain connections shall be supplied on both ends of pan for field conversion of slope and drain hand connection if required.
4. Drain pan slope shall be field convertible without removing the coil module.
5. Heating only units shall come equipped with a double sloped drain pan for future cooling needs.
6. Horizontal units shall have drain pan connection centerline located 4.5 in. above the bottom to provide easy piping to condensate disposal system.

D. Fans and Motor:

1. Fan and motor assembly shall be direct driven. One end of drive shaft shall be mounted in a sleeve-type or ball bearing, with other end of shaft supported by motor bearings.
2. Fan wheels shall be double-width, double-inlet with forward-curved blades, and shall operate at low speed. Fan wheels shall be large diameter (at least 8") for low speed, quiet operation and shall be constructed of high impact mineral filled polymer material (500-1500 CFM) Fan wheels shall be mounted on a hollow one piece steel shaft.
3. Fan wheels shall be statically and dynamically balanced.
4. Fan (blower) housings shall be constructed from heavy-gauge steel and mounted to a heavy-gauge galvanized steel fan deck.
5. To prevent vibration transmission to the unit frame, motor and shaft bearing shall be resiliently mounted. The drive shaft shall be connected to motor with a flexible coupling.
6. Fan motors shall be mounted outside of the airstream on a heavy-gauge steel partition and removable without removing the blower module.
7. Standard shall be supplied with permanently split capacitor (PSC) multi-tap transformer motors. Units that are used in high-static applications or that require higher efficiency shall be supplied with 3-speed, 120, 240 or 277 volt, single-phase, 60 Hz, electronically commutated motors (ECM). Units without controls shall be supplied with permanently split capacitor (PSC) multi-tap transformer motors. All motors shall have integral high temperature reset and shall be protected with cartridge-type fuse(s).

E. Filters:

1. Unit shall be supplied with a one piece 1-in. throwaway filter. The unit shall be capable of incorporating a 2 in. filter. For even loading, filter shall be positioned to filter mixed outdoor and return air.
2. Filter track shall be field adjustable to accept 1-in. or 2-in. permanent or renewable media replacement filters.

F. Dampers:

1. Unit shall contain a single outdoor-air/return-air damper with a continuous seal the length of the damper. The Damper shall be constructed of extruded aluminum that has an integral curved web to afford maximum rigidity. External closed cell insulation shall be applied. The damper assembly shall include an anti-draft plate to prohibit outdoor air from penetrating the classrooms through the damper assembly.
2. A single face and bypass damper with a continuous seal the length of the damper constructed of extruded aluminum shall be available.

G. Controls and Safeties:

1. The manufacturer shall furnish, install, wire and factory test a complete control package suitable for the unit type(s) selected. The control package shall be capable of stand-alone operation and shall have all of the necessary sensors and accessories to monitor, control and ensure complete and safe operation of the unit.
2. The minimum position of the outdoor-air/ return-air actuator shall be adjustable by the installing contractor and/or the owner/ operator.
3. ASHRAE Cycles II shall be available.

H. Special Features:

1. Cabinet full adapter back shall be available with an open space behind the back of cabinet for piping and electrical conduits. Cabinet will be properly gusseted to support the top of unit over the false back area.
2. Valve package options shall include all valves required for both 2-way and 3-way cooling and heating applications. Valve package options shall include wye strainers, flow setters, P/T (pressure/temperature) ports, ball valve and unions. The valve package shall include all valves required to match to the ASHRAE II control cycle. Field shall insulate the valve package.
3. Optional End panels with cutouts to match adapter backs or

custom needs. End panels shall be available in 1 in. standard sizes with 2”-4” sizes available.

4. Sub bases shall be available as an option for vertical units in sizes 2” to 12”.
5. Utility Cabinets shall be available to install along side of the vertical units. The cabinets will be available for in 16 5/8” and 21 7/8” depths and 12”, 18”, and 24” widths. The cabinets shall be available with colors to match unit cabinet and top.
6. A dual mount Wall Stat shall be provided with units containing factory supplied DDC Controls and be capable of wall mounting.
7. Units shall be capable of accepting a field installed CO2 sensor with the factory installed IAQ DDC Control packages.
8. Outdoor Air Louvers shall be available in vertical and horizontal blade styles. Options shall include with and without decorative lattice.
9. Trim flanges shall be available for horizontal units.
10. Touch-up paint shall be available to match cabinet color.
11. Architectural accessories shall be available to install together with vertical units. Cabinets in standard sizes 2’ to 5’ available with custom options.

I. See your local Magic Aire Representative for the following accessory specifications:
   1. Storage Cabinets
   2. Filler Sections
   3. Corner Sections
   4. Draft Stop Enclosures
   5. Pipe Enclosures

PART 3 – EXECUTION

3.1. EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, Best Practices and all applicable building codes.

3.3. CONNECTIONS

A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

B. Piping installation requirements are specified in division 15 mechanical & division 15a plumbing specifications. Drawings indicate general arrangement of piping, fittings and specialties.

C. Duct installation and connection requirements are specified in Division 23 of this document.

D. Electrical installation requirements are specified in Division 16 of this document.

3.4. FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A / E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.5. START-UP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 15 "Testing, Adjusting and Balancing" and comply with
provisions therein.

3.6. DEMONSTRATION AND TRAINING

A. Engage a factory authorized service representative to train owner's maintenance personnel to adjust, operate and maintain the entire unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

END OF SECTION

DIVISION 15 – MECHANICAL
SECTION 15803 – GRAVITY VENTILATORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: HVAC Gravity Ventilators
B. Related Sections:
   1. Project Manual General Requirements
   2. Project Manual Thermal and Moisture Protection
   3. Project Manual Finishes
   4. Project Manual Heating, Ventilating, and Air-Conditioning (HVAC)
   5. Project Manual Electrical

1.02 REFERENCES

A. Air Movement and Control Association Inc. (AMCA):
   1. 99 - Standards Handbook
   2. 200 - Publication, Air Systems
   3. 201-90 - Publication, Fans and Systems
   4. 202-88 - Publication, Troubleshooting
   5. 203-90 - Publication, Field Performance Measurement of Fan Systems
   6. 211-05 - Publication, Certified Ratings Program – Product Rating Manual for Fan Air Performance
   7. 300-96 - Standard Reverberant Room Method for Sound Testing of Fans
   8. 311-05 - Publication Certified Ratings Program – Product Rating Manual for Fan Sound Performance
   9. 99-0401-86 - Classification for Spark Resistant Construction
   10. 99-2408-69 - Operating Limits for Centrifugal Fans
B. Air Movement and Control Association Inc. (AMCA), American National Standards Institute (ANSI):
   1. 204-05 - Standard Balance Quality and Vibration Levels for Fans
   2. 210-99 - Standard Laboratory Methods of Testing Fans for Aerodynamic Performance Rating
C. American National Standards Institute (ANSI):
   1. 11-r1999 - Method of Evaluating Load Ratings of Bearings
D. American Society of Civil Engineers (ASCE):
   1. 7-02 - Minimum Design Loads for Building and Other Structures
E. American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE):
   1. Chapter 45 - 2003 Handbook, HVAC Applications
   2. Chapter 7 - 2001 Fundamentals handbook, Sound-Vibration
   3. Chapter 32 - 2001 Fundamentals handbook, Duct Design
   4. Chapter 18 - 1992 HVAC System and Equipment handbook, Fans
F. American Society for Testing and Materials (ASTM):
   1. E330-02 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylight and Curtain Walls by Uniform Static Air Pressure Difference
G. National Fire Protection Association (NFPA)
   1. 70 - National Electrical Code
   2. 90A-02 - Standard for the Installation of Air-Conditioning and Ventilating Systems
   3. 92A-06 - Recommend Practice for Smoke-Control System
   4. 92B-05 - Standard for Smoke Management System in Malls, Atria, and Large Areas
   5. 96-04 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
H. Occupational Safety and Health Administration (OSHA):
   1. 1910.212 - General requirements for Machine Guarding

2. 1910.219 - General requirements for guarding safe use of mechanical power transmission apparatus
3. 1926.300 - General requirements for safe operation and maintenance of hand and power tools

I. Underwriters Laboratories (UL):
1. 507 - Electric Fans
2. 555 - Fire Dampers
3. 555S - Smoke Dampers
4. 705 - Standard Power Ventilators
5. 762 - Standard Power Roof Ventilators for Restaurant Exhaust Appliances
6. 793 - Snow Load

1.03 SUBMITTALS

A. General: Submit in accordance with the Project Manual Submittal Procedures
B. Provide dimensional drawings and product data on each fan
C. Provide fan curves for each fan at the specified operation point, with the flow, static pressure and horsepower clearly plotted
D. Provide outlet velocity and fan's inlet sound power readings for the eight octave bands, decibels, and sones
E. Strictly adhere to QUALITY ASSURANCE requirements as stated in section 1.04 of this specification
F. Provide manufacturer's certification that exhaust fans are licensed to bear Air Movement and Control Association (AMCA), Certified Rating Seal for sound and air performance
G. Installation, Operation, and Maintenance Manual (IOM): Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety information and cleaning. A troubleshooting guide, parts list, warranty and electrical wiring diagrams

1.04 QUALITY ASSURANCE

A. Performance ratings: Conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA Standard 210-99 and AMCA Standard 300-96 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA label for air and sound performance seal
B. Classification for Spark Resistant Construction Conform to AMCA 99
C. Each fan shall be given a balancing analysis which is applied to wheels at the outside radius. The maximum allowable static and dynamic imbalance is 0.05 ounces (Balance grade of G6.3)
D. Comply with the National Electrical Manufacturers Association (NEMA), standards for motors and electrical accessories
E. The High Wind models shall be analyzed and stamped by a state license P.E. to the ASCE 7-02 Standard which meets the IBC, Florida and Miami-Dade codes
F. Each High Wind model is subject to be certified by a third party to the ASTM E330 Static Pressure Difference Standard
G. All High Wind models shall be analyzed using Computational Fluid Dynamics (CFD). The CFD simulates the flow of high speed (150MPH) winds over the surface of objects
H. The Finite Element Analysis (FEA) is the results from the CFD and it can accurately predict the stress, strain, and deflection resulting form high wind loads

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation
B. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer’s instructions. For long term storage follow manufacturer's Installation, Operations, and Maintenance Manual
C. Handling: Handle and lift fans in accordance with the manufacturer’s instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer

1.06 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents
   1. The warranty of this equipment is to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturers option when returned to Manufacturer, transportation prepaid
   2. Motor Warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during this period, they should be returned to the nearest authorized motor service station

1.07 MAINTENANCE

A. Refer to Manufacturer's Installation, Operation and Maintenance Manual (IOM), to find maintenance procedures

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Greenheck, PO Box 410, Schofield, Wisconsin 54476. Phone (715) 359-6171. Fax (715)355-2399. Website: www.greenheck.com

B. Approved Equivalent

2.02 SPUN ALUMINUM RELIEF GRAVITY VENTILATOR - GREENHECK MODEL GRSR

A. General Description:
   1. Ventilator is low silhouette for relief applications with natural gravity or negative pressure system
   2. Selection based on non-ducted applications
   3. Intake unit sizes 8 to 48
   4. Performance capability up to 18,200 cubic feet per minute (cfm)
   5. Each unit shall bear a permanently affixed manufacture's nameplate containing the model number and individual serial number

B. Hood:
   1. Constructed of aluminum
   2. Internal structure is constructed of galvanized steel

C. Birdscreen:
   1. Constructed of ½ inch Galvanized mesh
   2. Mounted horizontally across the intake area of the hood

D. Housing:
   1. Curb Cap type: Not Hinged
   2. Constructed of aluminum, includes windband and curb cap. Galvanized material is not acceptable
   3. Windband to be one piece spun aluminum construction and maintain original material thickness throughout the housing.
   4. Windband to include an integral rolled bead for strength
   5. Curb cap to have integral deep spun inlet venturi and prepunched mounting holes to ensure correct attachment to roof.

E. Options/Accessories:
   1. Roof Curbs:
      a. Type: GPI
      b. Mounted onto roof with fan
      c. Damper tray from easy damper installation
      d. Material: Galvanized
      e. Insulation thickness: 1 inch
      f. Flashing Flange: 2 inch
   2. Dampers:

a. Type: Motorized leakage class 1
b. Low-leakage type with factory mounted internal actuator
c. Prevents outside air from entering back into the building when fan is off
d. Balanced for minimal resistance to flow
e. Galvanized frames with prepunched mounting holes

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions

3.02 EXAMINATION

A. Examine areas to receive fans. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected

3.03 PREPARATION

A. Ensure roof openings are square, accurately aligned, correctly located, and in tolerance
B. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck. Install duct as specified in Air Distribution (Division 23)

3.04 INSTALLATION

A. Install fans system as indicated on the Installation, Operation and Maintenance Manual (IOM) and contract drawings
B. Install fans in accordance with manufacturer's instructions

3.05 SYSTEM STARTUP

A. Refer to Installation, Operation, and Maintenance Manual (IOM)

3.06 ADJUSTING

A. Ventilators shall be adjusted according to manufacturer's instructions

3.07 CLEANING

A. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction

3.08 PROTECTION

A. Protect installed product and finished surfaces from damage during construction
B. Protect installed ventilators to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion

END OF SECTION

DIVISION 15 – MECHANICAL

15804 – DOWNBLAST CENTRIFUGAL EXHAUST FAN

PART 1 - GENERAL

1.1. SUMMARY

A. Section Includes: HVAC Power Ventilators

B. Related Sections:

1. Project manual - General Requirements
2. Project manual - Thermal and Moisture Protection
3. Project manual - Finishes
4. Project manual - Heating, Ventilating, and Air-Conditioning (HVAC)
5. Project manual - Electrical

1.2. REFERENCES

A. Air Movement and Control Association Inc. (AMCA):

1. 99 - Standards Handbook
2. 200 - Publication, Air Systems
3. 201-90 - Publication, Fans and Systems
4. 202-88 - Publication, Troubleshooting
5. 203-90 - Publication, Field Performance Measurement of Fan Systems
6. 211-05 - Publication, Certified Ratings Program - Product Rating Manual for Fan Air Performance
7. 300-96 - Standard Reverberant Room Method for Sound Testing of Fans
8. 311-05 - Publication Certified Ratings Program - Product Rating Manual for Fan Sound Performance
9. 99-0401-86 - Classification for Spark Resistant Construction
10. 99-2408-69 - Operating Limits for Centrifugal Fans

B. Air Movement and Control Association Inc. (AMCA), American National Standards Institute (ANSI):

1. 204-05 - Standard Balance Quality and Vibration Levels for Fans
2. 210-99 - Standard Laboratory Methods of Testing Fans for Aerodynamic Performance Rating

C. American National Standards Institute (ANSI):

1. 11-r1999 - Method of Evaluating Load Ratings of Bearings

D. American Society of Civil Engineers (ASCE):

1. 7-02 - Minimum Design Loads for Building and Other Structures

E. American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc (ASHRAE):

1. Chapter 45 - 2003 handbook, HVAC Applications
2. Chapter 7 - 2001 Fundamentals handbook, Sound-Vibration
3. Chapter 32 - 2001 Fundamentals handbook, Duct Design

4. Chapter 18 - 1992 HVAC System and Equipment handbook, Fans

F. American Society for Testing and Materials (ASTM):
   1. E330-02 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylight and Curtain Walls by Uniform Static Air Pressure Difference

G. National Fire Protection Association (NFPA):
   1. 70 - National Electrical Code
   2. 90A-02 - Standard for the Installation of Air-Conditioning and Ventilating Systems
   3. 92A-06 - Recommend Practice for Smoke-Control System
   4. 92B-05 - Standard for Smoke Management System in Malls, Atria, and Large Areas
   5. 96-04 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

H. Occupational Safety and Health Administration (OSHA):
   1. 1910.212 - General requirements for Machine Guarding
   2. 1910.219 - General requirements for guarding safe use of mechanical power transmission apparatus
   3. 1926.300 - General requirements for safe operation and maintenance of hand and power tools

I. Occupational Safety and Health Administration (OSHA):
   1. 507 - Electric Fans
   2. 555 - Fire Dampers
   3. 555S - Smoke Dampers
   4. 705 - Standard Power Ventilators
   5. 762 - Standard Power Roof Ventilators for Restaurant Exhaust Appliances
   6. 793 - Snow Load

1.3. SUBMITTALS

A. General: Submit in accordance with the Project Manual Submittal Procedures
   1. Provide dimensional drawings and product data on each fan.
   2. Provide fan curves for each fan at the specified operation point, with the flow, static pressure and horsepower clearly plotted.
   3. Provide outlet velocity and fan's inlet sound power readings for the eight octave bands, decibels, and sones.
   4. Strictly adhere to QUALITY ASSURANCE requirements as stated in section 1.04 of this specification.
   5. Provide manufacturer's certification that exhaust fans are licensed to bear Air Movement and Control Association (AMCA), Certified Rating Seal for sound and air performance.
   6. Installation, Operation, and Maintenance Manual (IOM): Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety information and cleaning. A troubleshooting guide, parts list, warranty and electrical wiring diagrams.

1.4. QUALITY ASSURANCE

A. Performance ratings: Conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA Standard 210-99 and AMCA Standard 300-96 in an AMCA accredited
laboratory. Fans shall be certified to bear the AMCA label for sound and air performance seal.

B. Classification for Spark Resistant Construction, levels A, B, and C conform to AMCA 99

C. Each fan shall be given a balancing analysis which is applied to wheels at the outside radius. The maximum allowable static and dynamic imbalance is 0.05 ounces (Balance grade of G6.3).

D. Comply with the National Electrical Manufacturers Association (NEMA), standards for motors and electrical accessories.

E. The High Wind models have been analyzed and stamped by a state license P.E. to the ASCE 7-02 Standard which meets the IBC, Florida and Miami-Dade codes.

F. Each High Wind model is subject to be certified by a third party to the ASTM E330 Static Pressure Difference Standard.

G. All High Wind models have been analyzed using Computational Fluid Dynamics (CFD). The CFD simulates the flow of high speed (150 MPH) winds over the surface of objects.

H. The Finite Element Analysis (FEA) is the results from the CFD and it can accurately predict the stress, strain, and deflection resulting from high wind loads.

1.5. DELIVERY, STORAGE, and HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation.

B. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions. For long term storage follow manufacturer's Installation, Operations, and Maintenance Manual

C. Handling: Handle and lift fans in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer.

1.6. WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and is not a limitation of, other rights Owner may have under Contract Documents.

1. The warranty of this equipment is to be free from defects in material and workmanship for a period of 1 Yr (Standard) from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturers option when returned to Manufacturer, transportation prepaid.
2. Motor Warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during the period, they should be returned to the nearest authorized motor service station.

1.7. MAINTENANCE

A. Refer to Manufacturer's Installation, Operation and Maintenance Manual (IOM), to find maintenance procedures.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Greenheck, PO Box 410, Schofield, Wisconsin 54476. Phone (715) 359-6171 Fax (715) 355-2399. Website: www.greenheck.com

B. APROVED EQUIVALENT

2.2. DIRECT DRIVE ROOF DOWNBLAST CENTRIFUGAL EXHAUST FANS - GREENHECK MODEL G

A. General Description:

1. Downblast fan shall be for roof mounted applications
2. Performance capabilities up to 14,500 cubic feet per minute (cfm) and static pressure to 2.75 inches of water gauge
3. Fans are available in twenty sizes with nominal wheel diameters ranging from 8 inches through 30 inches (071 - 300 unit sizes)
4. Maximum continuous operating temperature is 180 Fahrenheit (82.2 Celsius)

5. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

B. Wheel:
   1. Constructed of Aluminum
   2. Non-overloading, backward inclined centrifugal
   3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
   4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency

C. Motors:
   1. Electronically Commutated Motor
      a. Motor enclosure: ODP
      b. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors
      c. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase
      d. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor
      e. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by motor controller
      f. Built-in soft start/stop and thermal overload protection.
      g. Motor shall be a minimum of 85% efficient at all speeds
   2. Motor Controller
      a. HOA (Hand/Off/Auto) type with LCD display
      b. Controller shall be capable of 2-speed (individually programmed on unit’s display) operation from control signals
      c. Hand mode operation shall be adjustable from the controller and speed shown on unit’s display.

D. Housing:
   1. Motor cover, shroud, curb cap, and lower windband shall be constructed of heavy gauge aluminum
   2. Shroud shall have an integral rolled bead for extra strength
   3. Shroud shall be drawn from a disc and direct air downward
   4. Lower windband shall have a formed edge for added strength
   5. Motor cover shall be drawn from a disc
   6. All housing components shall have final thicknesses equal to or greater then preformed thickness
   7. Curb cap shall have pre-punched mounting holes to ensure correct attachment
   8. Rigid internal support structure
   9. Leak proof

E. Housing Supports and Drive Frame:
   1. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators

F. Vibration Isolation:
   1. Rubber isolators
   2. Sized to match the weight of each fan

G. Disconnect Switches:

1. NEMA rated: NEMA 1: indoor application no water. Factory standard.
2. Positive electrical shut-off
3. Wired from fan motor to junction box installed within motor compartment

H. Options/Accessories:

1. Birdscreen:
   a. Material Type: Galvanized
   b. Protects fan discharge
2. Roof Curbs (as specified):
   a. Type: GPI - Welded, straight sided curb with 2 inches of flashing flange and wood nailer
   b. Mounted onto roof with fan
   c. Material: Galvanized
   d. Insulation thickness: 1 inch
   e. Flashing Flange: 2 inch
3. Curb Adapter (as specified)
   a. Aluminum construction
4. Curb Extension:
   a. Type: GPE - Bolted access door and damper holding tray
   b. Material Type: Aluminum
   c. Coating Type: N/A
5. Dampers:
   a. Type: VCD-23, 115 VAC
   b. Leakage class 1 rated
   c. Prevents outside air from entering back into the building when fan is off
   d. Balanced for minimal resistance to flow
   e. Galvanized frames with prepunched mounting holes

PART 3 - EXECUTION

3.1. MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions

3.2. EXAMINATION

A. Examine areas to receive fans. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected

3.3. PREPARATION

A. Ensure roof openings are square, accurately aligned, correctly located, and in tolerance

B. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck. Install duct as specified in Air Distribution (Division 15)

3.4. INSTALLATION

A. Install fans system as indicated on the Installation, Operation and Maintenance Manual (IOM) and contract drawings

B. Install fans in accordance with manufacturer's instructions

3.5. SYSTEM STARTUP

A. Refer to Installation, Operation, and Maintenance Manual (IOM)

3.6. CLEANING

A. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction

3.7. PROTECTION

A. Protect installed product and finished surfaces from damage during construction

B. Protect installed exhaust fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion

END OF SECTION

DIVISION 15 – MECHANICAL

15805 – AIR DESTRATIFICATION FANS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Destratification fans for thermal equalization of buildings.

1.02 RELATED SECTIONS

B. Project Manual, "Common Work Results for Electrical".

1.03 REFERENCES

C. UL 507: Underwriters Laboratory Standard for Electric Fans.

D. CAN/CSA C22.2#60335-1: Safety of household and similar electrical appliances.

E. CE: Product is certified to meet EU consumer safety, health or environmental requirements.

F. UL 94 5VA: Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

G. NEC: National Electric Code.

H. ETL: Listed for US and Canada in Intertek Directory of Listed Products.

1.04 SUBMITTALS

A. Submit under provisions of Project Manual, "Administrative Requirements".

B. Product Data: Manufacturer's data sheets for each product, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Power requirements and mounting recommendations.

C. Shop Drawings:
   1. Placement Drawings: Include manufacturer’s placement recommendation diagram.
   2. Wiring Diagrams.
   3. Mounting details, including seismic restraint where required.

D. Manufacturer’s Instructions: Provide manufacturer’s “Installation & Operation Guide”

E. Schedule

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of ten (10) years of product experience. Providing sole source for design, engineering, manufacturing and warranty claims handling.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products and materials to project site in manufacturer's unopened packaging.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.07 PROJECT CONDITIONS

A. Maintain temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. Warranty: 30-day money-back customer satisfaction guarantee. Refer to warranty information contained in the "Installation, Operation & Maintenance Guide".

B. Factory Refurbish Program: Users can purchase a motor replacement or a new discounted system upon failure outside the warranty period. Contact manufacturer for details.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Airius, LLC, which is located at: 811 S. Sherman St., Longmont, CO 80501 Toll Free Tel: 888-247-7327; Tel: 303-772-2633; Email: info@theairpear.com; Web: www.theairpear.com

B. Approved Equivalent

2.02 AIRIUS Q SERIES DESTRATIFICATION FANS

A. Performance: Coordinated design of housing, stator and motor shall provide columnar laminar airflow to produce a minimum of 100 fpm at center of column at grade level when installed within 2'-0" of ceiling.

B. Housing: The fan housing shall be made of PC/ABS resin, rated 5VA for flame resistance.
   1. Housing color:
      a. PMS Cool Gray 2C (off white)
      b. PMS Gray 432C (gray)
      c. Black
      d. As scheduled

C. Safety Cable: Supplied with 6'-0" steel cable fastened to seismic restraint point integrated into housing.

D. Motor Mounting: Enclosed in housing, above stator.

E. Stator: The fan shall be equipped with a patented multiple-vane stator coordinated with fan design for maximizing columnar laminar flow.

F. Certification: UL Standard 507 for Safety Electric Fans, CAN/CSA C22.2#60335-1and UL 94 5VA as certified by nationally recognized testing laboratory. Acceptable laboratories include ETL, UL or other nationally recognized testing laboratories.

G. Identification: Permanently affixed manufacturer's nameplate including the following: Model Number, Serial Number, Motor Power Specifications, Country of Manufacture and Safety Marks: ETL (US & CA) & CE (EU).

H. Power Cord: 6 foot, 300-volt AC, UL rated. Motors within the range of 100-130VAC are provided with a standard 3-prong plug. Motors within the range of 200-277VAC are not provided with a plug.

I. Destratification Fan **[DF-1]** shall be an Airius Q-50, or Approved Equivalent.
   1. Size and Weight:
      a. Standard: 23 inch height to bail; 17.125 inch height to rim; 15.25 inch diameter; 22 lb (10 kg).
   2. Motor:
      a. Electrically commutated motor, up to 92% efficient. Plastic blades bolted to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 1450 cfm, 1650 rpm, 67 dBA. Thermally protected motor with an operating range of -40° F (-40° C) to +176° F (80° C).
      b. Recommended ceiling height up to 50 feet (15.2 m) and area coverage up to 2000 sq. ft (185.8 sq. m); 25 feet (7.6 m) from the fan's center in all directions.
      c. Electrical Requirements:
         1) 100-130V AC, single phase, 50/60 Hz.; 1.6 Amps; 110 watts
      d. Controls shall be coordinated with motor electrical requirements.
         1) EC motor shall be controlled by 0-10VDC control signal via BAS. Uses low voltage control circuit. See wiring diagram.
         2) EC motor shall be controlled by wall mounted potentiometer. Uses low voltage control circuit. See wiring diagram.
   3. Motor (P4): Permanent split capacitor axial motor, 4-pole, standard speed. Plastic blades bolted to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 1450 cfm, 1650 rpm, 62 dBA. Thermally protected motor with an operating range of -40° F (-40° C) to +176° F (80° C). Shutoff at 275°F (135°C) and reset at 255°F (125°C).
      a. Recommended ceiling height up to 45 feet (13.7 m) and area coverage up to 2000 sq. ft (185.8 sq. m); 25 feet (7.6 m) from the fan's center in all directions.
      b. Electrical Requirements:
         1) 120V AC, single phase, 50/60 Hz.; 0.65/0.8 Amps; 70/90 watts
      c. Controls shall be coordinated with motor electrical requirements.
         1) Shall be an inline SMART TRIAC controller. Accepts 0-10VDC control signal from BAS. See wiring diagram.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until supporting structure and interior work have been properly completed.

B. Check location and availability of utility services to ensure proper voltage and installation preparation.

C. Installation of miscellaneous support, if required, electrical wire and wiring, conduit, fuses, and disconnect switches other than those provided by fan manufacturer are specified in other sections.

D. Examine the substrate and conditions under which the Fan is to be installed. Notify the Architect in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install destratification fan according to manufacturer's written recommendations.

B. Fan to be mounted at a maximum of 2’-0” from ceiling deck to ensure thermal/humidity equalization from ceiling to floor.

C. Adjust unit as required for proper operation in accordance with manufacturer’s installation instructions.

3.03 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.04 DESTRATIFICATION FAN SCHEDULE

Tag	Location	Manufacturer	Model	Weight (lb)	Diameter	Height (in.)	Max Airflow (CFM)	RPM	Watts	Volts	Phase	Remarks
DF-1	Light Well	Airius	Q-50-EC	22	15.25	23	1450	1650	110	100-130	1	1,2

1: Mount within 2’-0” of ceiling deck
2: Daisy chain low voltage control wire and link to wall mounted potentiometer.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15806 - FIRE DAMPERS

1.01 GENERAL

A. Fire dampers shall be furnished and installed where shown on the drawings. Each fire damper shall be provided with access doors.

B. Fire dampers shall be fabricated in compliance with NFPA and shall be U.L. labeled. Approved fire dampers shall be made by Air Balanced, Inc., Model 119, Type B of 319-P, or equal.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15891 - DUCTWORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of ductwork is indicated on drawings and by requirements of this section.

B. Types of ductwork required for project include the following:

1. Heating supply and return air systems.
2. Air conditioning supply and return air systems.
3. Fresh air supply systems.
4. Mechanical exhaust systems.
5. Air relief systems.
6 Fume hood exhaust systems.
7. Wood shop exhaust system.

C. Specific Duct System Classifications:

Service	Material	Pressure Class	Velocity
HVAC Supply	Galvanized Steel	2" WG	2500 FPM
Return Relief Exhaust	Galvanized Steel	1" WG Negative	1500 FPM
Air Plenums	Galvanized Steel	2" WG	2500 FPM
Fume hood	Stainless Steel	4" WG Negative	4000 FPM
Woodshop	Galvanized Steel	5" WG Negative	3000 FPM

D. External insulation for ductwork is specified in Division 15 insulation sections, and is not included as work of this section.

E. Duct accessories are specified in Division 15 Section and are included as work of this section.

F. Inlets and outlets are specified in Division 15 section and are included as work of this section.

G. Duct lining, as specified herein and indicated on drawings, is included as work of this section.

1.02 SUBMITTALS

A. Product data: Submit manufacturer's specifications on manufactured products and factory fabricated ductwork, used for work of this section.

B. Shop drawings: Submit dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Duct dimensions shall be external and provide adequate space to include lining and maintain internal dimensions

indicated on contract drawings. When appropriate, show modifications of indicated requirements made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

C. As-Built drawings: At project closeout, submit as-built drawings of installed ductwork, duct accessories, and outlets and inlets, in accordance with requirements of Division 1.

1.03 QUALITY ASSURANCE AND REQUIRED CODES AND STANDARDS

A. SMACNA standards (metal and flexible ductwork) - comply with SMACNA "HVAC Duct Construction Standards" latest edition for fabrication and installation of metal and flexible ductwork.

B. SMACNA standards (thermoplastic duct) - comply with SMACNA "Thermoplastic Duct (PVC) Construction Manual" latest edition for fabrication and installation of thermoplastic (PVC) ductwork.

C. SMACNA standards (fibrous glass ductwork) - comply with SMACNA "Fibrous Glass Duct Construction Standards" latest edition for fabrication and installation of fibrous glass ductwork.

D. SMACNA standards (industrial duct) - comply with SMACNA "Accepted Industry Practice for Industrial Duct Construction"; "Accepted Industry Practice for Round Industrial Duct Construction"; and "Accepted Industry Practice for Square Industrial Duct Construction", latest editions, for fabrication and installation of industrial ductwork.

E. SMACNA standards: Comply with SMACNA "Duct Liner Standards" for installations of duct liner in sheet metal ductwork.

F. NYS compliance: Comply with NFPA 90 A "Standard for the Installation of Air Conditioning and Ventilating Systems."

G. Mechanical Code of New York State

1.04 DELIVERY, STORAGE AND HANDLING

A. Protect shop fabricated and factory fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.

B. Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with waterproof wrapping.

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

A. Exposed ductwork materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks,

roller marks, oil canning, stains and discolorations, and other imperfections, including those which would impair painting.

B. Sheet metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ANSI/ASTM A 527, lockforming quality, with ANSI/ASTM A 525, G90 zinc coating, mill phosphatized for exposed locations.

C. Flexible Duct - Polyethylene Vapor Barrier Type. Where indicated, provide insulated flexible duct as follows:

1. Galvanized steel helix, formed and mechanically locked to fabric.
2. Aluminum foil trilaminate, fiberglass and aluminized polyester, mechanically locked (no adhesive).
3. Exterior fiberglass insulation blanket factory wrapped. Thermal conductance, C factor, not more than 0.23.
4. Outer jacket of gray fire retardant polyethylene material.
5. UL listed per UL 181, Class 1 Air Duct.
6. Operating temperature range -20 degrees to 250 degrees F.
7. Flame spread less than 25, smoke developed less than 50.
8. Working pressures:

   a. 6 inch w.g. positive (all diameters).
   b. 4 inch w.g. negative, through 16 inch diameters.
   c. 1 inch w.g. negative, 18 to 20 inch diameters.

9. Rated velocity: 4,000 FPM.
10. Manufacturer:

    a. Flexmaster, Type 3.
    b. Clevaflex USA, Inc.
    c. Thermaflex.

D. Flexible Duct Fittings: Provide factory manufactured galvanized steel fittings. Use 45 degree laterals, ball mouth tees, spin collars, or conical tees for duct taps. 90 degree tees shall not be allowed.

2.02 DUCT LINER

A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.

1. Manufacturers:

   a. CertainTeed Corp.; Insulation Group.
   b. Johns Manville International, Inc.
   c. Knauf Fiber Glass GmbH.
   d. Owens Corning.

2. Materials: ASTM C 1071; surfaces exposed to air stream shall be coated to prevent erosion of glass fibers.

   a. Thickness: 2 inches.

b. Thermal Conductivity (k-Value): 0.26 at 75°F (0.037 at 24°C) mean temperature.
c. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
e. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.

1) Tensile Strength: Indefinitely sustain a 50-lb- (23-kg) tensile, dead-load test perpendicular to duct wall.
2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch (3 mm) into air stream.
3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

2.03 MISCELLANEOUS DUCTWORK MATERIALS

A. General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

B. Duct sealant: Non-hardening, non-migrating mastic elastic sealant (type applicable for fabrication/installation detail) as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork. Liquid allowed for slip joints only. Silicone base duct sealer shall be used on duct joints exposed to weather.

C. Ductwork support materials.

1. For galvanized steel ductwork, provide hot dipped galvanized steel fasteners, anchors, rods, straps, trim and angles.
2. For stainless steel ductwork, provide matching stainless steel support materials.
3. For flexible ductwork, provide hot dipped galvanized steel support material.

D. Duct Connector: Where duct system meets or exceeds pressure class of 2" w.g., positive or negative, incorporate the use of rolled, formed, machine manufactured duct connector.

1. Manufacturer: Subject to compliance with requirements, provide duct connector of one of the following:

a. Ward.
b. Ductmate.
c. United McGill.
d. Flexmaster.

2.04 SHOP FABRICATION

A. Shop fabricate ductwork in 4, 8, 10 or 12 foot lengths, unless otherwise indicated or required to complete runs. Pre-assemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for re-assembly and coordinated installation.

B. Shop fabricate ductwork of gages and reinforcement complying with applicable SMACNA standard.

C. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with inside radius equal to associated duct width. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers.

D. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division 15 section "Duct Accessories" for accessory requirements.

E. Fabricate ductwork with duct liner in each section of duct where indicated. Fabricate ductwork large enough to accept liner of thickness indicated and to maintain inside dimensions shown on contract drawings. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners.

F. Provide lining in all ductwork that is conveying below ambient temperature air and is not insulated. Provide lining in supply air and return air ductwork from air handling unit to 20 feet away from the unit. Provide lining in ductwork as indicated on drawings.

2.05 FACTORY FABRICATED DUCTWORK

A. General: At Installer's option, provide factory fabricated spiral, round or oval duct and fittings, in lieu of shop fabricated duct and fittings.

B. Gauge: Tables 3-2 and 3-3 SMACNA "HVAC Duct Construction Standards." No standing rib shall be allowed.

C. Oval Elbows: 3 gore 90 degree and 2 gore 45 degree with machine formed seam.

D. Round Elbows: one piece construction for 90 degree and 45 degree elbows 14" and smaller. Provide 5 gore 90 degree and 3 gore 45 degree construction for larger diameter with machine formed seam joint.

E. Divided flow fittings: 90 degree tees, constructed with saddle tap spot welded and bonded to duct fitting body.

F. Manufacturer: subject to compliance with requirement, provide factory fabricated ductwork of one of the following:

1. United Sheet Metal Div., United McGill Corp.
2. Semco

PART 3 - EXECUTION

3.01 INSTALLATION OF DUCTWORK

A. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (5% leakage) and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.

B. Duct Sizing: Duct sizes indicated on drawings are inside dimensions.

C. Flexible Duct: Flexible duct may be used for connecting room diffuser to sheet metal duct and/or ceiling terminal box only. Extend flexible duct completely and limit lengths to five feet (5'), or as indicated on Drawings. Support according to SMACNA.

D. Seal ductwork to seal class as prescribed in SMACNA "HVAC Duct Construction Standards" for the static pressure classes indicated, unless otherwise recommended.

E. Complete fabrication of work at project as necessary to match shop fabricated work and accommodate installation requirements.

F. Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

G. Electrical equipment spaces: Do not run ductwork through transformer vaults and their electrical equipment spaces and enclosures.

H. Boiler Rooms: Do not run ductwork through boiler rooms unless protected per NFPA requirements.

I. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus insulation with sheet metal flanges of same gage as duct. Overlap opening on four sides by at least 1-1/2".

J. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.

K. Support ductwork in manner complying with appropriate SMACNA standard.

3.02 INSTALLATION OF WOODSHOP EXHAUST (N/A)

3.03 APPLICATION OF LINER IN RECTANGULAR DUCTSS

A. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.

B. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.

C. Butt transverse joints without gaps and coat joint with adhesive.

D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.

E. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.

F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).

G. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.

H. Secure transversely oriented liner edges facing the airstream with metal nosing's that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

1. Fan discharges.
2. Intervals of lined duct preceding unlined duct.

3. Upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm (12.7 m/s) or where indicated.

I. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used; secure buildouts to duct walls with bolts, screws, rivets, or welds.

3.04 CLEANING AND PROTECTION

A. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.

B. Strip protective paper from stainless ductwork surfaces, and repair finish wherever it has been damaged.

C. Temporary closure - at ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

3.04 BALANCING

A. Refer to Division 15 Section 15990 "Testing, Adjusting and Balancing" for air distribution balancing of ductwork. Seal any leaks in ductwork that become apparent in balancing process.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15893 - DUCT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of duct accessories work is indicated on drawings and in schedules, and by requirements of this section.

B. Types of duct accessories required for project include the following:

1. Fire and smoke dampers(in compliance with NFPA80-STD for opening protectives)
2. Access doors
3. Turning vanes
4. Manual Dampers

    a. Butterfly manual dampers
    b. Opposed-blade manual dampers

5. Intake/Exhaust dampers
6. Flexible connections

1.02 SUBMITTALS

A. Product data - submit manufacturer's specifications for each type of duct accessory, including dimensions, capacities, and materials of construction, and installation instructions.

B. Shop drawings - submit assembly type shop drawings for each type of duct accessory showing interfacing requirements with ductwork, and method of fastening or support.

C. Maintenance data - submit manufacturer's maintenance data including parts lists for each type of duct accessory, include this data in Maintenance Manual.

1.03 QUALITY ASSURANCE

A. SMACNA compliance - comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) high pressure and low pressure duct construction standards.

B. Industry standards - comply with American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of duct accessories, except as otherwise indicated.

C. UL compliance - construct, test and label fire dampers in accordance with Underwriters Laboratories (UL) Standard 555 "Fire Dampers and Ceiling Dampers".

D. NFPA compliance - comply with applicable provisions of ANSI/NFPA 90A "Air Conditioning and Ventilating Systems", pertaining to installation of duct accessories.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver components with factory installed packing and protective containers.

B. Handle components carefully to prevent damage to components and finish. Do not install damaged components; replace with new.

C. Protect components from weather, dirt, construction traffic and debris, etc.

PART 2 - PRODUCTS

2.01 FIRE AND SMOKE DAMPERS

A. Standards, Fire and Smoke Dampers: Conform to the requirements of NFPA 90A and UL listed, labeled and rated 1-1/2 hours, and in compliance with NFPA80-STD for opening protectives.
Provide fusible links 165 degrees F., vibration proof and secured with clinched "S" hooks or stainless steel bolts and lock nuts.

B. Smoke Dampers: Conform to UL, fit with control shafts for operation by electric or pneumatic motors. Provide a 165 degrees F thermal link.

C. Access Doors: Provide adjacent to all fire and smoke dampers.

D. Manufacturer: Subject to compliance with requirements, provide products by one of the following.

1. Ruskin Mfg. Co.
2. Controlled Air, Inc.

2.02 ACCESS DOORS

A. Standard: Conform to SMACNA.

B. Location: Provide access doors in casings, plenums and ducts where shown on Drawings and where specified for ready access to operating parts including fire dampers, smoke dampers, valves, and concealed coils.

C. Pressure Classification: Construct and install access doors in accordance with SMACNA Standards to suit the static pressure classifications and the locations where installed.

D. Access Doors in Ducts: Provide and size doors as follows.

1. Minimum 24-inch by 24-inch clear opening.
2. When field conditions require an access opening smaller than 16-inch by 12-inch, provide a 24-inch long removable

section of casing or duct, secured with quick acting locking devices, 6 inches on centers, to permit ready access without dismantling other equipment.

E. Door Requirements: Provide doors in casings and duct as follows.

1. Arrange doors so that system air pressure will assist closure and prevent opening when the system is in operation.
2. Coordinate doors and equipment to provide unrestricted passage through clear door opening, without removal of any equipment.
3. Where pressure regulating dampers are installed in ducts or plenums, provide access doors with a clear wire glass observation port, 6-inch by 6-inch minimum size. Anchor port with structural metal frame, resilient gaskets and stainless steel bolts.

F. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.

1. Ruskin Mfg. Co.
2. Flexmaster USA, Inc.
3. Ductmate Ind., Inc.
4. United McGill Corp.

2.03 TURNING VANES

A. Acoustic Turning Vanes: Construct of airfoil shaped aluminum extrusions with perforated faces and fiberglass fill.

B. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.

1. Air Filter Corp.
2. Anemostat Products Div., Dynamics Corp. of America.
3. Duro-Dyne Corp.
4. United McGill Corp.

2.04 MANUAL DAMPERS

A. Provide dampers of single blade (butterfly) type, constructed in accordance with SMACNA Duct Standards.

B. Provide dampers of multiple, opposed-blade type, constructed in accordance with SMACNA Duct Standards.

C. Bearings: Two piece molded synthetic.

D. Axles: 1/2" plated steel hew.

E. Control Shaft: 1/2" diameter.

F. Finish: Mill.

G. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.

1. Ruskin Mfg. Co.
2. Controlled Air, Inc.
3. United McGill Corp.

2.05 INTAKE OR EXHAUST DAMPERS

A. General: Provide low leakage, airfoil dampers; opposed blade arrangement; AMCA rated 6 CFM/sq. ft. at 4" w.g.

B. Construction

1. Frame: 6063T5 extruded aluminum hat channel 0.125 wall thickness 5" x 1" (5" x 1/2" top and bottom 12" high or less).
2. Blades: 6" wide 6063T5 heavy gage extruded aluminum airfoil shape with extruded metal (aluminum) jam seals.
3. Linkage: Concealed.
4. Operators: Control operators specified under "Controls" Section, and is work of Division 15.

C. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.

1. Construction Specialties, Inc.
2. Ruskin Mfg. Co.
3. Arrow United Industries, Inc.

2.06 FLEXIBLE CONNECTIONS

A. Fans: Provide flexible connections between fans and ducts or casings where indicated on the Drawings or required to accommodate expansion and vibration.

B. Material: Construct connections of cotton duck, minimum 20 ounces per square yard.

C. Elevated Temperature: For temperatures in excess of 100 degrees F., and corrosive, acid alkali or garage exhausts use close woven glass cloth, double neoprene coated, minimum 28 ounces per square yard.

D. Length: Limit flexible connections to 4-inch active length in the direction of airflow.

E. Standard: Construct in accordance with SMACNA Standards.

F. Attachment: Attach to fans, casings and ductwork as specified by manufacturer.

G. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
1. Vent Fabrics, Inc. or equal.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine areas and conditions under which duct accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install duct accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

B. Install turning vanes in square or rectangular 90 degree elbows in supply and exhaust air systems, and elsewhere as indicated.

C. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.

D. Coordinate with other work, including ductwork, as necessary to interface installation of duct accessories properly with other work.

E. Field quality control - operate installed duct accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leakproof performance.

END OF SECTION

DIVISION 15 - MECHANICAL
SECTION 15894 – CONTROL DAMPERS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section contains control dampers suitable for application in HVAC systems.

1.02 RELATED WORK

A. Project Manual – Air Duct Accessories (Formerly 15810 – Ducts)

B. Project Manual – HVAC Instrumentation and Controls: Actuators and Operators; Control Dampers (Formerly 15900 – HVAC Instrumentation and Controls: Connections to Actuator)

1.03 REFERENCES

A. AMCA 500-D – Laboratory Methods for Testing Dampers for Ratings

B. AMCA 511 – Certified Ratings Program for Air Control Devices

C. IECC – International Energy Conservation Code

D. ASHRAE Standard 62 – Ventilation for Acceptable Indoor Air Quality

1.04 SUBMITTALS

A. Comply with requirements of the Project Manual – Submittal Procedures.

B. Product Data: Submit manufacturer's product data.
   1. Include leakage, velocity, pressure drop and maximum pressure data
   2. Indicate materials, construction, and dimensions.
   3. Include pressure drop data for all damper sizes in accordance with AMCA 500-D test figures 5.2 (Ducted Inlet, Free Outlet), 5.3 (Ducted Inlet, Ducted Outlet) and 5.5 (Free Inlet, Free Outlet).
   4. Include a copy of Installation Instructions.

1.05 QUALITY ASSURANCE

A. Dampers shall bear the AMCA Certified Ratings Seal for Air Performance in accordance with AMCA 511 (VCD-20).

B. Dampers shall bear the AMCA Certified Ratings Seal for Air Performance Air Leakage in accordance with AMCA 511 (VCD-23, VCD-33, VCD-34, SEVCD-23 and SEVCD-33).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer, material, and location of installation.

B. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions.

C. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Greenheck, PO Box 410, Schofield, Wisconsin 54476-0410. Phone (715)359-6171. Fax (715) 355-6458. Web Site www.greenheck.com.

B. Approved Equivalent.

2.02 HVAC CONTROL DAMPERS

A. Model: VCD-42

B. Ratings:

1. Leakage: VCD-42
   Dampers shall have a maximum leakage of 6 cfm/ sq. ft. @ 4 in. wg or 3 cfm/ sq. ft. @ 1 in. wg. (VCD-42)

2. Differential Pressure:
   Dampers shall have a maximum differential pressure rating of 6 in. wg.

3. Velocity:
   Dampers shall have a maximum velocity rating of 6000 fpm.

C. Performance:

1. Pressure drop

   The Damper manufacturer's submittal data shall certify that all pressure drop data is licensed in accordance with the AMCA Certified Ratings Program for Test Figures 5.2, 5.3, and 5.5. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D. Dampers shall be labeled with the AMCA Air Performance Seal. AMCA certified pressure drop for a 24 in. wide x 24 in. high damper shall not exceed 0.06 in. wg when subjected to an airflow velocity of 1500 fpm according to AMCA Test Figure 5.3.

D. Blade Action:
   Blade action shall be opposed.

E. Construction:

1. Frame:

Damper frame shall be 16 ga. galvanized steel formed into a 5 in. x 1 in. structural hat channel. Top and bottom frame members on dampers less than 17 in. high shall be low profile design to maximize the free area of these smaller dampers. Frame shall be 4-piece construction with 1 ½ in. (minimum) integral overlapping gusset reinforcements in each corner to assure square corners and provide maximum resistance to racking.

2. Blades:

Damper blades shall be heavy gauge extruded aluminum airfoil shape with metal blade to blade overlap. Each blade shall be symmetrical relative to its axle pivot point, presenting identical performance characteristics with air flowing in either direction through the damper. Provide symmetrical blades of varying size as required to completely fill the damper opening. Blade orientation is horizontal.

3. Seals:

Blade Edge: Shall be TPE comes standard which are mechanically fastened to each blade.

Jamb: Flexible stainless steel compression type.

4. Blade Stops

Dampers of whole inch height increments shall not require blade stops. When required, individual blade stops shall occupy no more than ½ in. of the damper opening to provide maximum free area and minimal pressure loss.

5. Linkage:
Linkage shall be plated steel

6. Axles: Minimum ½ in. dia.

Axles shall be plated steel.

7. Bearings:
Axle bearings shall be synthetic (acetal) sleeve rotating in polished extruded holes in the damper frame.

2.03 ACCESSORIES

A. Actuators:

1. Type:

Electric, 24V AC, 2-position

2. Mounting location:

AAWAINTERNAL (inside of duct)

2.04 SOURCE QUALITY CONTROL

A. Factory Tests: Factory cycle damper and actuator assemblies to assure proper operation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive dampers. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization of dampers. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install dampers in accordance with manufacturer's UL Installation Instructions. Any damper installation aspect that is not in accordance with the manufacturer's UL Installation Instructions must be approved prior to installation.

B. Dampers must be accessible to allow inspection, adjustment, and replacement of components. The sheet metal contractor shall furnish any access doors in ductwork or plenums required to provide this access. The general contractor shall furnish any access doors required in walls, ceilings, or other general building construction.

C. Install dampers square and free from racking.

D. The installing contractor shall provide and install bracing for multiple section assemblies to support assembly weight and to hold against system pressure.

E. Do not compress or stretch the damper frame into the duct or opening.

F. Attach multiple damper section assemblies together in accordance with manufacturer's instructions. Install support mullions for reinforcement between assemblies as required.

G. Handle dampers using the frame or sleeve. Do not lift or move dampers using blades, actuator or jackshaft.

H. Install connections to actuators as specified in section 230923.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15895 - DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Scope: Extent of air diffuser and register work required in this Section is indicated on the Drawings and schedules and by the requirements of this Section.

B. Types required for project include the following:

1. Ceiling air diffusers.
2. Wall and duct registers and grilles.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's standard technical product data including capacity ratings, throw, drop, diffusion, terminal velocities, noise levels, adjustability, construction details, finish and mounting details.

B. Shop Drawings.

1. Provide dimensioned shop drawings of linear diffuser mounting, plenum dimensions, plenum connections, damper connections and branch ductwork connections.

a. Draw shop drawings showing plans, sections, mounting details and finishes.
b. Furnish certified test data, including acoustical performance of the air troffer/boot combination with maximum air quantities indicated on the drawings.

C. Schedule: Submit a schedule of proposed air diffusers, registers and grilles, keyed to the Contract Drawings and indicating the proposed type, size, air quantity, pressure drop and location of each device proposed under this Contract.

1. Manufacturer: Same for all diffusers and registers on project.

1.03 QUALITY ASSURANCE

A. ASHRAE: Test and rate air outlets and inlets in certified laboratories under the requirements of ASHRAE Standard 70.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Original Containers: Deliver air diffusers and registers to the site in manufacturer's original containers. Identify on outside of container type and location to be installed.

B. Protect From Damage: Do not install bent, marred or damaged devices. Replace with new. Store indoors, where possible, or outdoors in weatherproof enclosures above grade.

PART 2 - PRODUCTS

2.01 AIR DIFFUSERS AND REGISTERS: GENERAL

A. Construction: Provide devices as specified on drawinngs.

1. Treat steel with zinc phosphate or zinc chromate after fabrication.
2. Grind, polish and factory prime.
3. Factory finish with white baked enamel finish, unless otherwise indicated.
4. Roll or reinforce exterior faces and edges.
5. Ensure mitered joints and butt connections mate within 0.010-inch maximum crack.
6. Surface finish: Smooth within 0.005-inch at welds, joints, clamping points and splices.
7. Offsets and bends: Mitered.
8. Mate devices with the associated duct, plenum or boot to form an airtight joint.

B. Provide as scheduled on Drawings.

2.02 SUPPLY OR RETURN REGISTERS

A. Register Type: Adjustable single or double-deflection type, formed steel or extruded aluminum, as indicated on the Drawings; noise levels of NC 20 or less.

B. Bars: Provide adjustable or fixed face bars and fixed rear bars, as indicated by types on Drawings.

C. Frames: Provide stamped or rolled steel or extruded aluminum frames fitted with felt, neoprene or plastic gaskets.

D. Dampers: If indicated on drawings provide register dampers of formed steel, cadmium plated, gang key operated, opposed blade type, and arranged so that the operating mechanism does not project through any part of the register face.

E. Mounting Hardware: Provide round or countersunk head Phillips screws.

F. Air Extractors: Provide 18 gage frames, 22 gage curved steel blades, fixed pattern, screwed to the duct collar, and sized to match register dimensions.

G. Manufacturer: Subject to compliance with requirements, provide registers of one of the following:

1. Titus Products.
2. Anemostat Products Division, Dynamics Corp.
3. Carnes Co., Division of Wehr Corp.

2.03 RETURN GRILLES

A. Construction: Construct as specified for registers, except omit register damper.

B. Bars: Provide fixed horizontal face bars with 1/2-inch spacing and 35 degree downward blade angle.

C. Filters: If indicated on drawings provide 1-inch throw-away filters for return grilles.

D. Manufacturer: Subject to compliance with requirements, provide grille units of one of the following:

1. Titus Products.
2. Anemostat Products Division, Dynamics Corp.
3. Carnes Co., Division of Wehr Corp.

2.04 CEILING DIFFUSERS

A. Ceiling Diffusers: Provide circular, square or rectangular, as indicated on the Drawings; noise levels as indicated on drawings.

B. Diffuser Edge and Framing Details: Compatible with the type of ceilings in which the diffuser is installed. For plaster ceiling provide plaster frames or plaster rings, set flush with finished ceiling.

C. Materials: Refer to drawings.

D. Access: Provide removable internal parts of circular, square or rectangular diffusers, including volume regulators, diffuser face, dampers and equalizing devices.

1. Allow removal of parts, including internal assembly, without the use of special tools.
2. Do not allow removal of diffuser face to disturb the distribution pattern.

E. Finish: Provide baked enamel finish on visible face. Coordinate color with Architect.

1. Interior and concealed parts: Flat black or dark gray.

F. Adjustable Pattern: Provide adjustable pattern diffuser cones to vary the distribution from horizontal parallel to the ceiling to a downward distribution pattern into the space, not on exposed face.

G Pressure Range: Design to allow equal distribution pattern, both horizontal and vertical, for diffusers with pressure drops from 0.10 to 0.40 inches water gage.

H. Dampers, Diffusers, and Extractors: Products of the same manufacturer.

I. Extractors: Provide adjustable extractors, furnished by the diffuser manufacturer, in each ceiling diffuser where indicated on drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Coordination: Coordinate the location of grilles, registers and diffusers with other trades. Examine areas and conditions under which inlets and outlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Examine architectural floor plans, reflected ceiling plans and elevations and arrange for duct taps to be so placed that the installation of air outlets will present a uniform relationship with architectural features, lighting, sprinkler heads, speakers and smoke detectors.
2. On plain walls, if not otherwise indicated, locate sidewall registers approximately 8 inches down from the finished ceilings.
3. Adjust the face and rear bars of supply registers to provide a diffusion pattern such that the terminal velocity point is approximately 70 percent of the "room" width and 5 to 6 feet above the finished floor, at a velocity of 20 to 50 fpm.
4. On projects with reflected ceiling plans, locate outlets to conform to that plan.
5. If no reflected ceiling plans are included in the Contract Documents, coordinate the location of air outlets with other trades before cutting in ceiling and sidewall taps. Provide coordination drawing in shop drawings.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15920 - SOUND ATTENUATORS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of sound attenuator work is indicated by drawings and schedules, and by work of this Section.

B. Types: Types of sound attenuators specified in this Section include the following:

1. Duct sound attenuators

C. Refer to Ductwork section and Testing and Balancing sections.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model, clearly indicating dimensions, weights (shipping and installed), dynamic insertion loss in each octave band, and pressure drop for each attenuator and sound trap.

B. Shop Drawings: Submit shop drawings showing unit dimensions, details, method of assembly of components, and field connection details.

1.03 QUALITY ASSURANCE

A. Provide attenuators which have been designed and tested in accordance with ASTM E 477, "Standard Test Method for Measuring Acoustical and Air Flow Performance of Duct Liner Materials and Prefabricated Silencers".

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver units with factory installed packing and protective containers.

B. Handle units carefully to prevent damage to components and finish. Do not install damaged components; replace with new.

C. Protect units from weather, dirt, construction traffic and debris, etc.

PART 2 - PRODUCTS

2.01 DUCT SOUND ATTENUATORS

A. General: Provide sound attenuators of the prefabricated factory made type.

1. Provide sound attenuators conforming to the requirements indicated on the Drawings.
2. Contractor may substitute rectangular for cylindrical units and vice versa, provided total pressure drop does not exceed that specified, space is available, and there is no additional cost to Owner.

B. Ratings: Provide sound attenuators with ratings and capacities not less than those shown on the Drawings.

1. Include certified performance data from an independent acoustical testing laboratory, not affiliated with the manufacturer, for each sound attenuator furnished.
2. Test data: Show dynamic insertion loss, air flow regenerated noise and static pressure drop.
3. Tests: Employ the "duct to reverberant room" method to eliminate all effects of end reflection, directivity, standing waves and test chamber sound absorption.
4. Perform pressure drop tests on the same units at the same time acoustical tests are performed.

C. Construction: Construct sound attenuators to form rigid units that will not pulsate, vibrate, rattle or otherwise react to system pressure variations.

1. Do not use mechanical fastenings which may loosen, such as nuts, bolts and sheet metal screws in unit assemblies.
2. Lock-form and seal construction joints, or continuously weld.

D. Requirements: Zinc-coat outer casings and all metal parts of attenuators.

1. Casings for rectangular units, No. 22 gage minimum.
2. Casings for round attenuators, as follows:

CASING DIAMETER IN INCHES MS SHEET METAL GAGE

Up to 24” 22 gage minimum
a. thru 40” 20 gage minimum
b. thru 52” 18 gage minimum
c. thru 60” 16 gage minimum

3. Round casings fabricated of spiral lock seam duct may be two gages lighter than that indicated.
4. Design interior partitions and baffles to minimize aerodynamic losses, No. 22 MS gage sheet metal minimum.
5. Perforations in the sheet metal forming cells and baffles generally 1/8-inch diameter maximum.
6. Units: Airtight when tested under 200 percent of the associated fan static pressure or 6 inches water gage static pressure, whichever is greater.

E. Compress interior packing sufficiently so that cells are free of voids, settling minimized, and density compressed to not less than 4 pounds per cubic foot.

F. Flame Spread: Provide adhesives, sealers, packing material and all other accessory materials with fire ratings not exceeding 25 for flame spread and 50 for smoke developed as determined in conformance with ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials."

PART 3 - EXECUTION

3.01 INSTALLATION

A. Manufacturer: Install sound attenuators in accordance with the equipment manufacturer's written instructions.

B. Duct Attenuator Location: In general, locate duct attenuators as shown on Drawings, or between the fan of the system serving the attenuator and the terminal or outlet closest to the fan.

1. On return air systems without fans, locate the sound attenuator between the return air inlet and the air handling apparatus.
2. Where possible, locate the sound attenuator so that it straddles the wall of the mechanical equipment room where the noise is generated and the adjacent space.
3. Locate the major portion of the attenuator outside the room in which the sound is generated.
4. Pack the annular space or clearance between the attenuator and the wall with fiberglass to a density of 4 pounds per cubic foot and sealed with a firestop.

C. Provide duct connections between sound attenuators and connecting ducts with companion angles welded or riveted to the attenuator and adjacent ductwork.

1. Sheet metal screw connections, not permitted.
2. Companion flanges: Gasketed and bolted utilizing vibration-proof aircraft type bolts and nuts.

D. Methods of Suspension of Sound Attenuators: Conform to the requirements specified by the manufacturer.

1. Carry floor supported attenuators on light weight structural steel angles, arranged so that the outer casing of the attenuator will not need drilling or penetrating in any manner. Paint steel supports with one coat glossy black, or as otherwise indicated.

E. Suspended Units: Provide with factory installed suspension hooks or lugs securely attached to the attenuator frame and of sufficient quantity and spacing to preclude deflection or distortion, when suspended from the structure.

1. Reinforce units with cross angles or trapeze angles to provide a rigid means of suspension.

2. Do not cut, drill, or otherwise field penetrate attenuators.

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15990 – HVAC TESTING, ADJUSTING AND BALANCING

PART 1 – GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Scope: Extent of HVAC testing, adjusting and balancing work required by this Section is indicated on the drawings, in schedules, and by the requirements of this Section.

B. Testing, Adjusting and Balancing (TAB) contractor to meet or exceed all uniform code testing requirements. (e.g. ASHRAE, ASME, IMC, Etc.)

C. Systems: Testing, adjusting and balancing specified in this Section includes the following systems:

1. Air systems including supply, return and exhaust.
2. Hydronic systems including heating, chilled water.

D. Related Sections: Refer to other Division 15 sections for:

1. Fans
2. Air Terminal Units
3. Pumps
4. Hydronic Piping Systems
5. Ductwork
6. Boilers
7. Chillers and Cooling Towers

1.02 QUALITY ASSURANCE

A. Agency Qualifications

1. The qualifications of the TAB contracting firms shall be submitted, within 30 days of notice to proceed. Recent projects shall be listed and described for the company. Names and telephone numbers of the project contractors and facility managers will be provided.

2. The Owner must approve in writing the qualifications of both the company and the lead technician.

3. Qualifications of TAB Firm Personnel:

1. A minimum of one professional engineer with current registration is required to be in the permanent employment of the firm for supervision and direction in the work performed. This engineer shall be totally responsible for developing job site data as required for test procedures.

2. All personnel used on job site shall be either professional engineer or technicians, who shall have been permanent, full-time employees of firm for a

minimum of six (6) months prior to start of work for that specified project.

3. The qualifications of the TAB lead site technician who will remain on site during all TAB work, within 30 days of notice to proceed. Recent projects shall be listed and described for the company. Names and telephone numbers of the project contractors and facility managers will be provided.

4. The Owner must approve in writing the qualifications of both the company and the lead technician.

B. Tester's Qualifications: A specialist certified by the National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC) with at least 3 years of experience in those testing, adjusting and balancing requirements similar to those required for this project, who is not the installer of the system to be tested and is otherwise independent of the project.

C. Codes and Standards: Provide testing, adjusting and balancing conforming to American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), American National Standards Institute (ANSI), and either NEBB or AABC the following:

1. American National Standards Institute (ANSI): Comply with the following:

a. S1.4Specification For Sound Level Meters
b. S1.11Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters

2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): Comply with ASHRAE recommendations pertaining to measurements, instruments, and testing, adjusting, and balancing.

3. NEBB or AABC: Comply with NEBB'S "Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems" or comply with AABC MN-1 "National Standards," as applicable to mechanical air and hydronic distribution systems, and associated equipment and apparatus.

D. Calibration of Testing Instruments: All measurement instruments used for testing, adjusting, balancing, and commissioning shall be calibrated. The time between the most recent calibration data and the final test report date shall not be over 1 year.

1.03 SUBMITTALS

A. Test Reports: Provide certified test reports, signed by the test and balance supervisor who performed the work. The final reports shall include identification and types of instruments used, and their most recent calibration date and calibration date.

B. Standards: Deliver a copy of either NEBB or AABC standards for testing and balancing work associated with the project. This document shall serve as specific guidance to balancers as to minimum requirements.

C. Maintenance Data: Include, in maintenance manuals, copies of balance test reports and identification of instruments.

D. Qualifications: Submit the individual qualifications of all persons responsible for supervising and performing the actual work.

1.04 AGENDA

A. Agenda: A preliminary report and agenda shall be submitted and approved prior to the start of testing and balancing work.

1. Review Drawings and Specifications prior to installation of any of the affected systems, and submit a report indicating any deficiencies in the systems that would preclude the proper adjusting, balancing, and testing of the systems.

2. The agenda shall include a general description of each air and water system with its associated equipment and operation cycles for heating, intermediate, and cooling.

3. The agenda shall include a list of all air and water flow and air terminal measurements to be performed.

4. The agenda shall incorporate the proposed selection points for sound measurements, including typical spaces as well as sound sensitive areas.

5. The agenda shall also include specific test procedures and parameters for determining specified quantities (e.g. flow, drafts, sound levels) from the actual field measurements to establish compliance with contract requirements. Samples of forms showing application of procedures and calculations to typical systems shall be submitted.

6. Specific test procedures for measuring air quantities at terminals shall specify type of instrument to be used, method of instrument application (by sketch) and factors for:

a. Air terminal configuration.
b. Flow direction (supply or exhaust).
c. Velocity corrections.
d. Effective area applicable to each size and type of air terminal.
e. Density corrections.

7. The agenda shall include identification and types of measurement instruments to be used, and their most recent calibration date and calibration date.

1.05 JOB CONDITIONS

A. General: Do not proceed with testing, adjusting and balancing work until the following conditions have been met.

1. Work has been completed and is operable. Ensure that there is no latent residual work yet to be completed on the tested equipment.

2. Work scheduled for testing, adjusting and balancing is clean and free from debris, dirt and discarded building materials.

3. All architectural openings (doors, windows, and other openings) which may affect the operation of the system to be tested, adjusted, and balanced shall at their normal states.

4. All related mechanical systems which may affect the operation of the system to be tested, adjusted, and balanced shall be at their normal operating conditions. Coordinate tests with Controls Contractor.

5. Air handling unit filters are not "loaded"; Mechanical Contractor shall replace, if required, prior to balancing.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

A. Material: Seal, patch and repair ductwork, piping and equipment drilled or cut for testing purposes.

1. Plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2. Piping shall be capped with materials the same as the piping system.
3. Insulation shall be neatly hemmed with metal or plastic

2.02 TEST INSTRUMENTS

A. Standards: Utilize instruments and equipment of type, precision, and capacity as recommended in the following standards:

1. NEBB "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

2. AABC Manual MN-1, "AABC National Standards".

B. Test Instruments: All instruments used for measurements shall be accurate and calibration histories for each instrument shall be available for examination. Each test instrument shall be calibrated by an approved laboratory or by the manufacturer. Owner's representative has the right to request instrument recalibration, or the use of other instruments and test methodology, where accuracy of readings is questionable.

C. Additional Instruments: Permanently installed measuring instruments , such as temperature and pressure gauges, shall be checked against transfer standard instruments. Any instrument which does not meet specification requirement shall be replaced or recalibrated.

D. Cone Instruments: Employ manufactured enclosure type cones, capable of air volume direct readings, for all diffuser air flow measurements. The readout meters shall meet calibration requirements.

PART 3 - EXECUTION

3.01 PROCEDURES AND INSTRUMENTS, GENERAL

A. Requirements: All systems and components thereof shall be adjusted to perform as required by drawings and specifications.

B. Test Duration: Operating tests of heating and cooling coils, fans, and other equipment shall be of not less than four hours duration after stabilized operating conditions have been established. Capacities shall be based on temperatures and air and water quantities measured during such tests.

C. Instrumentation: Method of application of instrumentation shall be in accordance with the approved agenda.

1. All instruments shall be applied in accordance with the manufacturer's certified instructions.

2. All labor, instruments, and appliances required shall be furnished by the balancer. Permanently installed instruments used for the tests (e.g., flow meters and Btu meters) shall not be installed until the entire system has been cleaned and ready for operation.

3.02 AIR SYSTEM PROCEDURES

A. Adjustments: Adjust all air handling systems to provide approximate design air quantity to or through, each component, and to maintain stable and comfortable interior temperatures, free of drafts or stagnant conditions. Adjusting and balancing of all systems shall be conducted during periods of the year approximating maximum seasonal operation. Verify operating parameters prior to start of balancing. Laboratory doors shall be closed and fume hood sashes full open, and all other ancillary systems in simultaneous operation. Coordinate with automatic control system operation.

B. Balance: Flow adjusting (volume control) devices shall be used to balance air quantities (i.e., proportion flow between various terminals comprising system) to the extent that their adjustments do not create objectionable air motion or sound (i.e., in excess of specified limits).

1. Balancing between runs (submains, branch mains, and branches) generally shall be accomplished by flow regulating devices at, or in, the divided-flow fitting.

2. Restriction imposed by flow regulating devices in or at terminals shall be minimal. Final measurements of air quality shall be made after the air terminal has been adjusted to provide the optimum air patterns of diffusion.

C. Fan Adjustment: Total air system quantities, generally, shall be varied by adjustment of fan speeds or axial-flow fan wheel blade pitch. Damper restriction of a system's total flow may be used only for systems with direct-connected fans (without adjustable pitch blades), provided system pressure is less than 1/2-inch W.G. and sound level criteria is met.

D. Air Measurement: Where air quantity measuring devices are specified in other sections such systems shall be used as a cross-check of portable measuring equipment.

1. Except as specifically indicated herein, pitot tube traverses shall be made of each duct to measure air flow therein. Pitot tubes, associated instruments, traverses, and techniques shall conform to the ASHRAE "Handbook Fundamentals Inch Pound Edition."

2. For ducts serving modular office areas with movable partitions, which are subject to change, pitot tube traverses may be omitted provided the duct serves only a single room or space and its design volume is less than 2000 cfm. In lieu of pitot tube traverses, air flow in the duct shall be determined by totalling volume of individual terminals served, measured as described herein.

3. Where duct's design velocity and air quantity are both less than 1000 (fpm/cfm), air quantity may be determined by measurements at terminals served.

E. Test Holes: Test holes shall be in a straight duct, as far as possible downstream from elbows, bends, take-offs, and other turbulence generating devices, to optimize reliability of flow measurements.

F. Air Terminal Balancing: Generally, measurement of flow rates by means of velocity meters applied to individual terminals, with or without cones or other adapters, shall be used only for balancing. Measurement of air quantities at each type of air terminal (inlet and outlet) shall be determined by the method approved for the balancing agenda.

G. Air Motion: Air motion and distribution shall be as specified and indicated on Drawings.

3.03 WATER SYSTEM PROCEDURES

A. Adjustment: All heating, cooling and condensing water systems shall be adjusted to provide required quantity to or through each

component. Verify operating parameters prior to start of balancing.

B. Metering: Water quantities and pressures shall be measured with calibrated meters.

1. Venturi tubes, orifices, or other metering fittings and pressure gauges shall be used to measure water flow rates and balance systems. Systems shall be adjusted to provide the approved pressure drops through the heat transfer equipment (coils [except room units], converters, etc.) prior to the capacity testing.

2. Where flow metering fittings are not installed, in air/water type heat transfer equipment, flow balance shall be determined by measuring the air side energy differential across the heat transfer equipment. Measurement of water temperature differential shall be performed with the air system, adjusted as described herein, in operation.

C. Automatic Controls: Automatic control valves shall be positioned for full flow through the heat transfer equipment of the system during tests.

D. Flow: Flow through bypass circuits at three-way valves shall be adjusted to equal that through the supply circuit, when the valve is in the bypass position.

E. Distribution: Adjustment of distribution shall be effected by means of balancing devices (cocks, valves, and fittings) and automatic flow control valves as provided; service valves shall not be used.

1. Where automatic flow control valves are utilized in lieu of Venturi tubes, only pressure differential need be recorded, provided that the pressure is at least the minimum applicable to the tag rating.

F. Special Procedures: Where available pump capacity (as designed) is less than total flow requirements of individual heat transfer units of system served, full flow may be simulated by the temporary restriction of flow to portions of the system; specific procedures shall be delineated in the agenda.

3.04 HEAT EXCHANGER CAPACITY VERIFICATION

A. Air coil capacities shall be verified from air side measurement data. Capacities of coils shall be the difference of the energy carried by the air between the up stream and down stream of the coils.

B. The measured air flow rate for the fan may be used for air coil capacity calculations providing no ducted bypassing of coil is occurring.

C. Capacity verifications shall be performed after air and water systems have been balanced. Heat exchangers using steam as the

exchange medium shall have the steam measured and adjusted to the specified pressure.

D. False load shall be applied if the upstream air or water does not meet the specified conditions at the time of test.

3.05 REPORTS

A. Submittals: Three copies of the reports described herein, covering air and water system performance, air motion (fpm), and sound pressure levels, shall be submitted prior to final tests and inspection.

B. Instrument Records: Types, serial numbers, and dates of calibration of all instruments shall be included.

C. Reports: Reports shall conspicuously identify items not conforming to contract requirements, or obvious malfunction and deficiencies.

3.06 AIR SYSTEM DATA

A. Report: The report shall include for each air handling system the data listed below.

1. Equipment (Fan or Factory Fabricated Station Unit):

a. Installation data

1. Manufacturer and model
2. Size
3. Arrangement, discharge and class
4. Motor hp, voltage, phase, cycles, and full load amps
5. Location and local identification data

b. Design data

1. Data listed in schedules on drawings and specifications.

c. Fan recorded (test) data

1. cfm
2. Static pressure
3. rpm
4. Motor operating amps motor operating bhp

2. Duct Systems:

a. Duct air quantities (maximum and minimum) - main, submains, branches, outdoor (outside) air, total air, and exhaust

1. Duct size(s)
2. Number of Pitot tube (pressure measurements)

3. Sum of velocity measurements (Note: Do not add pressure measurements)
4. Average velocity
5. Recorded (test) cfm design cfm

b. Individual air terminals

1. Terminal identification supply or exhaust, location and number designation
2. Type size, manufacturer and catalog identification applicable factor for application, velocity, area, etc., and designated area
3. Design and recorded velocities- fpm (state "core," "inlet," etc., as applicable)
4. Design and recorded quantities -cfm deflector vane or diffusion cone settings

3.07 WATER SYSTEM DATA

A. Report: The certified report for each water system shall include the data listed below.

1. Pumps:

a. Installation data

1. Manufacturer and model
2. Size
3. Type drive
4. Motor hp, voltage, phase, and full load amps

b. Design data

1. gpm
2. Head
3. rpm, bhp, and amps

c. Recorded data

1. Discharge pressures (full-flow and no-flow)
2. Suction pressures (full-flow and no-flow) operating head
3. Operating gpm (from pump curves if metering is not provided) no-load amps (where possible)
4. Full-flow amps
5. No-flow amps

2. Air Heating and Cooling Equipment:

a. Design data

1. Load in Btu or MBh
2. gpm

3. Entering and leaving water temperature
4. Entering and leaving air conditions (DB and WB)

b. Recorded data

1. Type of equipment and identification (location or number designation)
2. Entering and leaving air conditions (DB and WB)
3. Entering and leaving water temperatures

3. Water Chilling Units:

a. Installation data

1. Manufacturer and model
2. Motor hp, voltage, cycles, phase, and full load amps
3. Part load amperes
4. gpm - chiller and condenser
5. Water pressure drop - chiller and condenser
6. Entering and leaving water temperature - chiller and condenser

b. Recorded data (chiller and condenser)

1. gpm
2. Water pressure drop
3. Entering and leaving water temperature
4. Amperes

3.08 FINAL COMMISSIONING TESTS, INSPECTIONS AND ACCEPTANCE

A. Scope: Test shall be made to demonstrate that capacities and performance of air and water systems comply with contract requirements.

1. At the time of final inspection, recheck random selection of data (water and air quantities, air motion, and sound levels) recorded in the balancing report. All laboratories shall be rechecked for satisfactory air flow and motion on vicinity of and through hoods.

2. Points and areas for recheck shall be selected by the Owner's Representative.

3. Measurement and test procedures shall be the same as approved for work forming basis of certified report.

4. Selections for recheck (specific plus random), in general, will not exceed 25 percent of the total number tabulated in the report, except that special air systems may require a complete recheck for safety reasons.

B. Retests: If random tests elicit a measured flow deviation of 10 percent or more from, or a sound level of 2 db or more greater than, that recorded in the report listings, as 10 percent or more of the rechecked selections, the report shall be automatically

rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new certified reports submitted, and new inspection tests made, all at no additional cost.

C. Marking of Settings: Following final acceptance of balance reports, the settings of all valves, splitters, dampers, and other adjustment devices shall be permanently marked so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15995 MECHANICAL SYSTEMS COMMISSIONING

PART 1 – GENERAL

1.01 DESCRIPTION

A. The purpose of this section is to specify Division 15 responsibilities in the commissioning process.

B. The systems to be commissioned are listed in Section 01810 Commissioning.

C. Commissioning requires the participation of Division 15 to ensure that all systems are operating in a manner consistent with the Contract Documents. The general commissioning requirements and coordination are detailed in Division 17. Division 15 shall be familiar with all parts of Division 17 and the commissioning plan issued by the CA and shall execute all commissioning responsibilities assigned to them in the Contract Documents.

1.02 RESPONSIBILITIES

A. Mechanical, Controls and TAB Contractors. The commissioning responsibilities applicable to each of the mechanical, controls and TAB contractors of Division 15 are as follows (all references apply to commissioned equipment only):

1. Construction and Acceptance Phases

a. Include and itemize the cost of commissioning in the contract price.

b. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, O&M data and training.

c. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Cx process.

d. Contractors shall provide the CA with normal cut sheets and shop drawing submittals of commissioned equipment.

e. Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures.

1. Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation, start-up and

checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent.

2. The Commissioning Agent may request further documentation necessary for the commissioning process.

3. This data request may be made prior to normal submittals.

f. Provide a copy of the O&M manuals and submittals of commissioned equipment, through normal channels, to the CA for review and approval.

g. Contractors shall assist (along with the design engineers) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.

h. Provide limited assistance to the CA in preparing the specific functional performance test procedures. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.

i. Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the construction checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup. Refer to Section 01810 Commissioning for further details on start-up plan preparation.

j. During the startup and initial checkout process, execute the mechanical-related portions of the construction checklists for all commissioned equipment.

k. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.

l. Address current A/E punch list items before functional testing. Air and water TAB shall be completed with discrepancies and problems remedied before functional testing of the respective air- or water-related systems.

m. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

n. Provide skilled technicians to perform functional performance testing under the direction of the CA for specified equipment in Section 01810. Assist the CA in interpreting the monitoring data, as necessary.

o. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, OR and A/E and retest the equipment.

p. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

q. During construction, maintain as-built red-line drawings for all drawings and final CAD as-builts for contractor-generated coordination drawings. Update after completion of commissioning (excluding deferred testing).

r. Provide training of the Owner's operating staff using expert qualified personnel, as specified.

s. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

2. Warranty Period

a. Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.

b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

B. Mechanical Contractor. The responsibilities of the HVAC mechanical contractor, during construction and acceptance phases in addition to those listed in (A) are:

1. Provide startup for all HVAC equipment, except for the building automation control system.

2. Assist and cooperate with the TAB contractor and CA by:

a. Putting all HVAC equipment and systems into operation and continuing the operation during each working day of TAB and commissioning, as required.

b. Including cost of sheaves and belts that may be required by TAB.

c. Providing test holes in ducts and plenums where directed by TAB to allow air measurements and air balancing. Providing an approved plug.

d. Providing temperature and pressure taps according to the Construction Documents for TAB and commissioning testing.

3. Install a P/T plug at each water sensor, which is an input point to the control system.

4. List and clearly identify on the as-built drawings the locations of all airflow stations.

5. Prepare a preliminary schedule for Division 15 pipe and duct system testing, flushing and cleaning, equipment start-up and TAB start and completion for use by the CA. Update the schedule as appropriate.

6. Notify the OR or CA depending on protocol, when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and TAB will occur. Be responsible to notify the OR or CA, ahead of time, when commissioning activities not yet performed or not yet scheduled will delay construction. Be proactive in seeing that commissioning processes are executed and that the CA has the scheduling information needed to efficiently execute the commissioning process.

C. Temperature Controls Contractor. The commissioning responsibilities of the Temperature Controls Contractor, during construction and acceptance phases in addition to those listed in (A) are:

1. Sequences of Operation Submittals. The Temperature Controls Contractor's submittals of control drawings shall include complete detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications. They shall include:

a. An overview narrative of the system (1 or 2 paragraphs) generally describing its purpose, components and function.

b. All interactions and interlocks with other systems.

c. Detailed delineation of control between any packaged controls and the building automation system, listing what points the BAS monitors only and what BAS points are control points and are adjustable.

d. Written sequences of control for packaged controlled equipment. (Equipment manufacturers' stock sequences may be included, but will generally require additional narrative).

e. Start-up sequences.

f. Warm-up mode sequences.

g. Normal operating mode sequences.

h. Unoccupied mode sequences.

i. Shutdown sequences.

j. Capacity control sequences and equipment staging.

k. Temperature and pressure control: setbacks, setups, resets, etc.

l. Detailed sequences for all control strategies, e.g., economizer control, optimum start/stop, staging, optimization, demand limiting, etc.

m. Effects of power or equipment failure with all standby component functions.

n. Sequences for all alarms and emergency shut downs.

o. Seasonal operational differences and recommendations.

p. Initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.

q. Schedules, if known.

r. To facilitate referencing in testing procedures, all sequences shall be written in small statements, each with a number for reference. For a given system, numbers will not repeat for different sequence sections, unless the sections are numbered.

2. Control Drawings Submittal

a. The control drawings shall have a key to all abbreviations.

b. The control drawings shall contain graphic schematic depictions of the systems and each component.

c. The schematics will include the system and component layout of any equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.

d. Provide a full points list with at least the following included for each point:

1. Controlled system
2. Point abbreviation
3. Point description
4. Display unit
5. Control point or setpoint (Yes / No)
6. Monitoring point (Yes / No)
7. Intermediate point (Yes / No)
8. Calculated point (Yes / No)

a. Key:
b. Point Description: DB temp, airflow, etc.
c. Control or Setpoint: Point that control equipment and can have its setpoint changed (OSA, SAT, etc.)

d. Intermediate Point: Point whose value is used to make a calculation which then controls equipment (space temperatures that are averaged to a virtual point to control reset).
e. Monitoring Point: Point that does not control or contribute to the control of equipment, but is used for operation, maintenance, or performance verification.
f. Calculated Point: "Virtual" point generated from calculations of other point values.

The Temperature Controls Contractor shall keep the CA informed of all changes to this list during programming and setup.

3. An updated as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal.

4. Assist and cooperate with the TAB contractor in the following manner:

   a. Meet with the TAB contractor prior to beginning TAB and review the TAB plan to determine the capabilities of the control system toward completing TAB. Provide the TAB any needed unique instruments for setting terminal unit boxes and instruct TAB in their use (handheld control system interface for use around the building during TAB, etc.).

   b. For a given area, have all required construction checklists, calibrations, startup and selected functional tests of the system completed and approved by the CA prior to TAB.

   c. Provide a qualified technician to operate the controls to assist the TAB contractor in performing TAB, or provide sufficient training for TAB to operate the system without assistance.

5. Assist and cooperate with the CA in the following manner:

   a. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system. Assist in the functional testing of all equipment. Provide two-way radios during the testing.

   b. Execute all control system trend logs.

6. The Temperature Controls Contractor shall prepare a written plan indicating in a step-by-step manner, the procedures that will be followed to test, checkout and adjust the control system prior to functional performance testing, according to the process in Section 01810 Commissioning. At minimum, the plan shall include for each type of equipment controlled by the automatic controls:

   a. System name.

b. List of devices.

c. Step-by-step procedures for testing each controller after installation, including:

1. Process of verifying proper hardware and wiring installation.

2. Process of downloading programs to local controllers and verifying that they are addressed correctly.

3. Process of performing operational checks of each controlled component.

4. Plan and process for calibrating valve and damper actuators and all sensors.

5. A description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.

d. A copy of the log and field checkout sheets that will document the process. This log must include a place for initial and final read values during calibration of each point and clearly indicate when a sensor or controller has "passed" and is operating within the contract parameters.

e. A description of the instrumentation required for testing.

f. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the CA and TAB contractor for this determination.

7. Provide a signed and dated certification to the CA and OR upon completion of the checkout of each controlled device, equipment and system prior to functional testing for each piece of equipment or system, that all system programming is complete as to all respects of the Contract Documents, except functional testing requirements.

8. Beyond the control points necessary to execute all documented control sequences, provide monitoring, control and virtual points as specified in Section 15950.

9. List and clearly identify on the as-built duct and piping drawings the locations of all static and differential pressure sensors (air, water and building pressure).

D. TAB Contractor. The duties of the TAB contractor, in addition to those listed in (A) are:

1. Six weeks prior to starting TAB, submit to the OR the qualifications of the site technician for the project, including the name of the contractors and facility managers of recent projects the technician on which was lead. The Owner will approve the site technician's qualifications for this project.

2. Submit the outline of the TAB plan and approach for each system and component to the CA, OR and the Temperature Controls Contractor six weeks prior to starting the TAB. This plan will be developed after the TAB has some familiarity with the control system.

3. The submitted plan will include:

   a. Certification that the TAB contractor has reviewed the construction documents and the systems with the design engineers and contractors to sufficiently understand the design intent for each system.

   b. An explanation of the intended use of the building control system. The Temperature Controls Contractor will comment on feasibility of the plan.

   c. All field checkout sheets and logs to be used that list each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.

   d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.

   e. Final test report forms to be used.

   f. Detailed step-by-step procedures for TAB work for each system and issue: terminal flow calibration (for each terminal type), diffuser proportioning, branch / submain proportioning, total flow calculations, rechecking, diversity issues, expected problems and solutions, etc. Criteria for using air flow straighteners or relocating flow stations and sensors will be discussed. Provide the analogous explanations for the water side.

   g. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.

   h. Details of how *total* flow will be determined (Air: sum of terminal flows via BAS calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations. Water: pump curves, circuit setter, flow station, ultrasonic, etc.).

   i. The identification and types of measurement instruments to be used and their most recent calibration date.

   j. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and provide methods to verify this.

   k. Confirmation that TAB understands the outside air ventilation criteria under all conditions.

l. Details of whether and how minimum outside air cfm will be verified and set, and for what level (total building, zone, etc.).

m. Details of how building static and exhaust fan / relief damper capacity will be checked.

n. Proposed selection points for sound measurements and sound measurement methods.

o. Details of methods for making any specified coil or other system plant capacity measurements.

p. Details of any TAB work to be done in phases (by floor, etc.), or of areas to be built out later.

q. Details regarding specified deferred or seasonal TAB work.

r. Details of any specified false loading of systems to complete TAB work.

s. Details of all exhaust fan balancing and capacity verifications, including any required room pressure differentials.

t. Details of any required interstitial cavity differential pressure measurements and calculations.

u. Plan for hand-written field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).

v. Plan for formal progress reports (scope and frequency).

w. Plan for formal deficiency reports (scope, frequency and distribution).

4. A running log of events and issues shall be kept by the TAB field technicians. Submit hand-written reports of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests to the CA and OR at least twice a week.

5. Communicate in writing to the Temperature Controls Contractor all setpoint and parameter changes made or problems and discrepancies identified during TAB which affect the control system setup and operation.

6. Provide a draft TAB report within two weeks of completion. A copy will be provided to the CA. The report will contain a full explanation of the methodology, assumptions and the results in a clear format with designations of all uncommon abbreviations and column headings. The report should follow the latest and most rigorous reporting recommendations by AABC, NEBB or ASHRAE Standard 111.

7. Provide the CA with any requested data, gathered, but not shown on the draft reports.

8. Provide a final TAB report for the CA with details, as in the draft.

9. Conduct functional performance tests and checks on the original TAB.

E. Mechanical Designer. Refer to Section 01810 Commissioning for the (reference only) responsibilities of the mechanical designer.

1.03 RELATED WORK

A. Refer to Section 01810 Commissioning, for a listing of all sections where commissioning requirements are found.

B. Refer to Section 01810 Commissioning for systems to be commissioned and Section 01810 Commissioning.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Division 15 shall provide all test equipment necessary to fulfill the testing requirements of this Division.

B. Refer to Section 01810 Commissioning for additional Division 15 requirements.

PART 3 - EXECUTION

3.01 SUBMITTALS

A. Division 15 shall provide submittal documentation relative to commissioning as required in this Section Part 1, Section 01300 and Section 01810 Commissioning.

3.02 STARTUP

A. The HVAC mechanical and Temperature Controls Contractors shall follow the start-up and initial checkout procedures listed in the Responsibilities list in this section and in 17100. Division 15 has start-up responsibility and is required to complete systems and sub-systems so they are fully functional, meeting the design objectives of the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility or shift that responsibility partially to the commissioning agent or Owner.

B. Functional testing is intended to begin upon completion of a system. Functional testing may proceed prior to the completion of systems or sub-systems at the discretion of the CA and OR. Beginning system testing before full completion, does not relieve the Contractor from fully completing the system, including all construction checklists as soon as possible.

3.03 TAB

A. Refer to the TAB responsibilities in Part 1.2 above.

3.04 FUNCTIONAL PERFORMANCE TESTS

A. Refer to Section 01810 Commissioning for a list of systems to be commissioned and for a description of the process.

3.05 TESTING DOCUMENTATION, NON-CONFORMANCE AND APPROVALS

A. Refer to Section 01810 Commissioning for specific details on non-conformance issues relating to construction checklists and tests.

B. Refer to Section 01810 Commissioning for issues relating to functional performance tests.

3.06 OPERATION AND MAINTENANCE (O&M) MANUALS

A. The following O&M manual requirements do not replace O&M manual ` documentation requirements elsewhere in these specifications.

B. Division 15 shall compile and prepare documentation for all equipment and systems covered in Division 15 and deliver this documentation to the GC for inclusion in the O&M manuals, according to this section and Section 01730, prior to the training of owner personnel.

C. The CA shall receive a copy of the O&M manuals for review.

D. Special Control System O&M Manual Requirements. In addition to documentation that may be specified elsewhere, the Temperature Controls Contractor shall compile and organize at minimum the following data on the control system in labeled 3-ring binders with indexed tabs.

1. Four copies of the controls training manuals in a separate manual from the O&M manuals.

2. Operation and Maintenance Manuals containing:

a. Specific instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. These instructions shall be step-by-step. Indexes and clear tables of contents shall be included. The detailed technical manual for programming and customizing control loops and algorithms shall be included.

b. Full as-built set of control drawings (refer to Submittal section above for details).

c. Full as-built sequence of operations for each piece of equipment.

d. Full points list. In addition to the updated points list required in the original submittals (Part 1 of this section), a listing of all rooms shall be provided with the following information for each room:

1. Floor
2. Room number
3. Room name
4. Air handler unit ID
5. Reference drawing number
6. Air terminal unit tag ID

7. Heating and/or cooling valve tag ID
8. Minimum cfm
9. Maximum cfm

e. Full print out of all schedules and set points after testing and acceptance of the system.

f. Full as-built print out of software program.

g. Electronic copy on disk of the entire program for this facility.

h. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

i. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.

j. Control equipment component submittals, parts lists, etc.

k. Warranty requirements.

l. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).

3. The manual shall be organized and subdivided with permanently labeled tabs for each of the following data in the given order:
   a. Sequences of operation
   b. Control drawings
   c. Points lists
   d. Controller / module data
   e. Thermostats and timers
   f. Sensors and DP switches
   g. Valves and valve actuators
   h. Dampers and damper actuators
   i. Program setups (software program printouts)

4. Field checkout sheets and trend logs should be provided to the CA for inclusion in the Commissioning Record Book.

E. Special TAB Documentation Requirements. The TAB will compile and submit the following with other documentation that may be specified elsewhere in the *Specifications.*

1. Final report containing an explanation of the methodology, assumptions, test conditions and the results in a clear format with designations of all uncommon abbreviations and column headings.

2. The TAB shall mark on the drawings where all traverse and other critical measurements were taken and cross reference the location in the TAB report.

F. Review and Approvals. Review of the commissioning related sections of the O&M manuals shall be made by the A/E and by the CA. Refer to Section 01810 Commissioning, Part 3.8 for details.

3.07 TRAINING OF OWNER PERSONNEL

A. The GC shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed. Refer to Section 01810 Commissioning for additional details.

B. The CA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment. Refer to Section 01810 Commissioning for additional details.

C. Mechanical Contractor. The mechanical contractor shall have the following training responsibilities:

1. Provide the CA with a training plan two weeks before the planned training according to the outline described in Section 01810 Commissioning.

2. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of HVAC equipment including, but not limited to, pumps, boilers, furnaces, chillers, heat rejection equipment, air conditioning units, air handling units, fans, terminal units, controls and water treatment systems, etc.

3. Training shall normally start with classroom sessions followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.

4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.

6. The Temperature Controls Contractor shall attend sessions other than the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

7. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.

8. Training shall include:

a. Use of the printed installation, operation and maintenance instruction material included in the O&M manuals.

b. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.

c. Discussion of relevant health and safety issues and concerns.

d. Discussion of warranties and guarantees.

e. Common troubleshooting problems and solutions.

f. Explanatory information included in the O&M manuals and the location of all plans and manuals in the facility.

g. Discussion of any peculiarities of equipment installation or operation.

h. The format and training agenda in *The HVAC Commissioning Process, ASHRAE Guideline 1-1989R*, 1996 is recommended.

i. Classroom sessions shall include the use of overhead projections, slides, video/audio-taped material as might be appropriate.

9. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.

10. The mechanical contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not *controlled* by the central control system.

11. Training shall occur after functional testing is complete, unless approved otherwise by the Project Manager.

12. Duration of Training. The mechanical contractor shall provide training on each piece of equipment according to the following schedule.

Hours	System
8	Chillers and System
8	Boilers and System
3	Piping Systems
4	Chemical Treatment
12	Air Handler Units
1	Spot Unit Heaters
2	Air Terminal Units
1	Central Exhaust Systems
2	Supplementary Fans
2	Pumps
16	Controls System
16	Control system Follow-up
4	Humidifiers
4	Water Heaters

D. Temperature Controls Contractor. The Temperature Controls Contractor shall have the following training responsibilities:

1. Provide the CA with a training plan four weeks before the planned training according to the outline described in Section 01810 Commissioning, Part 3.9.

2. The Temperature Controls Contractor shall provide designated Owner personnel training on the control system in this facility. The intent is to clearly and completely instruct the Owner on all the capabilities of the control system.

3. Training manuals. The standard operating manual for the system and any special training manuals will be provided for each trainee, with three extra copies left for the O&M manuals. In addition, copies of the system technical manual will be demonstrated during training and three copies submitted with the O&M manuals. Manuals shall include detailed description of the subject matter for each session. The manuals will cover all control sequences and have a definitions section that fully describes all relevant words used in the manuals *and* in all software displays. Manuals will be approved by the CA. Copies of audiovisuals shall be delivered to the Owner.

4. The trainings will be tailored to the needs and skill-level of the trainees.

5. The trainers will be knowledgeable on the system and its use in buildings. For the on-site sessions, the most qualified trainer(s) will be used. The Owner shall approve the instructor prior to scheduling the training.

6. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

7. The Temperature Controls Contractor shall attend sessions other than the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

8. There shall be three training sessions:

    1. Training I. Control System. This training may be held on-site or in the supplier's facility. If held off-site, the training may occur prior to final completion of the system installation. Upon completion, each student, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
    2. Training II. Building Systems. The second session shall be held on-site and will consist of actual hands-on training after the completion of system

commissioning. The session shall include instruction on:

a. Specific hardware configuration of installed systems in this building and specific instruction for operating the installed system, including HVAC systems, lighting controls and any interface with security and communication systems.

b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing set points and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.

c. All trending and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends. Trainees will actually set-up trends in the presence of the trainer.

d. Every screen shall be completely discussed, allowing time for questions.

e. Use of keypad or plug-in laptop computer at the zone level.

f. Use of remote access to the system via phone lines or networks.

1. Setting up and changing an air terminal unit controller.
2. Graphics generation
3. Point database entry and modifications
4. Understanding DDC field panel operating programming (when applicable)

3. Training III. The third training (Follow-up Training) will be conducted on-site six months after occupancy. The session will be structured to address specific topics that trainees need to discuss and to answer questions concerning operation of the system.

E. TAB The TAB contractor shall have the following training responsibilities:

1. TAB shall meet for 2 hours with facility staff after completion of TAB and instruct them on the following:

a. Go over the final TAB report, explaining the layout and meanings of each data type.

b. cuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.

c. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.

d. Discuss any temporary settings and steps to finalize them for any areas that are not finished.

e. Other salient information that may be useful for facility operations, relative to TAB.

3.08 DEFERRED TESTING

A. Refer to Section 01810 Commissioning, Part 3.10 for requirements of deferred testing.

3.09 WRITTEN WORK PRODUCTS

A. Written work products of Contractors will consist of the start-up and initial checkout plan described in Section 01810 Commissioning and the filled out start-up, initial checkout and construction checklists.

END OF SECTION

DIVISION 15A – PLUMBING

SECTION 15011A – PLUMBING GENERAL PROVISIONS

PART 1 – GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. This Section contains General Provisions related specifically to the Plumbing Work.

1. Quality Assurance
2. Protection
3. Coordination and Sequencing
4. General Completion
5. Painting and Finishing
6. Excavation for Plumbing Work
7. Concrete for Plumbing Work

B. Drawings and General Provisions of Contract, including General and Supplementary Conditions, apply to this section.

1.02 GENERAL

A. This Contractor, as well as sub-contractors for his work, must carefully read the "Instructions to Bidders" and study the plans and specifications.

1. It is the intention of these specifications to provide for the furnishing and installing of the plumbing equipment complete as shown and specified. Any work or changes which may be evidently necessary to complete the installation shall be furnished by the Contractor as being included in this Contract.

2. During the course of the work, should any ambiguities or discrepancies be found in the specifications to which the Contractor has failed to call attention to before submission of his bid, then the Engineer shall interpret the intent of the specifications, and the Contractor hereby agrees to abide by the Engineer's interpretation and agrees to carry out the work in accordance with the decision of the Engineer. It is expressly stipulated that neither the instructions nor the specifications shall take precedence, one over the other, and it is further stipulated that the Engineer may interpret or construe the specifications of the work, and of that question the Engineer shall be the sole judge.

3. Where no specified kind of quality of material is given, a first class standard article as approved by the Engineer shall be furnished. The specifications do not undertake to illustrate or set forth every item necessary for the work.

4. Small details not usually shown or specified but necessary for its proper installation and finishing shall be included in the Contractor's estimate, the same as if hereby specified or shown.

1.03 QUALITY ASSURANCE

A. Laws, Permits, Inspections.

1. Comply with the latest revisions of New York State Uniform Fire Protection and Construction Code, International Plumbing Code, any Local Codes or Regulations that apply.
2. Underwriters Laboratories label required for all electrical materials carrying 50 volts or more.
3. Comply with New York State Energy Conservation Construction Code, as referenced in NYCRR.
4. Comply with N.Y. State Education Department Manual of Planning Standards.
5. Comply to requirements of drawings and specifications that are in excess of governing codes.
6. Comply with section 1621 of the New York State Building Code for seismic requirements.
7. Do not install work as specified or shown if in conflict with governing code. Notify Engineer and request direction.
8. Pay all Inspection and Permit fees.
9. Provide Certificate of Inspection from all governing authorities.

B. Reference to technical society, organization, body or section made in accordance with the following abbreviations:

1. AGA – American Gas Association
2. AIA – American Institute of Architects
3. AMCA – American Moving and Conditioning Association, Inc.
4. ANSI – American National Standards Institute.
5. ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers
6. ASME – American Society of Mechanical Engineers
7. ASTM – American Society of Testing Materials
8. AWSC – American Welding Society Code
9. AWWA – American Water Works Association
10. CS – Commercial Standard
11. FS – Federal Specification
12. IEEE – Institute of Electric and Electronics Engineers
13. NEC – National Electric Code
14. NEMA – National Electrical Manufacturer's Association
15. NFPA – National Fire Protection Association
16. NYBFU – New York Board of Fire Underwriters
17. NYCRR – Codes, Rule and Regulations of the State of New York.
18. NSF – National Sanitation Foundation
19. PDI – Plumbing and Drainage Institute.

20. SMACNA – Sheet Metal and Air Conditioning Contractors National Association
21. USASI – United States of America Standards
22. UL – Underwriters' Laboratories, Inc.

C. Contractor submission of equivalent or substitute items other than those specified is at Contractor convenience only. If a substitution or equivalent is accepted, the Contractor shall coordinate the installation of the substitute or equivalent and make all associated changes required. The Contractor also waives any claim for additional costs associated with the substitute / equivalent which becomes apparent before, during or after installation. The Contractor agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution / equivalent.

1.04 PROTECTION

A. Protect equipment from damage, including water, chemical, mechanical injury and theft.

B. Replace damaged equipment or components.

C. Close and waterproof between sleeves, openings, pipes and voids in walls, floors and foundations to prevent entrance of water or moisture.

D. Holes made in firewalls, partitions, fire stops, shall be patched to maintain fire rating integrity.

E. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris and moisture.

F. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

G. Protect flanges, fittings, and piping specialties from moisture and dirt.

H. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.05 COORDINATION AND SEQUENCING

A. Coordinate plumbing equipment installation with other building components.

B. Arrange for chases, slots and openings in building structure during progress of construction, to allow for plumbing installations.

C. Coordinate the installation of required supporting devices set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.

E. Coordinate connection of plumbing systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Section 15052A"Access to Plumbing Work."

G. Coordinate installation of identifying devices after completion of covering and painting, where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

H. Coordination with other trades: Right-of-Way as follows:

1. Light Fixtures.
2. Fire Suppression.
3. Steam and condensate piping.
4. Hot water supply and hot water return piping.
5. Drain Pipes and Vents
6. Ductwork
7. HVAC Piping
8. Domestic Water Piping
9. Electrical Conduit

1.06 GENERAL COMPLETION

A. Oiling Equipment.

1. Lubricate equipment and motors in accordance with manufacturer's requirements. Provide lubrication chart in frame mount where directed by Owner.

B. Instructions to Owner's Representative.

1. Give notice to Engineer when all systems are installed and operating.

2. Obtain name of Owner's Representative to receive instructions.

3. Schedule instructions of Owner's Representative by manufacturer's representative and instruct Owner in system

installation and operation for all equipment installed under this contract.

C. Provide Operation and Maintenance manuals in accordance with the Requirements of Division 1 "Contract Closeout" Section.

1.07 PAINTING AND FINISHING

A. Refer to Division 9, Section "Painting" for field painting Requirements.

B. Damage and Touch-up: Repair marred and damaged factory painted finishes with materials and procedures to match original factory finish.

1.08 CUTTING AND PATCHING – SEE SPECIFICATION SECTION 15060A

1.09 EXCAVATION FOR PLUMBING WORK

A. Description of Work: Types of excavation for plumbing related work specified in this section include:

1. Underground plumbing utilities and services.
2. Underground tanks and equipment enclosures.
3. Interior and Exterior water distribution systems to 5 feet outside of the building or where indicated on the plans.
4. Interior and Exterior sanitary and storm drainage systems to 5 feet outside of the building or where indicated on the plans.

B. Project Conditions.

1. Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Liabilities arising out of performance of work is responsibility of Contractor doing excavation.

2. Protect persons from injury at excavations by barricades, warnings, and illumination.

3. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install plumbing work on frozen excavation bases or sub bases.

1.10 CONCRETE FOR PLUMBING WORK

A. Types of concrete for plumbing related work specified in this section include:

1. Lean concrete backfill to support plumbing work.

2. Encasement of mechanical work.
3. Plumbing equipment foundations and housekeeping pads.
4. Inertia bases for isolation of plumbing work.
5. Rough grouting in and around plumbing work.
6. Patching concrete cuts to accommodate plumbing work.
7. Thrust block.

1.11 REBATES

A. The Division 15A Contractor shall assist the Owner in applying for any available rebates from manufacturer's, utility companies, etc. on equipment or materials installed under the contract. Provide all required documentation and assist in the completion of applications as required to complete the rebate process. All proceeds from rebates remain the property of the Owner.

PART 2 – PRODUCTS

2.01 BACKFILL MATERIALS

A. Sub base Material (Bedding): Graded mixture of gravel, sand crushed stone or crushed slag.

B. Backfill Material: Soil material free of large stones, shale, wood and similar material.

2.02 CONCRETE

A. Concrete installed by this division shall comply with Division 3 Specifications for Concrete.

PART 3 – EXECUTION

3.01 EXCAVATION - GENERAL

A. Do not excavate for plumbing work until work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum.

B. Excavate with vertical sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross bracing to sustain sides of excavation. Remove sheeting and cross bracing during backfilling wherever such removal would not endanger work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.

C. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other mechanical work to provide minimum practical but adequate working clearance.

C. Depth for direct support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand excavate bottom cut to accurate elevations, undercut at pipe hubs.

D. Depth for sub base support: For large piping (6" pipe size and larger), tanks, and where indicated for other plumbing work, excavate for installation of sub base material in depth indicated or, if not otherwise indicated, 6" below bottom of work to be supported.

E. Depth for unsatisfactory soil or rock conditions: Where directed, (because of unsatisfactory conditions at bottom of indicated excavation), excavate additional depth as directed to reach satisfactory conditions. Backfill with sub base material compacted as directed, to indicate excavation depth.

F. Store excavated material (temporarily) near excavation, in manner, which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).

1. Dispose of excavated material, which is either in excess of quantity needed for backfilling, or does not comply with requirements for backfill material.
   a. Remove unused material from project site, and dispose of it in lawful manner.

3.02 WATER CONTROL

A. Maintain dry excavations for plumbing work, by removing water. Protect excavations from inflow of surface water. Pump minor inflow of ground water from excavations, protect excavations from major inflow of ground water, by installing temporary sheeting and waterproofing. Provide adequate barriers which will protect other excavations and below grade property from being damage by water, sediment or erosion from or through plumbing work excavations.

3.03 BACKFILLING

A. Do not backfill until installed plumbing work has been tested and accepted.

B. Install drainage fill where indicated, and tamp to uniform firm density.

C. Backfill with finely graded sub base material to 6" above wrapped, coated and plastic piping and tanks, or as shown on drawngsand to centerline of other tanks.

D. Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials.

E. Backfill simultaneously on opposite side of plumbing work, and compact simultaneously, do not dislocate work from installed positions.

F. Backfill excavations in 8" high courses of backfill material uniformly compacted to the following densities (% of maximum density, ASTM D1557), using power-driven hand operated compaction equipment.

1. Lawn and landscaped areas: 85% for cohesive soils, 90% for cohesion less soil.

2. Paved areas and roadways: 90% for cohesive soils, 95% for cohesion less soils.

G. Backfill to elevations matching adjacent grades, at time of backfilling excavations for mechanical work. Return surfaces to original condition.

H. After covering piping with 6" layer of approved fill backfill and compact excavations beneath:

1. New foundations.
2. Slabs on grade.
3. Areas to be paved by General Contractor.

3.04 CONCRETE BASES

A. Construct concrete equipment bases of minimum 4 inches higher or as shown on drawings, and not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.

3.05 CONCRETE GENERAL

A. Concrete installed by this division shall comply with Division 3 Specifications for Concrete.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15013A - CODES, STANDARDS, AND PERMITS

1.01 GENERAL

A. The entire installation shall be made in accordance with State rules and regulations and shall also conform with the standards of the National Board of Fire Underwriters for this installation and the local Board of Fire Underwriters having jurisdiction. The installation shall also comply with air pollution requirements of the State of New York and Industrial Code Rule 4 of the State of New York Department of Labor, Board of Standards and Appeals, dated March 31, 1965, and all other ordinances having jurisdiction.

B. The Contractor shall submit to all authorities having jurisdiction all required applications and shall secure all necessary permits, tests, and inspections required for final approval.

C. Certain standard and staple materials are described by reference to standard specifications. These standards are as follows:

AGA	American Gas Association
ASA-B9	Safety Code for Mechanical Refrigeration
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
CGA	Compressed Gas Association
AWWA	American Water Works Association
CS	Commercial Standard
FS	Federal Specification
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
PDI	Plumbing and Drainage Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
USASI	United States of America Standards Institute
UL	Underwriters' Laboratories
	New York State Uniformed Fire Prevention and Building Code
IPC	International Plumbing Code

D. All electric facilities shall receive the Underwriters label and be installed in accordance with the latest issue of the National Electric Code requirements.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15014A - SCHEDULE OF EQUIVALENCY

1.01 GENERAL

A. Wherever a brand name or manufacturer is named in this specification, it indicates the standard of quality or purpose desired. Where one certain kind, type, brand, or manufacturer of materials is named, it shall be regarded as the standard quality. Where two or more are named, these are presumed to be equal, and the Contractor may select one of those items; if the Contractor desires to use any other kind, type, brand, or manufacturer of material other than named in the specifications, he shall submit a list, with his bid, stating what material, equipment, or method is offered as equal and how it affects the contract price.

B. The equivalency of such items is to be judged by the Engineer whenever offered by bidders as equivalent to the Base Bid items and so reported to the Owner for his ultimate decision.

C. The following manufacturers are approved equivalents for those listed in the specifications:

1. Insulation:

   Johns-Mansville Corporation
   Owens-Corning Fiberglass Corporation
   Knauf
   Certainteed

2. Drains, Cleanouts, Flashing Sleeves, Wall Hydrants, Water Hammer Arrestors, Interceptors, and Fixture Supports

   Zurn Manufacturing Company
   Josam Manufacturing Company
   Jay R. Smith Company

3. Plumbing Fixtures

   Zurn
   American Standard
   Crane Company

4. Fixture Trim

   American Standard
   Chicago Faucet Company
   T & S Brass and Bronze Works

5. Flush Valves

   Zurn
   Sloan Valve Company
   American Standard

6. Toilet Seats

American Standard
Olsonite
C.F. Church Company

7. Access Doors

Karp Associates, Inc.
Zurn Manufacturing Company
Wilcox Steel Company

8. Valves

Jenkins Brothers
Lukenheimer Company
Walworth Company

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15015A - MAINTENANCE INSTRUCTIONS

PART 1 - GENERAL

1.01 GENERAL

A. In addition to the requirements outlined in the "General Provisions", the following information shall be incorporated:

1. Manufacturer's plumbing equipment parts list of all functional components including control diagrams and wiring diagrams of controllers.

2. Step by step instructions for each system including preparation for starting, operation, and shutdown. Provide full maintenance manual describing procedures for each new piece of equipment. In addition, provide a video showing / describing step by step instructions for maintenance of each new piece of equipment.

3. Twelve-month maintenance schedule for each type of equipment.

4. Possible breakdowns and repairs for each type of equipment.

5. List of nearest local suppliers for all equipment.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15050A – PLUMBING BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. This Section includes the following basic plumbing materials and methods to complement other Division 15A Sections.

1. Submittals.
2. Pipe joining materials and installation instructions common to piping systems.
3. Piping specialties: Escutcheons, dielectric fittings, sleeves and seals.
4. Non-shrink grout for equipment installations.
5. Drip pans.
6. Pipe supports: Hangers, clamps, support spacing, building attachments, shields and saddles, flashing, miscellaneous materials, and anchors.
7. Field fabricated metal and wood equipment supports.
8. Firestopping.

B. Pipe and pipe fitting materials are specified in piping system sections.

1.02 RELATED DOCUMENTS

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

B. NSF 372 and ANSI 61

1.03 SUBMITTALS

A. General - Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for following piping specialties:

1. Mechanical sleeve seals.
2. Identification materials and devices.

C. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

1.04 STANDARDS FOR MATERIALS AND WORKMANSHIP

A. All materials and workmanship shall, at a minimum be in accordance with (in no order of precedence):

1. New York State Codes – latest edition as adopted by the Authority Having Jurisdiction, unless otherwise noted.

2. State and municipal Building Codes and related subcodes.

3. Occupational and Safety Act (OSHA) Requirements.

4. Rules and Regulations of the Authority Having Jurisdiction applicable to the work.

5. National Electrical Standards Association Standard for Good Workmanship in Electrical Construction (NECA-1)

6. Serving utility's rules and regulations for providing service.

7. Contract Drawings and Specifications.

8. Manufacturer recommended installation instructions, practices and procedures for the products being utilized or installed.

9. Where conflicts arise between the above, the more stringent requirement shall be adhered to.

PART 2 - PRODUCTS

2.01 PIPE AND PIPE FITTINGS

A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

C. All fittings NSF 372 ANSI 61.

2.02 PIPE JOINING MATERIALS

A. Refer to individual piping system specification Sections in Division 15A for special joining materials not listed below.

B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, except where thickness or specific material is indicated.

a. Full-Face Type: for flat-face, Class 125 cast-iron and cast-bronze flanges.
b. Narrow-Face Type: for raised-face, Class 250 cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8-inch-thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where

other material is indicated.

2.03 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling and floor plates; deep-pattern type, where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube and insulation of insulated piping.
2. Outside Diameter: Completely cover opening.
3. Cast Brass: One-piece, with set-screw.

   a. Finish: Rough brass.
   b. Finish: Polished chrome plate.

4. Cast Brass: Split casting, with concealed hinge and set-screw.

   a. Finish: Rough brass.
   b. Finish: Polished chrome plate.

5. Stamped Steel: One-piece, with set screw and chrome plated finish.
6. Stamped Steel: One-piece with spring clips and chrome plated finish.
7. Stamped Steel: Split plate with concealed hinge, set-screw, and chrome plated finish.
8. Stamped Steel: Split plate with concealed hinge, spring clips and chrome plated finish.
9. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
2. Insulating Material: Suitable for system fluid, pressure and temperature.
3. Dielectric Unions: Factory-fabricated, union assembly, for 250 psig minimum working pressure at 180 deg F temperature.
4. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system pressures.
5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers and steel backing washers.

   a. Provide separate companion flanges and steel bolts and nuts for 150 or 300 psig minimum working pressure to suit system pressures.

6. Dielectric Couplings: Galvanized steel coupling, having inert and non-corrosive, thermoplastic lining, with threaded ends and 300 psig minimum working pressure at 225 deg F temperature.
7. Dielectric Nipples: Electroplated steel nipple, having inert and non-corrosive, thermoplastic lining, with combination of plain, threaded or grooved end types and 300 psig working pressure at 225 deg F temperature.

C. Mechanical Sleeve Seals: Modular, watertight, mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.

D. Sleeves: The following materials are for wall, floor, slab and roof penetrations.

1. Steel Sheet-Metal: 24 gage or heavier, galvanized sheet metal, round tube closed with welded longitudinal joint.
2. Steel Pipe: ASTM A53, Type E, Grade A, Schedule 40, galvanized, plain ends.
3. Cast-Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.

    a. Penetrating Pipe Deflection: 5 percent without leakage.
    b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111 of housing and gasket size as required to fit penetrating pipe.
    c. Pipe Sleeve: AWWA C151, ductile-iron pipe.
    d. Housing-to-Sleeve Gasket: Rubber or neoprene, push-on type, of manufacturer's design.

5. Cast-Iron Sleeve Fittings: Commercially-made, sleeve having integral clamping flange, with clamping ring, bolts and nuts for membrane flashing.

    a. Underdeck Clamp: Clamping ring with set screws.

2.04 VALVES

A. Refer to individual piping system specifications section in Division 15A for special valves not listed below.

B. General

1. Valves shall be installed only in upright vertical or horizontal positions unless specifically otherwise required by the drawings.

2. All valves shall be installed in accessible locations to facilitate easy removal for repair or replacement. Where not possible provide access doors. Refer to 15052A.

3. All gate and globe valves shall be designed for repacking when wide open under pressure.

4. Domestic water system valves 3/4" and smaller and all balancing valves shall be globe type.

5. All valves of the same type shall be the products of a single manufacturer and shall comply with ANSI B31.1.

6. All valves for domestic water use shall be no lead type in accordance with NSF-372 ANSI 61.

C. GATE VALVES

1. Cold, hot, and hot water return, 2" and smaller: Ball type solder end connections. Jenkins, Nibco, or equal Type B. 3" and larger gate valve: Jenkins, Nibco, or equal Type 1, Class "A", Style 3.

D. GLOBE VALVES

1. 3" or smaller: Jenkins, Nibco, or equal. Over 3": Jenkins, Nibco, or equal, Type 1 with cast iron body and bronze trim.

E. CHECK VALVES

1. 3" and smaller: Jenkins, Nibco, or equal, Type IV, Class "A".

2.05 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi, 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

2.06 DRIP PANS

A. Provide drip pans fabricated from corrosion resistant sheet metal with watertight joints, and with edges turned up 2-1/2 inches. Reinforce top, either by structural angles or by folding over according to size. Provide hole, gasket, and flange at low point for watertight joint and 1-inch drain line connection.

2.07 HORIZONTAL PIPING HANGERS AND SUPPORTS

A. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports. Hangers and supports shall be in complete conformance with Chapter 3 of the New York State Plumbing Code. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper plated hangers and supports for copper piping systems.

B. Adjustable steel clevises.

1. Material: Carbon steel, copper plated for copper piping.
2. Finish: Black or copper plated.
3. Adjustment: Hanger to be adjustable for vertical height of pipe without removing the pipe.

2.08 VERTICAL PIPING CLAMPS

A. Two bolt riser clamp.

1. Material: Carbon steel copper plated for copper piping.
2. Finish: Black or copper plated.

2.09 HANGER ROD AND SPACING

ROD SIZE AND SPACING SCHEDULE

Pipe Size	Maximum Spacing		Rod Size
	Steel	Copper	
1/2 to 1	6 ft.	6 ft.	3/8"
1-1/4 to 1-1/2	6 ft.	6 ft.	3/8"
2	12 ft.	10 ft.	3/8"
2-1/2 - 3-1/2	12 ft.	10 ft.	1/2"
4 - 5	12 ft.	10 ft.	5/8"
6	12 ft.	10 ft.	3/4"
8 - 12	12 ft.		7/8"
14 - 16	12 ft.		1"

Note: Cast Iron - support at every hub or coupling 5 ft. maximum spacing.

2.10 BUILDING ATTACHMENTS

A. General: Except as otherwise indicated provide factory fabricated building attachments of one of the following types listed, selected by Installer to suit building substrate conditions. Select size of building attachments to suit hanger rods. Provide copper plated building attachments for copper piping systems.

B. On Structural Steel:

1. For pipes 2" and smaller: C clamps with lock nuts similar to Anvil figure 86.
2. For pipes 5" and larger: Use beam clamps similar to Anvil figure 228 or 292.

C. On New Masonry:

1. Use concrete inserts similar to Anvil figure 281.

D. On Existing Concrete:

1. Use expansion case similar to Anvil figure 117.

E. On Wood:

1. Use coach screw rods Anvil figure 142. Ceiling flanges Anvil figure 153, or fabricated angle clips. Use wood drive screws or lag bolts as fasteners.

2.11 SHIELDS AND SADDLES

A. General: For insulated piping.

B. Shields: 16-gauge galvanized metal.

C. Protection saddles:

1. Hardwood block
2. Steel saddle Anvil 160 series

2.12 FLASHING MATERIALS

A. General: Provide flashings for each penetration of plumbing systems through roofs or waterproof membranes.

B. Molded Pipe Flashing: Compatible with single ply membranes with which it is used and manufactured by membrane manufacturer.

C. Coated copper flashing: Provide cold-rolled sheet copper (ANSI/ASTM B 370), of proper temper for applications shown and required forming, coated on one side with not less than 0.06 lbs. per sq. ft. of antimony (ANSI/ASTM B 101, Type I, Class A), weighing 1.06 lbs. per sq. ft., except as otherwise indicated.

D. Bituminous coating: FS TT-C-494, or MIL-C-18480, or SSPC-Paint 12, cold applied solvent type bituminous mastic coating for application in dry film thickness of 15 mils per coat.

2.13 MISCELLANEOUS MATERIALS

A. Metal framing: Provide products complying with NEMA.

B. Steel plates, shapes and bars: Provide products complying with ANSI/ASTM A 36.

C. Heavy duty steel trapezes: Fabricate from steel shapes selected for loads required, weld steel in accordance with American Welding Society (AWS) standards.

D. Pipe guides: Provide factory fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two section outer cylinder and base with a two section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

2.14 ANCHORS

A. Fabricate pipe anchors from 3 x 3 x 1/2" angle.

B. Use pipe protection saddles one size larger than piping.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15A specify piping installation requirements unique to the piping system.

B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordinate drawings.

C. Pitch piping at low points. Provide Manual Blowdown for maintenance.

D. Install piping at indicated slope.

E. Install components having pressure rating equal to or greater than system operating pressure.

F. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

G. Install piping free of sags and bends.

H. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.

I. Install piping tight to slabs, beams, joists, columns, walls and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

J. Install piping to allow application of insulation plus 1-inch clearance around insulation.

K. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

L. Install fittings for changes in direction and branch connections.

M. Install couplings according to manufacturer's printed instructions.

N. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wallboard partitions and suspended ceilings according to the following:

1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw and polished chrome-plated finish. Use split-casting escutcheons where required, for existing piping.
2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.
3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips and chrome-plated finish.
5. Piping in Utility Areas: Cast-brass or stamped-steel with set-screw or spring clips.

O. Sleeves are not required for core drilled holes.

P. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.

Q. Install sleeves for pipes passing through concrete and masonry walls, concrete floor and roof slabs, and where indicated.

R. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs and where indicated.

1. Cut sleeves to length for mounting flush with both surfaces.

    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.

2. Build sleeves into new walls and slabs as work progresses.
3. Install large enough sleeves to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

    a. CPVC Pipe Sleeves: For pipes smaller than 6 inches.
    b. Steel Pipe Sleeves: For pipes smaller than 6 inches.
    c. Steel Sheet-Metal Sleeves: For pipes 6 inches and

larger, penetrating gypsum-board partitions.

d. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.

e. Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.

4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants.

S. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeve and mechanical sleeve seals. Size sleeve for 1 inch annular clear space between pipe and sleeve for installation of mechanical seals.

1. Install steel pipe for sleeves smaller than 6 inches.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger.
3. Assemble and install mechanical seals according to manufacturer's printed instructions.

T. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.

U. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.

V. Verify final equipment locations for roughing-in.

W. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

X. Piping Joint Construction: Joint pipe and fittings as follows and as specifically required in individual piping system specification Sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS "Soldering Manual", "The Soldering of Pipe and Tube".
4. Brazed Joints: Construct joints according to AWS "Brazing Manual", "Pipe and Tube".
5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:

a. Note the internal length of threads in fittings or valve ends and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
c. Align threads at point of assembly.
d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

Y. Welded Joints: Construct joints according to AWS "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to "Quality Assurance" article.

Z. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

AA. Piping Connections: Except as otherwise indicated, make piping connections as specified below.

1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2 inches or smaller threaded pipe connection.
2. Install flanges, in piping 2 1/2 inches and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials or dissimilar metals.
4. Wet Piping Systems (Water): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.02 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom, where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.03 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit and place miscellaneous metal supports accurately in location, alignment and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code - Steel".

3.04 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.05 GROUTING

A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms for placement of grout, as required.

D. Avoid air entrapment when placing grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases to provide a smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's printed instructions

3.06 DRIP PANS

A. Locate drip pans under piping passing over or within 3 feet

horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, and weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1-inch drain line to drain connection and run to nearest plumbing drain or elsewhere as indicated. Provide Leak Detection Alarm Floodmaster RS097. Provide power to unit.

3.07 INSTALLATION OF BUILDING ATTACHMENTS

A. Install building attachments at required locations in concrete, in wood or on structural steel for proper piping support. Space attachments within maximum piping span length indicated. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed, fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.08 INSTALLATION OF HANGERS AND SUPPORTS

A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Install hangers and supports of same type and style for grouped piping runs.

C. Support fire water piping independently of other piping.

D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.

E. Provisions for movement:

1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
2. Load distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
3. Pipe slopes: Install hangers and supports to provide indicated pipe slopes.

F. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.09 SHIELDS AND SADDLES FOR INSULATED PIPING

A. 4" and below use 16 gauge x 12 inch long shield with oversized hanger outside insulation.

B. 6" and above use hardwood protection saddle with 16 gauge x 18 inch long shield with oversized hanger outside insulation.

C. 6" and above use steel protection saddle. Fill void between shield and pipe with insulation. Cover with vapor barrier. Protect barrier with 16 gauge x 18 inch long shield with oversized hanger outside assembly.

3.10 INSTALLATION OF ANCHORS

A. Install anchors at proper locations to prevent stresses and to prevent transfer of loading and stresses to connected equipment.

B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure.

C. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.

D. Anchor spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.11 FLASHINGS

A. Manufacturer's recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.

B. Coat back side of metal flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent separation as recommended by manufacturer of metal.

C. On vertical surfaces, lap flashings minimum of 3".

D. On sloping surfaces, for slopes of not less than 6" in 12", lap unsealed flashings minimum of 6".

E. For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges minimum of 6" for embedment.

3.12 FIRE STOPPING

A. Provide UL listed and tested firestopping material, silicone elastomer specifically formulated for use in horizontal and vertical applications. The material shall possess intumescent characteristics, and upon exposure to heat above 250 degrees F. shall expand to not less than five times its original volume to form a fireproof envelope UL rated for 2- and 3-hours protection, when applied in accordance with the manufacturer's recommendation.

B. See section 15511 for additional fire stopping requirements.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15052A - ACCESS TO PLUMBING WORK

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Access doors in walls and ceilings.

1.02 SUBMITTALS

A. Product data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.

1.03 QUALITY ASSURANCE

A. Fire resistance ratings: Where fire resistance rating is required for construction penetrated by access units, provide UL listed and labeled units, except for units which are smaller than minimum requirements.

PART 2 - PRODUCTS

2.01 ACCESS DOORS

A. Where walls and ceilings must be penetrated for access to mechanical work, provide types of access doors indicated. Furnish sizes indicated or, where not otherwise indicated, furnish adequate size for intended and necessary access. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, complete with anchorages and hardware.

B. Construction: Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground smooth, 16-gauge frames and 14-gauge flush panel doors, 175 degree swing with concealed spring hinges, flush screwdriver-operated cam locks, factory applied rust-inhibitive prime coat paint finish.

C. Available manufacturers

1. Milcor Div., Inryco Inc.
2. Smith (Jay R.) Mfg. Co.
3. Zurn Industries, Inc.

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with manufacturer's instructions for installation of access doors.

B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

C. Adjust hardware and panels after installation for proper operation.

D. Remove or replace panels or frames which are warped, bowed, or otherwise damaged.

E. Paint access doors to match surrounding surfaces.

F. In wet and damp locations provide stainless steel doors.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15057A – PLUMBING IDENTIFICATION SYSTEMS

1.01 GENERAL

A. Provide labels for all new pipes including hot water, hot water return, cold water, sanitary drain, storm drain, vent, gas and acid waste piping. Install identifying tags on all valves.

PART 2 – PRODUCTS

2.01 EQUIPMENT LABELS

A. Small: Labels shall be adhesive backed plastic tape with embossed letters in contrasting color. Tape shall be 3/8" wide.

B. Large: Labels shall be adhesive backed plastic tape with embossed letters in contrasting color.

C. Make: Seton Name Plate Corporation.

2.02 PIPING MARKERS

A. Pipe markers shall be snap-on type indicating pipe contents and direction of flow on a color coded background conforming to American National Standards Institute (ANSI) Standard A13.1. Pipe diameter less than 2" and smaller shall be snap-on type. Pipe diameter greater than 2" shall be stick-on type.

1. Hot water – green with white lettering.
2. Cold water – green with white lettering.
3. Sanitary Drain and Vent – green with white lettering.
4. Storm Drain – green with white lettering.
5. Gas – yellow with black lettering.
6. Acid Waste – black with orange lettering.

B. Make: Seton Name Plate Corporation – Setmark, or equal by Dover, Brady.

2.03 VALVE TAGS

A. Tags: Tags shall be 1 3/4" x 3 1/2" laminated with two 0.020" thick plastic sheets with matte finish and with a brass eyelet in the corner. Typed information shall include appropriate alphanumeric code (prefixed with the letter "P"), system designation, the fluid in the pipe, and size and function of the valve.

B. Make: Dover Enterprises, Syracuse, New York or approved equal by Seton Name Plate Company.

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish; including valve tags in finished mechanical spaces, install identification after completion of covering and painting.

3.02 EQUIPMENT

A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

1. Meters, gauges, thermometers and similar units.
2. Fuel-burning units including water heaters.
3. Pumps and similar motor-driven units.
4. Storage tanks and pressure vessels.
5. Strainers, filters, humidifiers, water treatment systems and similar equipment.

B. Lettering Size: Minimum 1/4" high lettering for name of unit where viewing distance is less than 2'-0", 1/2" high for distances up to 6'-0", and proporitionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 size of principal lettering.

C. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

3.03 PIPING

A. After piping has been painted or insulated, apply pipe labels as specified above.

B. Space labels on 15' centers in mechanical rooms, space at 25' centers elsewhere and at each side of partitions and interior walls. Also, at each branch and riser take off and adjacent to each valve (except at fixtures and equipment).

3.04 VALVES IDENTIFICATION

A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience hose bibs, and shut-off valves at plumbing fixtures, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.

B. Provide valve tag chart, framed and securely fastened to the wall, using anchors and fasteners, where directed by owner.

C. Submit list of valve tags, including wording, for approval **BEFORE** ordering.

3.05 ADDITIONAL INFORMATION

A. For additional information see Specification Section 15050A – Plumbing Basic Materials & Methods.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15060A - CUTTING AND PATCHING

PART 1 – GENERAL

1.01 GENERAL

A. Each Contractor shall be responsible for his cutting and patching. The Contractor shall also be responsible for all finish patching and painting.

B. Each Contractor shall replace and patch any surfaces of any structure disturbed by his operations and his work, even if such operations and work are outside the contract limit. Such replacement, repair, and patching shall be with similar material and shall restore surfaces as they exist, or better.

C. Cut and alter existing materials as required to perform the work. Limit cutting to the smallest amount necessary for proper installation of the work.

D. Where the removal of existing building components necessitates the addition of patching in new materials, such work shall be executed to insure the fire resistance rating of the system and visual continuity with adjacent surfaces, whether or not the remedial work is specifically detailed on the drawings.

E. Perform the removal work with such care as may be required to prevent damage to adjoining construction which is to remain.

F. Do not disturb any existing structure, piping, apparatus, or other construction which must remain unless expressly required by the contract. Where cutting or removals are required in existing construction, do the work in a manner that will safeguard and not endanger the structure and as approved by the Engineer.

G. If unforeseen obstructions are encountered, take all precautions necessary to prevent damage and obtain full instructions from the Engineer before proceeding with the work.

H. Remove from the site all debris and other materials resulting from the alterations and removals, subject to the General Requirements.

I. Fill all voids and patch existing construction and finishes damaged within area of alteration work unless otherwise indicated. Provide new materials to match existing corresponding items as closely as practicable.

J. Any pipe penetrations through fire rated areas shall be accomplished using Hilti fire barrier products in sheets, strips, or caulk using ASTM, UL, and FM standards.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15180A - PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of plumbing insulation work required by this section is indicated on Drawings and by requirements of this section.

B. Work includes thermal insulation for the following:

1. Domestic cold water piping.
2. Domestic hot water and hot water circulating piping.
3. Domestic tempered water piping
4. Storm water drainage piping.
5. Roof drain bodies.

1.02 QUALITY ASSURANCE

A. Fire Hazard Classification: In accordance with ASTM E-84, NFPA 255 and UL 723, for insulation systems, including insulation, adhesives and coverings, not to exceed the following:

1. Flame spread 25.
2. Fuel contributed 50.
3. Smoke developed 50.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers specification sheets, installation instructions, fire and smoke ratings. Submit schedule matching insulation type to mechanical systems and equipment.

1.04 INSULATION THICKNESS

A. Insulate domestic hot water supply, tempered water, and hot water recirculating piping with insulation thickness of fiberglass piping insulation as shown below, ASTM C 547 Class 1, with All Service Jacket.

B. Insulate domestic cold water Branches and Mains with insulation thickness as shown below of fiberglass piping insulation, ASTM C 547 Class 1.

C. Insulate storm water piping and roof drains with 1” insulation thickness of fiberglass insulation, ASTM C 547 Class 1.

D. Insulate condensate drain to HVAC units with 1” fiberglass insulation.

To Meet or Exceed Energy Conservation Construction Code of the State of New York

THICKNESS TABLE

	IPS 1-1/4" & Below	IPS 1-1/2" to 4"	IPS Above 4"
Hot Water	1"	1-1/2"	1-1/2"
Hot Water Ret.	1"	1-1/2"	N/A
Cold Water	1"	1"	1"
Storm	1"	1"	1"

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label affixed showing fire hazard indexes of products.

B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet installation, remove from project site.

PART 2 - PRODUCTS

2.01 DOMESTIC COLD WATER, HOT WATER, TEMPERED, AND HOT WATER CIRCULATING PIPING

A. Scope: Insulate all mains, branches, fittings, flanges and valves including those in ceiling spaces, pipe chases or spaces. Terminate insulation at the fixture supply stops. Insulate equipment connections to the equipment stop.

B. Type:

1. Pre-formed sectional type nominal 3# density glass fiber in standard 3' long sections tightly butted together. K factor (Thermal conductivity) of 0.23 at 75^0 mean. Make: Mansville, Owens-Corning, or Knauf.

C. Finish:

1. Main mechanical room piping and exposed risers and runouts in finished rooms: Factory-applied All Service Jacket with self-sealing laps.
2. Valves, fittings and flanges: Equal thickness of fiberglass insulation with Zeston fittings covers or equal by Ham-Fab, Mansville.

2.02 STORM WATER PIPING – ABOVE GROUND

A. Scope: Insulate all horizontal piping above ground including underside of roof drain bodies and all fittings.

B. Type: Pipe insulation shall be preformed sectional type nominal 3 pound density glass fiber in standard 3 foot long sections with a K factor of 0.23 at 75 mean and factory applied All Service

Jackets. Seal joints with 3" All Service Jacket.

C. Fittings & Drain Bodies: Insulate all fittings, hubs, flange and Drain bodies with fiberglass pre-moulded fitting insulation or with 1" resilient fiberglass blanket. (3/4) pcf density minimum) wrapped around the fitting or drain body, tied down with wire or jute. Compress blanket 50% in installation. Coat each fitting or drain body with two 1/8" coats of vapor barrier mastic reinforced with glass fabric extending 2" onto adjacent pipes.

2.03 METAL JACKETED PIPE INSULATION

A. Scope: Pipe exposed to weather or physical abuse shall be insulated with .016" aluminum jacket over fiberglass insulation of the specified thickness. Sections shall be made in 36" lengths.

B. Fire and smoke Hazard Classification shall not exceed flame spread index of 25 or less and smoke developed index of 50 or less as tested by ASTM E-84, NFPA 255 or UL 723.

C. Manville Micro-Lok 650ML.

2.04 EQUIPMENT INSULATION MATERIALS

A. Rigid Fiberglass Equipment Insulation: ASTM C 612, Class 2.

B. Flexible Fiberglass Equipment Insulation: ASTM C 553, Type I, Class B-4.

C. Jacketing Material for Equipment Insulation: Provide pre-sized glass cloth jacketing material, not less than 7.8 ounces per square yard, or metal jacket at Installer's option, except as otherwise indicated.

D. Equipment Insulation Compounds: Provide adhesives, cements, sealers, mastics and protective finishes as recommended by insulation manufacturer for applications indicated.

E. Equipment Insulation Accessories: Provide staples, bands, wire, wire netting, tape, corner angles, anchors and stud pins as recommended by insulation manufacturer for applications indicated.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Apply insulation in accordance with the Schedule of Insulation on the Contract Specifications.

B. Use only insulation and finish materials including adhesives, cements, and mastics which conform to the requirements of all local codes and ordinances.

C. Fire resistant adhesive is highly flammable in liquid form. Eliminate welding, smoking, or other sources of ignition during application.

D. Apply insulation after all piping pressure tests, as described in Piping Installation Procedure, have been completed.

E. Clean surfaces of loose scale, dirt, oil, and other foreign matter and dry prior to insulating.

1. Detail for space @ blowdown
2. Detail for pipe @ insulation penetrating wall.

F. Apply insulation to completely cover piping surface. Do not insulate over weld certification stamps.

G. "Exposed" as used in this section means exposed to view. "Concealed" means concealed to view such as in furred chases or above suspended ceiling. Penthouse and equipment rooms are considered exposed locations.

H. Fill surface imperfections in the insulation such as chipped edges, small joints or cracks, and small voids or holes with appropriate insulation material and smooth with skim coat of hydraulic-setting insulating cement. Vapor barriers shall be continuous and unbroken at hanger installations.

I. Fit inside diameter of insulation sections or segments to outside curvature of pipe or previous insulation layer.

J. Where standard insulation shapes are not available, cut, score, or miter segments of appropriate block to fit contour of pipe. Stagger joints of adjoining segments. Fit insulation carefully and secure with No. 20 gage galvanized annealed steel wire. Finish with a smoothing coat of hydraulic-setting insulating cement.

K. Insulate valves, strainer, fittings, and flanges with identical material, density, thickness, and surface finish as the piping insulation. All edges shall be filled with filler and finished with a smoothing coat of hydraulic-setting insulating cement.

L. Insulate the entire surface of fittings and strainers. Insulate valves up to and including bonnets, unless authorized otherwise by Project Engineer. Do not cover removable valve bonnets.

M. Insulate strainers to permit removal of the basket without disturbing the insulation of the strainer body. Strainer covers shall be molded and taped to upper section of insulation.

N. Bevel the ends of pipe insulation adjacent to flanges to permit bolt removal. Provide a collar of sectional block insulation over the flanges and extend a minimum of 2 inches over the adjacent pipe insulation. Fasten with staples to permit easy removal. Prior to applying collar fill annular spaces with loose insulation.

O. Insulate all piping through sleeves.

P. Where pipelines pass through masonry walls or floors, completely fill the space between outside of pipe or insulation and the

inside of the sleeve or framed opening with fibrous mineral wool or fiberglass pipe insulation.

Q. When it is unavoidable and hangers for cold lines must be installed directly on the pipe, insulate and finish the entire hanger and the rod for a length of not less than 12 inches above the pipe.

R. Apply insulation to completely cover metal surfaces.

S. Cut, score, or miter insulation to fit shape and contour of equipment. Where surfaces are flat, cylindrical, or regularly curved, use premolded blocks or segments.

T. Where required, provide permanently fastened angles or plates to support insulation.

U. Apply insulation on cover plates, heads and access openings as separate sections, with insulation cut back for access to boltheads and other fasteners.

V. Do not insulate over nameplates. Cut back insulation and line the insulation edges with 24 gage galvanized steel.

W. Surface Finish.

1. Apply surface finish to present a tight, smooth appearance.
2. Do not apply sealant or cement until all previous applications of cement and adhesives have thoroughly dried.
3. Extend surface finish to protect all insulation surfaces. Prevent raw edges or ends of insulation from being exposed.

3.02 INSTALLATION OF PIPING INSULATION

A. Apply to pipes with side and end joints butted tightly per manufacturer's directions.

B. Where joints in insulation occur, and at hangers, take extra precautions to seal the vapor barrier with adhesive BF 95-44 so that no moisture penetration will occur. Notify Engineer when insulation is complete so he may make inspection before walls are closed in or ceilings applied.

C. Where fiberglass insulation is exposed in an occupied room, apply pre-sized glass cloth vapor barrier jacket in same manner using same type of adhesive (or use ASI/SSL).

D. Repair all breaks in the jacket with 4" wide strip of vapor barrier jackets (FRGC or SSL as required) applied smoothly and securely. When applying adhesive at temperature below 75^0F, use staples with an additional brush coat of adhesive over the exterior of the staples.

E. Adhere 4" wide strips of jacket material smoothly and securely over all end joints with vapor barrier adhesive as above to insure a continuous vapor barrier.

F. Apply insulation on all cold surfaces where vapor barrier jackets are used with a continuous, unbroken vapor seal. Insulate and vapor seal hangers, supports, anchors, etc., that are securely directed to cold surfaces to prevent condensation.

3.03 EQUIPMENT INSULATION

A. Cold Equipment (Below Ambient Temperature)

1. Application Requirements: Insulate the following cold equipment:

a. Domestic Hot water expansion tanks

2. Insulate each item of equipment specified above with fiberglass: 2" thick

B. Hot Equipment (Above Ambient Temperature)

1. Application Requirements: Insulate the following hot equipment.

a. Hot water storage tanks
b. Water heaters (not insulated by manufacturer)

2. Insulate each item of equipment specified above with fiberglass: 2" thick.

3.04 SUPPORT OF INSULATED PIPE LINES

A. Scope: Install inserts at each hanger or support for all water lines for sizes 1-1/2" and up, or 16 gauge electro-galvanized carbon steel shields may be used in lieu of inserts. Install supporting devices on insulated lines with hangers with insulation shields.

B. Inserts:

1. Inserts between the pipe and pipe hangers shall consist rigid pipe insulation of equal thickness to the adjoining fiberglass insulation and shall be provided with vapor barrier where required.
2. Insulation inserts shall not be less than the following lengths:

1-1/2" to 2-1/2" pipe size, use 6" length
3" to 6" pipe size, use 9" length

C. Supporting Devices: Use cork stoppers, short lengths of wood dowels or wood blocks of the same thickness as insulation. Curve the support device surfaces to match the curve of the metal shield. Metal shields are provided with the hanger.

3.05 ADHESIVES, MASTIC, AND COATINGS

A. Apply adhesives, mastic and coatings specified at the

manufacturer's recommended coverage per gallon.

3.06 EXPOSED RISERS AND RUNOUTS

A. Finish exposed risers and runouts in occupied rooms with ALL SERVICE JACKET.

B. Occupied areas mean all areas except ceiling spaces, crawl spaces and closed off pipe spaces or chases.

3.07 EXISTING INSULATION REPAIR

A. Repair damaged sections of existing mechanical insulation damaged during this construction period. Use insulation of the same thickness as existing insulation. Install new jacket lapping and seal over existing.

3.08 PROTECTION AND REPLACEMENT

A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: Insulation installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

C. Surface Finish: No surface finish required.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15411A – PLUMBING DOMESTIC WATER PIPING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of domestic water piping systems work is indicated on drawings and schedules, and by requirements of this section.

B. Applications for domestic water piping systems include the following:

1. Domestic cold water piping.
2. Domestic hot water piping.
3. Domestic recirculating water piping.
4. Water hammer arresters.
5. Valves.
6. Pumps

C. All domestic water piping systems must comply with the "Lead-Free" Division 15A Specifications. The contractor shall provide the required submittals for all equipment that will be part of the system prior to the equipment installation, and confirm on the jobsite that the equipment adheres to "Lead-Free" regulations.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's data for domestic water piping systems, materials and products.

B. Submittals shall include but not be limited to the following:

1. Valves
2. Water hammer arresters
3. Piping
4. Pumps

1.03 QUALITY ASSURANCE

A. Plumbing Code: Comply with applicable portions of New York State Uniform Fire Protection and Building Code, Article 9, Plumbing Requirements, State sanitary code, Department of Health, Division Sanitary Engineering, Bureau of Public Water Supply, any local codes or regulations, and the International Plumbing Code and the International Energy Conservation Code.

B. All piping valves, hydrants, etc. shall comply with all ASME, ANSI, ASTM, AWWA and NFPA regulations that apply to the work.

C. Meters, backflow preventers, hydrants, etc. shall conform to local utility company regulations, ordinances and laws, and the International Plumbing Code (IPC).

D. Obtain all necessary approvals, certificates and arrange for all inspections required by local authorities having jurisdictions. Pay all fees.

E. Perform water sampling upon completion of all piping systems. Samples to be analyzed by a NYS Dept. of Health approved lab for bacteria as well as all other code required chemical / organic analyses. The plumbing contractor will bear all costs associated with the testing procedures / reports. Test reports shall be included as part of the project closeout documents.

PART 2 – PRODUCTS
(All to comply with the 2015 IPC)

2.01 DOMESTIC WATER PIPING

A. Underground Water

1. 3" or larger: Class 52 ductile iron pipe per AWWA C151, with C104 cement lining, and asphaltic coating inside and out. Fittings shall be cast or ductile iron per AWWA C110, with push-on joints with four serrated silicon bronze wedges at each joint for electrical continuity. Underground type plastic line marker: Provide standard permanent bright colored, continuous-printed plastic tape, intended for direct burial service, not less than 6"wide X 4 mils thick, with lettering "WATER SERVICE".

2. 2" and smaller: Type 'K' copper soldered or brazed.

B. Domestic hot water, cold water and tempered water.

1. Type "L" copper, ASTM B88.
2. Make: Anaconda, or equal by Muller, Revere.
3. Fittings shall be wrought or cast solder type pressure fittings.
4. Chrome plated sponge cleanable brass, sch. 40 for exposed piping.

2.02 BALL VALVES

A. Description: Bronze body, ball valve with 600 PSI W.O.G. min. rating, teflon seats, stainless ball, blow-out proof stem, viton-o-ring sealed union, removable operating handle and solder ends. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61. ANSI372

2.03 INTERIOR HOSE BIBBS

A. 'No-Lead', Anti-siphon vacuum breaker wall faucet enclosed in a flush mounting wall box, ¾" male hose outlet, loose key opens box and faucet operator, chrome plated casting.
B. Make:
C. Josam or equivalent. Where indicated, install on cold water piping.

2.04 EXTERIOR WALL HYDRANTS

A. 'No lead', Automatic draining, freezeless wall hydrant with an anti-siphon vacuum breaker enclosed in a flush mounting wall box. Cast bronze, ¾" male hose outlet, non-freeze, "water" on cover, key handle, proper length galvanized wall sleeve, vacuum breaker, wall clamp, chrome finish.
B. Where indicated, install on cold water piping.

2.05 SWING CHECK VALVES

A. General: Construct pressure-containing parts as follows:

1. Bronze valves, 125 or 150 psi: ANSI/ASTM B 62. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61. ANSI 372.

B. Construct valves with disk seating angle 40° to 45° unless composition disc is specified. Provide stop plug as renewable stop for disc hanger. Construct disc and hanger as separate parts, with disc free to rotate. Support hanger pins on both ends by removable side plugs.

C. Soldered ends 2" and smaller: Class 125, bronze body, screwed cap, horizontal swing, bronze disc.

D. Flanged ends 2 1/2" and larger: Class 125, iron body bronze mounted, bolted cap, horizontal swing, cast iron disc.

E. Manufacturers:

1. Jenkins Bros., A Corp.
2. Kennedy Valve.
3. Lunkenheimer.
4. Stockham Valves and Fittings, Inc.

2.06 SPECIAL VALVES

A. Balance valve:

1. Bronze/Brass Ball valve with pressure readout ports, calibarated nameplate and memory stop. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61.
2. Make: Bell & Gossett model CB, Watts

B. Trap Primer Valve:

1. 'No lead', Automatic, large port openings, activates on 10 psig pressure drop at 30-250 psig. Water release is factory set. Chrome plated finish.

2.07 THERMOMETERS AND GAGES

A. Water Pressure Gages: 0-150 psi range, aluminum or brass 4-1/2" case, 1/4" NPT connection. Glass enclosed dial with ¼" ball valve. 1 percent accuracy, ANSI B40.1, Grade A.

B. Glass Thermometers

1. General: Die cast aluminum, baked epoxy enamel finish, glass front, 9" long, adjustable joint, locking device. 1 percent accuracy, shock mounted. Copper plated steel or brass stem. Alcohol based thermometers to be used.
2. Range:
   a. Hot water: 30 to 240°F, 2°F divisions.
   b. Cold water: 30 to 180°F, 2°F divisions.

3. Thermometer wells: No Lead, Brass or stainless steel, 2" extension for insulated piping. Cap nut with chain fastened to thermometer well.

2.08 PLUMBING INSULATION

A. General: Comply with Division 15A Section "15180A, Plumbing Insulation".

2.09 UNIONS

A. Description: "No lead" Cast Brass with Solder Ends. Working pressure: 200 PSI W.O.G.
B. Make: Nibco, or equal by Mueller, Revere.

2.10 SOLDER AND FLUX

A. Solder shall be in solid wire form of Type II 95-5 tin antimony solder conforming to ASTM B-32, Grade 5A. Flux shall be a zinc chloride or a mixture of zinc and ammonium chlorides. Solders containing lead shall not be used. 96.5 – 3.5 and 95-5 tin/silver solders may be used.

2.11 SHOCK ARRESTER

A. Construction:
1. Type 1: Stainless steel body with stainless steel bellows, an air or argon gas cushion and with or without hydraulic displacement fluid.
2. Type 2: "No lead" Hard drawn copper body, polypropylene piston with EPDM O ring seal and brass NPT threaded connection.
3. Contractor may use either Type 1 or Type 2.

B. Code Compliance: Shock absorbers shall comply with the following codes:

1. P.D.I. – WH201 latest issue.
2. ASSE 1010 latest issue.

C. Make:
1. Type 1: J.R.Smith 5000 Series.

2. Type 2: Watts LF15M2 -DR Series

PART 3 - EXECUTION

3.01 INSTALLATION OF DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

A. General: Install the following in accordance with Division 15A Section "Basic Materials and Methods".

1. Identification.
2. Piping specialties.
3. Supports, anchors and seals.

3.02 INSTALLATION OF PIPE, TUBE AND FITTINGS

A. General: Install in accordance with Division 15A Section "Basic materials and Methods".
B. Install in accordance with recognized industry practices, which will achieve permanently leak proof piping systems. Install each run with minimum joints and couplings. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for pressure piping.
C. Hose faucets at low points. Cap with hose caps.
D. Carry headers for groups of fixtures full size through their length.
E. Swing joints as follows:

1. From water mains to risers.
2. From riser to branch connections to fixtures.
3. From riser to mains.

3.03 INSTALLATION OF SHOCK ARRESTORS

A. General: Upright position, locations and sizes indicated in accordance with PDI Standard WH-201.

3.04 INSTALLATION OF STRAINERS

A. General: Install full size of pipeline, in accordance with manufacturers installation instructions. Install pipe nipple and shutoff valve in strainer blow down connection, full size of connection, except for strainers 2" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blow down connection.

1. Locate plate-type strainer in supply line ahead of the water meter.

3.05 INSTALLATION OF VALVES

A. General: Install where required for proper operation of piping and equipment, including all branch lines to isolate sections of piping. Locate to be accessible and separate support can be provided.
B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for

horizontal plane unless unavoidable.

C. Insulation: Where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation.

D. Drain Valves: Each plumbing equipment item. Located to completely drain equipment for service or repair. Base of each riser, base of each rise or drop in piping system, at all low points, and where indicated or required to completely drain system. Provide hose caps on hose bibbs.

E. Check Valves: Horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction of flow.

3.06 INSTALLATION OF SPECIAL VALVES

A. Balance Valves: Each hot water recirculating loop, and where indicated.

B. Trap Primer Valves: Install in upright, vertical position in a convenient cold water line where indicated for floor drain primer supply.

3.07 INSTALLATION OF THERMOMETERS AND GAGES

A. General: Install in accordance with manufacturer's instructions.

B. Locations: Where indicated on Drawings.

3.08 INSTALLATION OF PLUMBING INSULATION

A. Install in accordance with Division 15A Section "Plumbing Insulation".

3.09 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Hot and cold water runouts of sizes indicated, no smaller than required by the Plumbing Code.

B. Mechanical Equipment Connections:

1. Connect hot and cold water piping system to plumbing equipment as indicated.
2. Comply with equipment manufacturer's installation instructions.
3. Provide shutoff valve and union for each connection.
4. Provide drain valve on drain connection.
5. Exposed piping shall be sch. 40 chrome plated brass, sponge cleanable surface.

3.10 WALL HYDRANT AND HOSE BIBB INSTALLATION

A. Wall hydrant: Install approximately 24” above finished grade or as noted on the plans. Install a stop and drain valve on each wall hydrant branch.

B. Hose Bibbs for toilet and finished rooms: In rooms where shown with lavatories, install approximately 18” above finished floor under lavatory where indicated. Elsewhere, install 36” above the finished floor where shown. Install stop on branch. Hose bibbs to be furnished with loose key handles.

3.11 WATER SYSTEM DISINFECTION

A. Scope: All newly installed lines carrying potable water and parts of existing systems which have been altered, extended or repaired prior to use.

B. Before any use of system is made for domestic purposes, disinfect by one of the following methods as specified in the New York State Uniform Fire Prevention and Building Code. All water samples are to be sent to / tested by a New York State Department of Health approved lab for bacteria analysis. All test results shall be sent to the engineer for review prior to placing the systems in service.

1. The system shall be filled with a water solution containing 50 parts per million of available chlorine and allowed to stand for 24 hours before flushing and returning to service.
2. The system shall be filled with a water solution containing 200 parts per million of available chlorine and allowed to stand one hour before flushing and returning to service.
3. For a potable water storage tank, where it is not practicable to disinfect by the foregoing methods, the entire interior of the tank shall be swabbed with a water solution containing 200 parts per million of available chlorine and allowed to stand for two hours before flushing and returning to service.

C. Contractor shall provide test kit for residual chlorine.

D. After contact period flush system with clear water until system tests no more than 0.2 PPM residual chlorine.

3.12 DOMESTIC WATER SYSTEM TEST

A. Test in accordance with the requirements of Section 15985A – "Plumbing, Testing, Adjusting and Balancing."

3.13 SPARE PARTS

A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bib, or faucet installed.

3.14 ADD LEAD TESTING NOTE

A. Following the completion of the P.C. work scope, the owner shall have the water conditions tested for lead containments by a third-party testing firm to regulation 67.4 of the Department of Health regulations as part of Section 1417 of the Federal Safe Water Act to determine "Lead-Free" compliance and SED guidelines of less then 15 parts per billion.

B. If the system does not comply with Sub-Part Regulation 67.4 of the DOH Section 1417 of the Federal Safe Water Act, the P.C. shall provide replacements at no additional cost, to then repeat the installation and testing requirements. The P.C. shall absorb the fee for the first lead testing procedure as well as the following confirmation procedures at no additional cost to the owner.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15412A – PLUMBING SANITARY PIPING SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of soil, waste and vent piping system work, is indicated on drawings and schedules, and by requirements of this section.
B. Applications for soil, waste and vent piping systems include the following:

1. Above ground soil, waste and vent piping within buildings including soil stacks, vent stacks, horizontal branches, traps, and connections to fixtures and drains.
2. Underground building drain piping including mains, branches, traps, connections to fixtures and drains, and connections to stacks, terminating at connection to sanitary sewer, 5’-0” from building wall, or where shown on drawing. Coordinate with site contractor.

C. Trenching and backfilling is required in conjunction with underground and building drain piping is specified in applicable Division 15A sections, and is included as work of this section.

1.03 QUALITY ASSURANCE

A. Plumbing code compliance - comply with applicable portions of New York State Uniform Fire Protection and Building Code, especially Article 9, Plumbing Requirements, State Sanitary Code, Department of Health, Division Sanitary Engineering, Bureau of Public Water Supply, any local codes or regulations that apply pertaining to plumbing materials, and the 2015 IPC especially Chapter 7.
B. ANSI compliance - comply with applicable American National Standards pertaining to products and installation of soil and waste piping systems.
C. PDI compliance - comply with applicable Plumbing and Drainage Institute Standards pertaining to products and installation of soil and waste piping systems.

1.04 SUBMITTALS

A. Product data - submit manufacturer's data for soil and waste piping systems materials and products on the following:

1. Pipe and Couplings
2. Clean outs
3. Floor drains

B. Acceptable Manufacturers

1. Floor Drains
   a. Jay R. Smith
   b. Josam
   c. Zurn
   d. Watts

2. Couplings for no-hub pipe
   a. Anaco
   b. Tyler

3. Soil Pipe
   a. Eastern Foundry
   b. Tyler Pipe
   c. Charlotte Pipe

PART 2 – PRODUCTS
(All to comply with the 2015 IPC)

2.01 SOIL AND WASTE PIPING MATERIALS AND PRODUCTS

A. General - provide piping materials and factory fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections, provide fittings of materials which match pipe materials used in soil and waste piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.02 BASIC IDENTIFICATION

A. General - provide identification complying with Specification Section 15057A, in accordance with the following listing:

1. Above ground soil, waste and vent piping - pipe markers.
2. Underground building drain piping - underground type plastic line markers.

2.03 PIPE

A. Below Ground:
   1. Service weight cast iron with push-on gaskets, hub and spigot. Compression Gaskets shall conform to the requirements of ASTM Standard C564-14 and CISPI310.

B. Above Ground:
   1. Service weight C.I. soil pipe and fittings with no-hub joints. Make: Tyler pipe or equal by Eastern Foundry Co. Anaheim Foundry Co.
   2. Copper drainage tubing, type DWV, shall not be used on site.
   3. Exposed: Sch. 40 chrome plated brass, threaded, sponge cleanable.

2.04 COUPLINGS FOR NO-HUB PIPE

A. Description: Type 304 stainless steel shield and 3/8” slot head 304 stainless steel screws. All other component metal parts shall be 304 stainless steel. The coupling sealing gasket shall be made of Neoprene as the sole elastomer. A cast iron coupling may be used.

Do not use under ground. Coupling shall meet or exceed CISPE Standard 310.

B. Make: Anaheim Co., Tyler Pipe.

2.05 BASIC PIPING SPECIALTIES

A. General - provide piping specialties complying with Division 15A Basic Materials and Methods section, in accordance with the following listing:

1. Pipe escutcheons.
2. Mechanical sleeve seals.
3. Pipe sleeves.

2.06 BASIC SUPPORTS AND ANCHORS

A. General - provide supports, anchors and seals complying with Division 15A Basic Materials and Methods section "Supports and Anchors".

2.07 CLEANOUTS

A. General

1. Units shall meet all design parameters shown on the drawings.
2. Units shall be complete with all design features and accessories necessary to provide a coordinated installation (such as carpet markers, tile recesses, etc.).
3. Units shall be of the following sizes:

   a. Line size for piping to 4”.
   b. 4” for piping from 5” to 8”.
   c. 6” for piping 10” and larger.

4. Location:

   a. At each bend of more than 45 degrees.
   b. At bottom of soil or waste stacks and rainwater leaders.
   c. At 50’ intervals or less on horizontal pipe lines 4” or smaller.
   d. At 50’intervals or less horizontal pipe lines 5” or larger.
   e. At exit of sanitary and storm drains from building.
   f. Wherever shown on the drawings.
   g. At the end of each branch line serving more than two fixtures.

5. Placement: must be located where they will be accessible. Check general construction drawings for location of lockers or other equipment which may prevent access.

B. Cleanout Types

1. Deck Plate Cleanout:

   a. Adjustable cast iron floor cleanout with inside caulk outlet, adjustable ABS housing, clamp device, internal tapered bronze cleanout plug, secured round scoriated nickel alloy cover plate. Jay R. Smith Figure 4020.

2. Wall Plate Cleanout:

a. Exposed installation: Cast iron 'T' branch cleanout tee with bronze tapered plug. Jay R. Smith Fig. 4510
b. Concealed installation behind plaster, dry or masonry walls: Provide cleanout tee with bronze plug tapped for center screw similar to exposed installation with polished vandalproof stainless steel access plate.

3. Cleanout:

a. Cast iron cleanout with straight body for caulking into soil pipe hub and fitted with bronze plug countersunk or raised head as required.

4. Exterior Cleanout:

a. Round coated cast iron access frame, heavy duty scoriated (vandalproof), secured cover. Coated cast iron cleanout ferrule with inside caulk connection and recessed tapered thread bronze plug.

2.08 FLOOR DRAINS

A. Drains and traps shall be same size as waste pipes. Provide clamping devices for drain flashing. Provide P-trap in outlet from each drain, or as shown on drawings.
B. Drain bodies to be cast iron.
C. Floor drains shall be by Jay R. Smith, Zurn, Watts or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

A. General - install plumbing identification in accordance with Specification Section 15057A.

3.02 INSTALLATION OF SOIL WASTE AND VENT PIPING

A. General - install soil and waste piping in accordance with Division 15A Basic Materials and Methods section "Pipe, Tube and Fittings" and with Plumbing Code having jurisdiction.

B. Solder joints use Type 1 solder.

C. Insulate vent piping within three feet of passage through roof.

3.03 INSTALLATION DRAINAGE PIPING - SANITARY

A. Changes in direction long sweep bends or 1/8 and/or 1/16 bends.

B. Connections of branches to mains with "Y" fittings and 1/8 and/or 1/16 bends.

C. All connections of horizontal into vertical piping with long turn sanitary "T-Y's".

D. Grade the "horizontal" piping 1/4" per foot, minimum for 2 1/2 ” or less, 1/8” per foot minimum for 3” and larger.

3.04 TURNS AND OFFSETS

A. Turns:

1. From vertical to horizontal:
   a. Less than 3”: Use long sweep or extra-long turn elbow.
   b. 3” and larger: Use short sweep or 90° short turn fittings.
   c. Horizontal piping: Use 45° wyes, long sweeps: 1/4, 1/6, 1/8 and 1/16 bends or any combination of same.
   d. For vents in any direction; Use quarter bends or 90° short turn fittings.

B. Offsets:

1. Make offsets at no less than 45° angle to the horizontal in the following cases:

   a. Offsets in stack vent portion of soil and waste stacks (above the highest fixture drainage connection).
   b. Offset in vent stacks.
   c. Grade the “horizontal” piping 1/4" per foot.
   d. Connect all plumbing fixtures into sanitary house drain. No case shall soil or waste pass through more than one trap before entering house drain.

3.05 INSTALLATION OF VENT PIPING

A. Provide vents shown and required by Plumbing Code.

B. Grade vents to discharge water of condensation.

C. Make offsets at 45 degree angle.

D. Connect upper ends of drainage lines to vent system or extend through roof without decreasing size.

E. Arrange vents and connections except wet vents, so not to carry drainage.

C. Connect bottom to drains so drainage will wash out rust and scale.

D. Extend vents above floor line to not less than 6" above flood rim of highest fixture before running horizontally.

E. Terminate vents 18 inches above roof line.

F. Increase pipes smaller than 3" to 3" from 18 inches below roof to terminus, using standard length tapered increasers.

3.06 INSTALLATION OF PIPING SPECIALTIES

A. Install piping specialties in accordance with Division 15A Basic Materials and Methods section.

3.07 INSTALLATION OF SUPPORTS AND ANCHORS

A. Install supports, anchors and seals in accordance with Division 15A Basic Materials and Methods section.

3.08 INSTALLATION OF DRAINAGE PIPING PRODUCTS

A. Cleanouts - install in sanitary above ground piping and sanitary building drain piping as indicated, as required by Plumbing Code, and at each change in direction of piping greater than 45 degrees, at minimum intervals of 50' for piping 4" and smaller and 50' for larger piping, and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping.
B. Flashing flanges - install flashing flange and clamping device with each stack and cleanout passing through waterproof membranes.

3.09 INSTALLATION OF FLOOR DRAINS

A. General - install floor drains in accordance with manufacturer's written instructions and in locations indicated.
B. Coordinate with soil and waste piping as necessary to interface floor drains with drainage piping systems.
C. Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.
D. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.
E. Position drains so that they are accessible and easy to maintain.

3.10 FLASHING

A. General

1. Flash openings with 6 lb. copper flashing.
2. Make watertight, allow for expansion and contraction.

B. Vent pipes

1. Extend not less than 12" from base of pipe.
2. Turn flashing over edge on cast iron; extend into same one (1) inch.
3. Ream coupling screw down over flashing at least one (1) inch screwed pipe.
4. Copper flashing assembly acceptable.

C. Waterproof pipes through waterproof walls or floors: See details on drawings.

3.11 EQUIPMENT CONNECTIONS

A. Piping runouts to fixtures - provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, but in no case smaller than required by Plumbing Code. Traps and tailpieces shall be chrome plated brass. Waste stubs out of wall (exposed) shall be sch. 40 threaded chrome plated brass. All exposed surfaces shall be sponge cleanable.

3.12 INSPECTION AND TEST

A. New drainage piping shall be subjected to hydrostatic pressure test, see requirements in Section 15985, "Plumbing Testing, Adjusting and Balancing".

3.13 PROTECTION

A. Protect drains during remainder of construction period, to avoid clogging with construction materials and debris and to prevent damage from traffic and construction work.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15413A – PLUMBING STORM WATER PIPING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of storm water piping work, is indicated on drawings, and by requirements of this section.

B. Applications for storm water piping include the following:

1. Conductor piping from roof drains to storm building drain.

2. Storm building drain piping from conductor piping and area drains to storm sewer.

C. Insulation for storm water piping is specified in specification section 15180A, and is included as work of this section.

D. Trenching and backfill required in conjunction with storm building drain piping is specified in specification section 15011A, and is included as work of this section.

1.03 QUALITY ASSURANCE

A. Plumbing code compliance - comply with applicable portions of Plumbing Standards, New York State Uniform Fire Protection and Building Code, especially Article 9, Plumbing Requirements, State Sanitary Code, Department of Health, Division Sanitary Engineering, Bureau of Public Water Supply, any local codes or regulations that apply pertaining to plumbing materials.

B. ANSI compliance - comply with applicable American National Standards pertaining to products and installation of storm water piping systems.

1.04 SUBMITTALS

A. Product data - submit manufacturer's data for storm water piping systems materials and products on the following:

1. Cleanouts
2. Catch Basins

B. Acceptable Manufacturers

1. Roof Drains

   a. By General Contractor.

2. Couplings for no-hub pipe

   a. Anaco 'Husky'
   b. Clamp-All
   c. MG Coupling

3. Soil Pipe

   a. Eastern Foundry
   b. Tyler Pipe
   c. Charlotte Pipe

4. Catch Basins
   a. Jay R. Smith
   b. Josam
   c. Zurn

PART 2 - PRODUCTS

2.01 STORM WATER PIPING MATERIALS AND PRODUCTS

A. General - provide piping materials and factory fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections, provide fittings of materials which match pipe materials used in storm water piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.02 BASIC IDENTIFICATION

A. General - provide identification complying with specifications section 15057A plumbing identification systems, in accordance with the following listing:

1. Above ground conductor piping - plastic pipe markers.
2. Underground building drain piping - underground type plastic line markers.

2.03 PIPE

A. Above Ground Piping within building:

1. Hubless cast-iron pipe
   a. Pipe class – service weight

b. Fittings – hubless cast-iron soil pipe fittings, hubless joints.

2. Galvanized Steel Pipe
   a. Pipe Weight - Schedule 40
   b. Fittings - Class 125 galvanized cast-iron drainage pattern screwed joints.
   c. Fittings – mechanical grooved type.

B. Below Ground:

1. Service weight cast iron with push-on gaskets.
2. Fittings – cast-iron, hub-and-spigot soil pipe fittings with neoprene gaskets. Gaskets shall conform to the requirements of ASTM Standard C-564.

2.04 COUPLINGS FOR NO-HUB PIPE

A. Description: A heavy duty 24 gauge type 304 stainless steel shield and 3/8" slot head 304 stainless steel screws. All other component metal parts shall be 304 stainless steel. The coupling sealing gasket shall be made of Neoprene as the sole elastomer. Coupling shall comply with CISPI 310. Do not use under ground. Torque to 80 in-lb. Joints shall be good for a minimum of 15 psi. Above these pressures, all piping shall be properly restrained at each joint.
B. Make: Anaco, Tyler, Clamp-All.

2.05 BASIC PIPING SPECIALTIES

A. General – provide piping specialties complying with Division 15A Basic Materials and Methods section "Piping Specialties", in accordance with the following listing:

1. Pipe escutcheons
2. Mechanical sleeve seals
3. Drip pans
4. Pipe sleeves
5. Sleeve seals

2.06 BASIC SUPPORTS, ANCHORS AND SEALS

A. General - provide supports, anchors and seals complying with Division 15A Basic Materials and Methods section “Supports, Anchors and Seals”.

2.07 CLEANOUTS

A. General

1. Units shall meet all design parameters shown on the drawings.
2. Units shall be complete with all design features and accessories necessary to provide a coordinated installation (such as carpet markers, tile recesses, etc.).

3. Units shall be of the following sizes:

   a. Line size for piping to 4".
   b. 4" for piping from 5" and larger

4. Location:

   a. At each bend of more than 45 degrees.
   b. At bottom of soil or waste stacks and storm water leaders.
   c. At 50' intervals or less on horizontal pipe lines 4" or smaller.
   d. At 100' intervals or less on horizontal pipe lines 5" or larger.
   e. At exit of sanitary and storm drains from building.
   f. Wherever shown on the drawings.
   g. At the end of each branch line serving more that two fixtures.

5. Placement: must be located where they will be accessible. Check general construction drawings for location of lockers or other equipment which may prevent access.

B. CLEANOUT TYPES

1. Deck Plate Cleanout, CODP:

   a. Adjustable cast iron floor cleanout with inside caulk outlet, adjustable ABS housing, clamp device, internal tapered bronze cleanout plug, secured round scoriated nickel alloy cover plate. Jay R. Smith Figure 4020.

2. Wall Plate Cleanout, COWP:

   a. Exposed installation: Cast iron 'T' branch cleanout tee with bronze tapered plug. Jay R. Smith Fig. 4510
   b. Concealed installation behind plaster, dry or masonry walls: Provide cleanout tee with bronze plug tapped for center screw similar to exposed installation with polished vandalproof stainless steel access plate. Jay R. Smith Fig. 4530

3. Cleanout, CO:

   a. Cast iron cleanout with straight body for caulking into soil pipe hub and fitted with bronze plug countersunk or raised head as required. Jay R. Smith Fig. 4280.

4. Exterior Cleanout:

   a. Round coated cast iron access frame, heavy duty scoriated (vandalproof), secured cover. Coated cast iron cleanout ferrule with inside caulk connection and recessed tapered thread bronze plug. Jay R. Smith fig. 4250.

A. Drains to be same size as connecting roof leader.
B. Install sump pan.
C. Secure drain body to deck with a deck clamp bolted to underside of drain body.
D. Seal extension sleeve to body as required by manufacturer's design. Extension height as required.
E. Protect from roofing tar or gravel entering drain body.
F. Drains to be cast iron with cast iron dome.
G. Manufacturer:
   1. General Roof Drain: Jay R. Smith model 1010.
   2. Overflow Roof Drain with 3" high water dam: Jay R. Smith Model 1070 with 3" high PVC standpipe.

2.09 CATCH BASINS (Provided & installed by G.C.)

A. Description: Heavy duty roadway drain, coated cast iron flanged body with vandal proof grate and dome bottom strainer. Galvanized cast iron grate.
B. Make and model: Jay R. Smith model 2570

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

A. General - install mechanical identification in accordance with Specifications Section 15057A, Plumbing Identification Systems.

3.02 INSTALLATION STORM WATER PIPING

A. Changes in direction long sweep bends or 1/8 and/or 1/16 bends.
C. Connections of branches to mains with "Y" fittings and 1/8 and/or 1/16 bends.
D. All connections of horizontal into vertical piping with long turn sanitary "T-Y's".
E. Grade the "horizontal" piping 1/4" per foot, minimum for 3" and less, 1/8" per foot minimum for 4" and longer.

3.03 INSTALLATION OF CLEANOUTS

A. Install in conductor piping and storm building drain piping as indicated on drawings, at each change in direction of piping greater than 45 degrees, at minimum intervals of 50' for piping 4" and smaller and 100' for larger piping, and at base of each conductor. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.
B. Provide flashing flange and clamping device for cleanouts passing through waterproof membrane.

3.04 INSTALLATION OF ROOF DRAINS

A. Roof drains t6o be provided and installed by the general contractor.
B. Coordinate piping work with general contractor.

3.05 INSTALLTION OF CATCH BASINS

A. All catch basins to be installed by the general contractor.
B. Coordinate drains and piping with site contractor.

3.07 INSTALLATION OF PIPING SPECIALTIES

A. Install piping specialties in accordance with requirements of Division 15A Basic Materials and Methods section "Piping Specialties".

3.08 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

A. Install supports, anchors and seals in accordance with Division 15A Basic Materials and Methods section "Supports, Anchors and Seals".

3.09 INSTALLATION OF SPECIAL EXPANSION COMPENSATION PRODUCTS

A. Expansion joints – install expansion joints on vertical risers as indicated, and as required by Plumbing Code having jurisdiction.

3.10 FLASHING

A. General

1. Flash openings with 6 lb. metal flashing.
2. Make watertight, allow for expansion and contraction.

B. Waterproof pipes through waterproof walls or floors. See Details on Contract Drawings.

C. Cleanouts

1. Install 6 lb. Nobel "Chloraloy". Extend 12" from flange edge.

D. Roof drains

1. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes, where penetrated.
2. Install 6 lb. Nobel "Nobelflex" flashing.
3. Turn down into drain. Extend 12" from flange edge.

3.11 ADJUSTING, CLEANING, AND TESTING

A. New drainage piping shall be subjected to hydrostatic pressure test, see requirements in Section 15985B, “Plumbing Testing, Adjusting and Balancing”.

3.12 PROTECTION

A. Protect drains during remainder of construction period, to avoid clogging with construction materials and debris and to prevent damage from traffic and construction work.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15440A - PLUMBING FIXTURES AND TRIM

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

A. Extent of plumbing fixtures and trim work is indicated by drawings and by requirements of this section.

B. Types of plumbing fixtures required for the project including but not limited to, the following:

1. Water closets.
2. Urinals.
3. Lavatories.
4. Sinks.
5. Mop sinks.
6. Electric water coolers.
7. Specialty faucets.
8. Showers
9. Floor Drain
10. Hose Bibbs
11. Emergency Eye Wash/Showers
12. Drinking Fountains
13. Bathtubs
14. Shower Bases

C. Refer to Division 16 sections for electrical connections to following plumbing fixtures, not work of this section.

1. Electric water coolers.
2. Electronic flush valves and faucets.

1.02 SUBMITTALS

A. Product Data: Submit Product Data and installation instructions for each fixture, faucet, specialties, accessories, trim etc.

1. Clearly indicate rated capacities of selected models of water coolers.
2. Identify compliance with specified ANSI, UL, ASHRAE and New York State Standards, Codes and Listings and Lead Free Standards. (NSF)

B. Shop Drawings: Submit rough-in drawings. Detail dimensions, rough-in requirements, required clearances and methods of assembly of components and anchorages. Coordinate requirements with Architectural Woodwork shop drawings for fixtures installed in countertops and cabinets. Furnish templates for use in woodwork shop.

C. Wiring Diagrams: Submit manufacturer's electrical requirements and wiring diagrams for power supply to units. Clearly differentiate

between portions of wiring that are factory installed and field installed portions.

D. Color Charts: Submit manufacturer's standard color charts for fixture colors.

1.03 QUALITY ASSURANCE

A. Plumbing code compliance: Comply with applicable portions of New York State Uniform Fire Protection and Building Code, especially Article 9, Plumbing Requirements, and any local codes or regulations that apply pertaining to plumbing material, and 2015 IPC.

B. New York State Law plumbing fixtures to comply with New York State Conservation Law 15-0314.

1. Lavatory faucets: 0.5 gpm self-closing faucet, or a metering faucet which limits discharge to a maximum of 0.25 gallons per cycle.
2. Sink faucets: 2.2 gpm.
3. Urinal flush valves: .5 gal. per flush.
4. Water closets: 1.3 gal. per flush.
5. Shower Head: 2.0 gpm

C. Plumbing fixture standards: Comply with applicable portions of National Standard Plumbing Code pertaining to materials and installation of plumbing fixtures.

D. Codes and Standards

1. ASHRAE Standard 18: "Method of Testing for Rating Drinking Water Coolers with Self-Contained Mechanical Refrigeration Systems.
2. Add NSF Lead Free
3. ARI Standard 1010: "Self-Contained Mechanically-Refrigerated Drinking-Water Coolers".
4. ICC Standard A117.1-09: "Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People".
5. Public Law 90-480: "Architectural Barriers Act of 1968".
6. UL Standard 399: Standard for "Drinking-Water Coolers".
7. Public Law 101-336: "Americans with Disabilities Act".
8. ANSI A117.1 – Accessible and Usable Buildings and Facilities
9. ASHRAE Std 18 – Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008.
10. ASME A112.6.1M – Supports for Off-the Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2002).
11. ASME A112.18.1 – Plumbing Supply Fittings; 2012.
12. ASME A112.19.2 – Ceramic Plumbing Fixtures; 2013.
13. ASME A.112.19.3 – Stainless Steel Plumbing Fixtures (Designed for Residential Use); 2008 (R2013).
14. ASME A112.19.5 – Flush Valves and Spuds for Water Closets,

Urinals, and tanks; 2011
15. NSF 61 – Drinking Water System Components – Health Effects; 2014 (Errata 2015).
16. NSF 372 – Drinking Water System Components – Lead Content; 2011

1.04 DELIVERY, STORAGE AND HANDLING

A. Store fixtures where environmental conditions are uniformly maintained within the manufacturer's recommended temperatures to prevent damage.

B. Store fixtures and trim in the manufacturer's original shipping containers. Do not stack containers or store in such a manner that may cause damage to the fixture on trim.

1.05 SEQUENCE AND SCHEDULING

A. Schedule rough-in installations with the installation of other building components.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

A. General: Type, style, and material indicated, including stops, valves, faucets, strainers, wastes, escutcheons, bolts, screws, bushings, etc.

B. Fixtures of same type must be furnished by single manufacturer.

2.02 MATERIALS

A. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, decoloration, or other surface imperfections on finished units are not acceptable.

B. Fittings, trim and accessories to be copper or brass unless otherwise noted.

1. Exposed or semi-exposed: Bright chrome-plated units.
2. Escutcheons: Cast brass, bright chrome-plated with set screw.

C. Stainless steel sheets: ANSI/ASTM A 167, Type 302/304, hardest workable temper.

1. Finish: No. 4, bright, directional polish on exposed surfaces.

D. Steel sheets for baked enamel finish: ANSI/ASTM A 591, coating Class C, galvanized bonderized.

E. Steel sheets for porcelain enamel finish: ANSI/ASTM A 424, commercial quality, Type I.

F. Galvanized steel sheet: ANSI/ASTM A 526, except ANSI/ASTM A 527 for extensive forming, ANSI/ASTM A 525, G90 zinc coating, and chemical treatment.

G. Vitreous china: High quality, free from fire cracks, spots, blisters, pinholes and specks, glaze exposed surfaces, and test for crazing resistance in accordance with ANSI/ASTM C 554.

H. Fiberglass: ANSI Z 124, smooth surfaced, with color selected by Architect/Engineer.

I. Synthetic stone: High quality, free from defects, glaze on exposed surfaces, stain resistant.

J. Manufacturer

1. Fixtures: American Standard, Crane, Kohler, Eljer.
2. Flush valves: American Standard, Sloan.
3. Closet seats: Church, Beneke, Bemis.
4. Chair carriers: Josam, Smith, Zurn.
5. Supplies and traps: Fixture manufacturer or McGuire, Eastman Central D, Brass Craft, Bridgeport Brass.
6. Master mixing valves: Powers, Symmons, Leonard.

2.03 PLUMBING FITTINGS, TRIM & ACCESSORIES

A. Refer to the "Plumbing Fixture Schedule" on the contract drawings for plumbing fixture manufacturer / model number information.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify all dimensions by field measurements. Verify that all plumbing fixtures may be installed in accordance with pertinent codes and regulations, the original design and the referenced standards.

B. Examine rough-in for potable water and waste piping systems to verify actual locations of piping connections prior to installing fixtures.

C. Examine walls, floors and cabinets for suitable conditions where fixtures are to be installed.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install plumbing fixtures level and plumb in accordance with fixture manufacturer's written instructions, rough-in drawings and pertinent codes and regulations, the original design and the referenced standards.

B. Comply with the installation requirements of ICC Standard A117.1, Public Law 90-480 and Public Law 101-336 with respect to plumbing fixtures for the physically handicapped.

1. Water closets flush valve handle on open side of fixtures.
2. Insulate water supply and drain pipes under wheelchair accessible lavatories and sinks or as otherwise shown on drawings.

C. Fasten plumbing fixtures securely to supports or building structure. Secure supplies behind or within wall construction to provide rigid installation.

D. Set following in a leveling bed of cement grout.

1. Mop sinks.
2. Tubs.

E. Install a Lead Free stop valve in an accessible location in the water connection to each fixture.

F. Install escutcheons at following locations:

1. Wall penetrations, exposed finished locations.
2. Floor penetrations, exposed finished locations.
3. Ceiling penetrations, exposed finished locations.
4. Within cabinets and millwork.

G. Seal fixtures to walls and floors using silicone sealants or latex caulking. Match sealant color to fixture color.

H. Install a sediment trap at each sink or grouping of sinks in Art Rooms. Install so that trap may be easily serviced and removed.

3.03 EQUIPMENT TO BE FURNISHED BY OTHERS

A. Make complete plumbing connections to fixtures and equipment to be furnished by others. Secure exact locations and roughing-in dimensions before beginning work.
B. Provide approved supplies with stops and escutcheons, cast brass traps and wastes with CO plug and escutcheon.
C. All exposed piping chrome plated.
D. Equipment shall be chrome plated except piping located below equipment.

3.04 FIELD QUALITY CONTROL

A. Test fixtures to demonstrate proper operation upon completion of installation and after units are water pressurized.
B. Inspect each installed unit for damage and operation. Replace damaged or faulting operating fixtures.

3.05 CLEANING

A. Clean fixtures, trim and strainers using manufacturer’s recommended cleaning methods and materials.

3.06 PROTECTION

A. Provide protective covering for installed fixtures, water coolers and trim.
B. Do not allow use of fixtures for temporary facilities unless expressly approved in writing by the Owner.

3.07 SPARE PARTS

A. Furnish special wrenches, water filters and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt in a quantity of one device for each 10 fixtures.

B. Furnish faucet repair kits complete with all necessary washers, springs, pins, and retainers, packings, O-rings, sleeves and seats in a quantity of 1 kit for each 40 faucets.

END OF SECTION

DIVISION 15a - PLUMBING

SECTION 15511a – FIRE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

A. Only tested fire stop systems shall be used in specific locations as follows:

1. Penetrations for the passage of ductwork, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Safing slot gaps between edge of floor slabs and curtain walls.

C. Openings between structurally separate sections of wall or floors.

D. Gaps between the top of walls and ceilings or roof assemblies.

E. Expansion joints in walls and floors.

F. Openings and penetrations in fire-rated partitions or walls containing fire doors.

G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03300 - Cast-In-Place Concrete
2. Section 07900 - Joint Sealers
3. Section 04200 - Masonry Work
4. Section 09200 - Lath and Plaster
5. Section 09250 - Gypsum Drywall Systems
6. Section 13080 - Sound, Vibration and Seismic Control
7. Section 13900 - Fire Suppression and Supervisory Systems

8. Section 15050 - Basic Mechanical Materials and Methods
9. Section 15250 - Mechanical Insulation
10. Section 15300 - Fire Protection
11. Section 15400 - Plumbing
12. Section 16050 - Basic Electrical Materials and Methods

1.05 REFERENCES

A. Test Requirements: ASTM E-814-02, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:

a. Fire stop Devices (XHJI)
b. Fire Resistance Ratings (BXUV)
c. Through-Penetration Fire stop Systems (XHEZ)
d. Fill, Voids, or Cavity Material (XHHW)
e. Forming Materials (XHKU)

2. Alternate "Omega Point Laboratories Directory" (updated annually)

C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems" (July 1998.)

D. Test Requirements: ASTM E 1966-01, "Standard test method for Fire Resistive Joint Systems"

E. Inspection Requirements: ASTM E 2174 – 01, "Standard Practice for On-site Inspection of Installed Fire Stops."

F. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

G. ASTM E-84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.

H. All major building codes: ICBO, SBCCI, BOCA, and IBC.

I. NFPA 101 - Life Safety Code

J. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.

B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Hilti, Inc., Tulsa, Oklahoma (or equal)
   800-879-8000

2.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type,

annular space requirements, and fire-rating involved for each separate instance.

B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:

1. Hilti CP 680 Cast-In Place Firestop Device
   a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.

2. Hilti CP 681 Tub Box Kit for use with tub installations.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 604 Self-leveling Firestop Sealant
3. Hilti CP 620 Fire Foam
4. Hilti CP 606 Flexible Firestop Sealant
5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601s Elastomeric Firestop Sealant
2. Hilti CP 606 Flexible Firestop Sealant
3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti CP 677 Speed Plugs
2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Fire stop Sealant
2. Hilti CP 618 Fire stop Putty Stick
3. Hilti CP 620 Fire Foam
4. Hilti CP 601s Elastomeric Fire stop Sealant
5. Hilti CP 606 Flexible Fire stop Sealant

I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti CP 618 Fire stop Putty Stick

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Fire stop Putty Pad

K. Fire stop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 642 Fire stop Collar
2. Hilti CP 643 Fire stop Collar
3. Hilti CP 645 Wrap Strips

L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti CP 637 Trowelable Fire stop Compound
2. Hilti FS 657 FIRE BLOCK
3. Hilti CP 620 Fire Foam

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Fire stop Sealant
3. Hilti CP 606 Flexible Fire stop Sealant
4. Hilti CP 604 Self-Leveling Fire stop Sealant

O. Provide a fire stop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

P. Provide a fire stop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which fire stop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate location and proper selection of cast-in-place Fire stop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place fire stop devices without interferences.

3.03 INSTALLATION

A. Regulatory Requirements: Install fire stop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL fire stop systems that might hamper the performance of fire dampers as it pertains to duct work.

3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing fire stop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess fire stop materials and soiling as work progresses.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15985A - PLUMBING, TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of testing, adjusting and balancing work is indicated by requirements of this section, and also by drawings and schedules.

B. Component types of testing, adjusting and balancing specified in this section includes the following:

1. Rough sanitary and storm piping.
2. Water supply system.
3. Gas system – Refer to 15488A

1.03 QUALITY ASSURANCE

A. Installer - a firm with at least 3 years of successful testing, adjusting and balancing experience on projects with testing and balancing requirements similar to those required for this project.

1.04 REQUIREMENTS

A. No system shall be covered or concealed until tested, approved.

B. Pay for Permit and Inspection Fees required by Authority having jurisdiction.

C. Test in presence of Owner's Representative and Plumbing Inspector.

D. Prove tight for period stated or longer if required.

E. Tests may be made in sections.

1.05 CODES AND REQUIREMENTS

A. Comply with latest editions and applicable portions of International Plumbing Code, Local Plumbing Standards, New York State Building Code, especially Article 9, Plumbing Requirements and Plumbing Code.

B. Comply with applicable portions of Standards for Waste Treatment Works, New York State.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide test equipment and materials necessary for tests.

PART 3 - EXECUTION

3.01 GENERAL

A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable.

B. Test, adjust and balance systems and components as indicated, in accordance with procedures outlined below and in applicable standards. Test which follows shall be considered minimum standards.

3.02 TESTS & INSPECTIONS TO BE

A. Rough Sanitary and Storm Piping.

1. Stop openings, fill with water to top of highest vent. Water shall hold constant for two (2) hours.
2. May be tested in sections using water pressure test.
3. Test pressure shall be equal to at least 10 ft. water column at all points.
4. Retest at least upper 10 ft. of next lower section.
5. Compliance with the Department of Health Lead in Water Regulation is located on Drawings.

B. Water Supply System.

1. Fill, subject to 125 psig hydrostatic pressure at lowest level for two (2) hours.
2. Fixtures shall not be connected into system during test.
3. After fixtures are connected, test system for two (2) hours, at 75 PSIG or prevailing water pressure, whichever is higher.
4. Regulate flow of water to each fixture.
5. Adjust balancing valves on hot water system.
6. Faucets, flush valves shall operate satisfactorily without waste of water, without objectionable noise.

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16010 – GENERAL PROVISIONS

PART 1 – GENERAL

1.01 GENERAL

A. Applicable provisions of the Conditions of the Contract shall govern the work of Division 16 and its related sections.

B. Intent:

1. The drawings and specifications are intended to provide for a complete and ready for operation electrical installation. However, both the drawings and specifications are for the Division 16 Contractor's guidance and are not intended to give every detail of the existing conditions or new installations nor do they describe every fitting required for the installation of the work. The Division 16 Contractor shall furnish, install, and place in workmanlike manner all equipment, accessories, supports, fittings, and all other material needed for the complete electrical installation. The Division 16 Contractor shall prepare such additional drawings as necessary or required for any purpose and shall submit them for the approval of the Engineer.

2. Before submitting his proposal, the Division 16 Contractor shall be fully informed to the extent, character, and intent of the work to be done by him. No consideration will be granted for any misunderstanding of the material to be furnished or work to be performed. See also the applicable sections of the Conditions of the Contract.

C. Verifying Existing Conditions:

1. The Division 16 Contractor, before submitting his bid, shall examine the site to which this work is in any way dependent upon according to the intent of these specifications and accompanying drawings. He shall report to the Engineer, in writing, with his bid, any conditions which prevent him from performing his work. No "Waiver of Responsibility" for inadequate, incomplete, or defective work will be considered by the Engineer unless writing notice had been filed by the Division 16 Contractor with his bid.

D. Cooperation:

1. The work called for in this Specification and indicated on the accompanying drawings shall be carried on in conjunction with the continued operation of the building and shall be so arranged that its installation and operation will conform with and facilitate the early installation of the work.

2. The Division 16 Contractor shall bear the expense required to revise his work due to any failure to coordinate the installation of his work with that of the buildings operation.

3. The Division 16 Contractor shall be responsible for the distribution and information concerning his work as required for the prompt installation. The Division 16 Contractor will be held fully responsible for any delay in the work as to any information, etc. regarding his work as required. See also the applicable sections of the Conditions of the Contract.

4. The Division 16 Contractor shall assist the Owner in applying for any available rebates from manufacturer's, utility companies, etc. on equipment or materials installed under the contract. Provide all required documentation and assist in the completion of applications as required to complete the rebate process. All proceeds from rebates remain the property of the Owner.

E. Accessibility and Clearances:

1. The Division 16 Contractor shall inform himself fully regarding peculiarities and limitations of space for the installation the materials and equipment under Division 16. He shall verify all dimensions and conditions in the field and from rough-in drawings of the equipment manufacturer. No extra compensation will be allowed because of differences between actual dimensions and the sizes shown on the drawings.

2. The Division 16 Contractor shall see that all his equipment such as apparatus necessary to be reached from time-to-time for operation and maintenance are made easily accessible. All work shall be checked for interferences with beams, ducts, pipes, etc. prior to installation of any equipment.

3. Although the location of equipment may be shown on the drawings in a specific place, the construction of the building may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such case, the Division 16 Contractor shall call the Engineer's attention to same before installing the work and shall be guided by the Engineer's instruction.

F. Protection of the Work:

1. The Division 16 Contractor shall effectively protect, at his expense, all materials and equipment, including his employees, during the period of construction and he shall be held responsible for all damage done to his work, until the same is fully accepted by the Architect. See also the applicable sections of the Conditions of the Contract.

2. The Division 16 Contractor shall exercise particular care insuring that work in progress, and notably switchgear,

shall not become wet from condensation or water for any source. Further, he shall protect work in progress from contamination, overspray, or other damage from other trades, including his own. All traces of such events shall be removed, remedied, or otherwise corrected to turn over the electrical system to the Owner in new condition.

G. Shop Drawings:

1. For Shop Drawing requirements, see the applicable sections of the Conditions of the Contract. In addition, The Division 16 Contractor shall submit all shop drawings within 30 days of signing Contract. Generally, all equipment and materials of the same classification, type, or kind shall be submitted at one time in a bound brochure. All shall include a minimum of special shop drawings and shall be accomplished by a written detailed sequence of operation together with schematic wiring diagrams which shall show the functions, facilities, operation, and inter-connections of the equipment. Shop drawing submission not including this information will not be considered. Any construction delays caused by failure to submit shop drawings on time or in the proper format shall be the responsibility of the Division 16 Contractor.

2. Engineer/Architect review of contractor submittals and shop drawings is for general conformance with the design concept of the project and for compliance with the information provided in the Contract Documents. The Contractor is responsible for confirming all quantities and fit. Engineer / Architect acceptance of quantities provided in the Contractor's Submission shall not be used as basis of Change Order.

3. Contractor submission of equivalent or substitute items other than those specified is at Contractor convenience only. If a substitution or equivalent is accepted, the Contractor shall coordinate the installation of the substitute or equivalent and make all associated changes required. The Contractor also waives any claim for additional costs associated with the substitute / equivalent which becomes apparent before, during or after installation. The Contractor agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution / equivalent.

H. Guarantee:

1. For guarantee requirements, see the applicable section of the Conditions of the Contract.

1.02 SPECIAL CONDITIONS

A. This Contractor, as well as subcontractors for his work, must carefully read the "Instructions to Bidder" and study the plans and specifications.

B. It is the intention of these specifications and the drawings accompanying same that they shall provide for the furnishing and installing of the indicated items complete as specified and as shown. Any work on the drawings, particularly described in these specifications, or vice versa, or any work or change which may be evidently necessary to complete the installation shall be furnished by the Contractor as being included in this Contract.

C. During the course of the work, should any ambiguities or discrepancies be found on the drawings or in the specification, to which the Contractor has failed call attention before submission of his bid, than the Engineer shall interpret the intent of the drawings and specifications, and the Contractor hereby agrees to abide by the Engineer's interpretation and agrees to carry out the work in accordance with the decision of the Engineer. It is expressly stipulated that neither the drawings nor the specifications shall take precedence, one over the other, and it is further stipulated that the Engineer may interpret or construe the drawings and specifications of the work, and of that question, the Engineer shall be the sole judge.

D. This Contractor shall provide and erect all sheds for the storage of his materials and provide temporary office for plans, details, records, etc. He shall furnish all scaffolding and equipment required for the installation of his work.

E. Where no specified kind or quality of material is given, a first class standard article as approved by the Engineer shall be furnished. The drawings and specifications do not undertake to illustrate or set every item necessary for the work, as it is assumed that the Contract is expert in the several lines of the work and is capable of interpreting them.

F. Small details not usually shown or specified but necessary for a proper installation and finishing shall be included in the Contractor's estimate, the same as if hereby specified or shown.

G. This Contractor assumes the responsibility to fit his equipment into every space regardless of discrepancies in the plans and/or specifications unless he notified the Engineer in writing, prior to the acceptance of his bid, of these discrepancies.

1.03 WORK INCLUDED

A. These specifications and the accompanying drawings are intended to include the furnishings of all labor, materials, tools, hoists, transportation, equipment apparatus, and all required appurtenances and incidental auxiliaries necessary for the installation of the electrical work in a safe, substantial, workmanlike manner, complete in every detail, tested, programmed and ready for satisfactory operation.

B. Any equipment called for in these specifications and not shown on the drawings and vice versa shall be furnished and installed complete as would any equipment both specified and shown. Generally, the work under Division 16 shall include, but shall not necessarily be limited to, the following items. Omission of specific items shall not be construed as being omitted from Division 16.

1.04 CODES, PERMITS, AND CERTIFICATES

A. All work, material, and equipment under Division 16 shall comply with the current applicable requirements of an approved electrical construction agency serving the locale of the project, the service utility company, all State and Municipal agencies having jurisdiction, UL label equipment requirement, and to the 2017 edition of the National Electrical Code / NFPA 70.

B. Before submitting his bid, the Division 16 Contractor shall familiarize himself with the rules of all herein before mentioned Boards, Departments, Agencies, etc. having jurisdiction, and he shall notify the Engineer with his bid, if in his opinion any work or materials specified is contrary to any such rules. Otherwise, the Division 16 Contractor shall be responsible for the approval of all work or materials and in case the use of any material specified is not permitted, a substitute approved by the authorities and by the Engineer shall be furnished and installed without additional cost to the Owner.

C. The Division 16 Contractor shall procure and pay for all necessary drawings, permits, and certificates required by the various governing agencies having jurisdiction and shall turn over to the Engineer all permits for construction before starting work and certificates of test, inspection, and approval before requesting payment.

1.05 TESTS

A. All tests required by the National Electrical Code, approved Electrical Inspection Agencies, State and Local Authorities, the servicing Utility Company, and the Engineer shall be executed by or paid for by the Division 16 Contractor. Furnish all labor, material, and instruments for each test. All major tests shall be witnessed by the Engineer and/or the Authority having jurisdiction, all of whom shall be given a minimum of one week’s written notice prior to such tests.

B. During the course of work and prior to final acceptance, all such tests shall be made as specified above and as to the Engineer deems necessary to insure that the Electrical Work meets with the intent of these specifications and is approved by the Authority having jurisdiction. Should the tests show that any of the material, apparatus, or workmanship is not first class or not in compliance with these requirements, the Division 16 Contractor, on notice from the Engineer shall remove same and promptly replace them with other materials and apparatus in conformity to the requirements.

C. All circuit work, throughout, on all systems shall be tested for grounds and short circuits, prior to being energized, and all work shall be left in first class operating condition when energized. All other tests shall be as specified above and/or specified elsewhere herein.

D. Tests of electrical work shall be made as equipment is installed.

E. Provide complete functional testing and documentation of installed lighting controls in accordance with NYECC Section C408.3.

1.06 DEMONSTRATION OF THE COMPLETED ELECTRICAL WORK

A. Instruction Demonstration:

1. The Division 16 Contractor shall be fully responsible for the instructing of the Owner's designated personnel in the operation and maintenance of the all equipment furnished by him. All costs required for such instruction and demonstration shall be paid for by the Division 16 Contractor. Such instruction shall take place in the presence of the Engineer's representative, upon completion of the work, when the Division 16 Contractor and his equipment manufacturers and/or vendors shall arrange a demonstration of all electrical systems and equipment for the Owner's design representatives and shall furnish for their use, Engineer approved, printed and bound copies of all operation and maintenance construction manuals. Included in these manuals shall be one (1) copy of all previously submitted and Engineer "Approved" or "Approved as Noted" shop drawings ("Approved as Noted" shop drawings must first be permanently corrected). Informal or non-Engineer witnessed instructions or instructions to non-designed Owner personnel shall not be recognized as fulfilling these requirements.

B. Final:

1. The Division 16 Contractor shall, before payment is received, clean the installed electrical equipment; he shall assure that all guarantees and record drawings, have been prepared and approved; that all instructions have been given and that all demonstrations have taken place.

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16060 - GROUNDING AND BONDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Data: For the following:

1. Ground rods.

2. Grounding clamps & connectors

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

D. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 QUALITY ASSURANCE

A. 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.

1. Comply with UL 467.

B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.

C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Burndy Corp.
2. Cadweld Div.; Erico Product, Inc.
3. Ideal Industries, Inc.
4. Joslyn Corp.
5. OZ Gediney Div.; General Signal Corp.
6. Thomas and Betts Corp.

2.02 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."

B. Material: Aluminum, copper-clad aluminum, and copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Grounding Electrode Conductors: Stranded cable.

E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

F. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

G. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.03 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.04 GROUNDING ELECTRODES

A. Ground Rods: Pointed, Copper-clad steel.

1. Size: 3/4 x 120 inches

B. Test Wells: Provide handholes as specified in Division 2 Section "Underground Ducts and Utility Structures."

PART 3 - EXECUTION

3.01 APPLICATION

A. In raceways, use insulated equipment grounding conductors.

B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.

C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

D. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.

E. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

3.02 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

D. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.

E. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.

F. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6.4-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

G. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

3.03 INSTALLATION

A. Ground Rods: Install ground rods per NEC and utility requirements.

1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds. Make connections without exposing steel or damaging copper coating.
3. Ground rods shall be installed in undisturbed earth.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.

F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.

H. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.

3.04 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.05 GRADING AND PLANTING

A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16100 – BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.01 GENERAL

A. Standards for Materials and Workmanship:

1. All materials and workmanship shall, at a minimum be in accordance with (in no order of precedence):
   a. National Electric Code (NPFA 70) – latest edition as adopted by the Authority Having Jurisdiction, unless otherwise noted.
   b. State and municipal Building Codes and related subcodes.
   c. Occupational and Safety Act (OSHA) Requirements.
   d. Rules and Regulations of the Authority Having Jurisdiction applicable to the work.
   e. National Electrical Standards Association Standard for Good Workmanship in Electrical Construction (NECA-1)
   f. Serving utility's rules and regulations for providing service.
   g. Contract Drawings and Specifications.
   h. Manufacturer recommended installation instructions, practices and procedures for the products being utilized or installed.

   Where conflicts arise between the above, the more stringent requirement shall be adhered to.

2. Except where existing materials and equipment are called for to be reused, all materials and equipment furnished and installed under Division 16 shall be new, of standard first grade quality, and correctly designed for their specific purpose. All new materials and equipment shall conform to the standards of and be listed/labeled by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories (UL) and shall be approved for use by all local authorities having jurisdiction.

3. All equipment and material furnished shall be the manufacturer's standard item of production unless specifically specified or required to be modified to suit job conditions. Size material; finish dimensions, and the capacities for the specified application shall be published in catalogs for national distribution by the manufacturer. Ratings and capacities shall be certified by a recognized American rating bureau.

4. Equipment and material fabricated specifically for use on this project shall be in strict accordance with the Drawings and Specifications and shall conform to the latest

standards of the National Electric Manufacturer's Association.

5. All materials and equipment of one and the same kind, type, or classification and used for identical purpose shall be made by the same manufacturer.

6. All equipment and materials to be installed under Division 16 shall be done so in a workmanlike manner in accordance with recognized workmanship standards and shall present a neat and professional appearance when completed. Any workmanship considered by the Engineer as being faulty or as not being first class shall be removed and replaced by the Division 16 Contractor to the satisfaction of the Engineer at no additional cost to this Owner.

7. Within 30 days of Contract signing and prior to the submission of shop drawings or the purchase of any material or equipment, the Division 16 Contractor shall submit to the Engineer a detailed list of all items of materials and equipment, which he proposes to furnish under Division 16. Such a list shall bear the equipment manufacturer's name, general description or series catalog number, and intended location or use of same. In addition, furnish a list of distributors who will be providing equipment for this project.

8. Where particular products or materials are specified hereinafter by manufacturer's name, they shall be considered as the standard and as most satisfactory for their purpose of use on the site or in the building. Another manufacturer's product other than those indicated may be submitted for substitution with the understanding that the Engineer shall be the sole judge as to the acceptability of the substituted items. In addition, furnish to the Engineer or Owner upon request, and within 14 days of such a request, samples of any Base Bid and/or corresponding Alternate Bid or intended substitute equipment, fixtures, etc. for their comparison and selection.

1.02 CUTTING AND PATCHING AND REPAIR

A. General

1. The Division 16 Contractor shall be responsible for the removal and replacement of existing ceiling, wall and flooring systems as required to perform the work, unless otherwise noted. Prior to disturbing the area, notify the Owner of any pre-existing damaged, stained, degraded finish materials or areas, such that pre-existing conditions can be documented and for Owner option to provide replacements for re-installation.

2. When applicable to project conditions, removal of existing hung ceilings shall be done with care and stored in a

controlled location for future reinstallation under this Contract. Any ceiling tile damaged as a result of this work shall be replaced by the Division 16 Contractor (at no additional cost to the Owner).

3. All cutting required to facilitate the proper installation of all work to be installed under Division 16 shall be done by the Division 16 Contractor. All cutting shall be done in the manner specified and/or directed and approved by the engineer and only after permission of the Engineer is obtained. The installation of sleeves, chases, etc. in concrete walls, floors, ceilings, and roofs as well as the cutting of existing concrete walls, floors, ceilings, and roofs shall be done by core drilling. All patching will be the responsibility of this Contractor.

4. Any penetrations through fire rated areas shall be accomplished using 3M or Hilti fire barrier products in sheets, strips, or caulk (i.e., USG Fire Stop System (that meets ASTM, UL, and FM standards.

5. Where the Division 16 Contractor's demolition, relocation or replacement activities result in bare areas remaining exposed, the Division 16 Contractor shall be responsible to patch, prime and paint, or otherwise repair the exposed areas as required to match the adjacent areas. Remove unused anchors and fasteners and patch appropriately. Prime and paint as required to match the adjacent area.

6. All costs for the above shall be included in bid price.

1.03 WATERPROOFING

A. Wherever any of the work of Division 16 has to pierce any waterproofing, this work shall be done by the Division 16 Contractor with care and after the part of these systems have been put in place through this waterproofing, the opening made by same shall be waterproofed and made absolutely water-tight as approved by the Architect and/or as hereinafter specified.

B. Conduits piercing the cement waterproofing of wall sand floors shall be provided with waterproof conduit entrance seal sleeves around same. These sleeves shall be Type "WSK" (walls) or "FSK" (floors) as manufactured by O-Z or other approved.

C. Conduit sleeves through non-waterproofed walls and floors shall be grouted, caulked with oakum, and sealed with approved semi-plastic mastic compound on both sides of the wall.

1.04 CONDUIT, RIGID AND FLEXIBLE

A. All conduits installed on the site or in the building shall be of the highest quality, free from defects, and listed by a NRTL and bear the manufacturer's mark or stamp. The Division 16 Contractor shall check the details of other Division and also the various Vendors' and Manufacturers' approved layouts for the exact

locations of all equipment, motors, etc. and shall terminate his conduit turns as shown thereon and as directed.

1. Thin Wall Steel Electrical Metallic Tubing, EMT (galvanized inside and outside).

   a. All areas where conduit is concealed in walls or hung ceilings and allowed by Code.

   b. All areas where conduit is exposed on walls or ceilings and allowed by Code. (Except otherwise noted on drawings).

2. Flexible Metal Clad Cable, MC (galvanized steel inside and outside).

   a. Run concealed in ceiling and non-masonry partitions as indicated by the special symbol and for the particular wiring systems indicated on the drawings. Provide conduit sleeves or junction box conversion to pipe and wire for extension of these runs from ceilings into masonry partitions for switch legs and similar case. In no case shall MC be permitted for wiring sizes larger than No. 10 AWG or quantities greater than four (4) conductors in a single armored cable, furnish and install a flexible steel conduit (Greenfield) with the required number of conductors for that particular armored cable run in order to comply with the requirements for this paragraph and NEC Codes.

   b. **Use of aluminum clad MC Cable is disallowed.**

B. The Drawings indicate the general location of conduit runs which may be modified at the time of installation to adapt same to building construction or site configuration but in no case shall circuits be combined without permission from the Engineer. Minimum size conduit for rigid steel, thin wall steel, flexible steel, or rigid **non-metallic conduit shall be ¾-inch** unless indicated otherwise on the Drawings. All rigid steel, thin wall steel, and rigid non-metallic conduit corners shall be turned with standard elbows or long radius bends. For all sizes of conduit larger than one inch, use standard manufactured elbows and offsets made for this purpose. For one inch and smaller sizes, the Division 16 Contractor will be permitted to make bends, but care must be taken not to damage the conduit. The radius of the inner curve on any bend shall be not less than allowed by Code. No more than four (4) right angle bends shall be permitted in any conduit run between any two (2) terminations or pull boxes.

C. The ends of all conduits shall be carefully reamed before installation and after the application of the dies and shall be free from burrs and sharp edges. Where it becomes necessary to cute a length of conduit, it shall be done with a hacksaw or other approved cutter and care shall be taken to secure a straight end on all conduits so that all conduit joints can and

will be brought to a shoulder. In installing all conduits, particular care must be taken in cutting to the proper length so that the ends will fit exactly into the outlet boxes and cabinets. Where conduits terminate in cabinets, they shall be neatly arranged. The ends of all conduits shall be immediately temporarily plugged after installation with plugs similar to T & B Series 1471, size as required, so as to avoid the conduit filling with earth, mortar, dust, etc.

D. All conduits shall be furnished complete with all required size associated or elsewhere herein under Grounding. Joints in rigid steel conduit shall be made with threaded type steel coupling made up with Thomas and Betts Krop-Shield compound. Terminations of rigid steel conduit shall be made with double steel locknuts and insulated galvanized steel grounding type bushing, Thomas & Betts Series 3800 or other approved made with the threading compound specified above where required. Running threads on rigid conduit shall not be permitted; therefore, where straight threads cannot be used, approved type unions shall be installed. Joints in thin wall steel conduit shall be made with steel compression type couplings and connectors. Terminations of thin wall steel conduit shall be made with a single steel locknut, a compressions type steel connector and an insulated galvanized steel grounding type bushing, Thomas & Betts Series 5100 and Series 3800 or other approved. All fittings for flexible steel conduits and flexible armored cables shall be of the standard steel set screw and single locknut type or of the steel double locknut ‘0’ ring type and shall be approved for grounding purposes by the Local Inspector. Fittings for rigid non-metallic conduit shall be of non-metallic thread type and/or of the non-metallic solvent weld type. Where required, provide cast or installed above grade or within building(s). The ends of conduits terminating at motors, starters, and similar apparatus and devices shall be furnished with fittings as specified above and suitably required in each case. Provide expansion fittings on all conduits passing through or crossing building expansion joints. Expansion fittings for steel, conduits shall be OZ Catalog No. “DX (rigid) and TX (thin wall) or other approved. Expansion fittings for non-metallic conduits shall be of the ‘O’ ring non-metallic expansion coupling type as manufactured by Carlon or other approved. Care shall be taken to secure a straight end on all conduits so that all conduit joints can and will be brought to a shoulder. In installing all conduits, proper care must be taken in cutting to the proper length so that the ends will fit exactly into the outlet boxes and cabinets. Where conduits terminate in cabinets, they shall be neatly arranged. The ends of all conduits shall be immediately temporarily plugged after installation with plugs similar to T & B Series 1471, size as required, so as to avoid the conduit filling with earth, mortar, dust, etc.

E. All conduits shall be furnished complete with all required size and associated fittings. Joints in rigid steel conduit shall be made with threaded type steel coupling made up with Thomas & Betts Krop-Shield compound. Terminations of rigid steel conduit shall be made with double steel locknuts and insulated galvanized steel ground type bushing, Thomas & Betts Series 3800 or

otherwise approved made up with the threading compound specified above where required. Running threads on rigid conduit will not be permitted; therefore, where straight threads cannot be used, approved type unions shall be made with steel compression type couplings and connectors. Terminations of thin wall steel conduit shall be made with a single steel locknut, a compression type steel connector and an insulated galvanized steel grounding type bushing, Thomas & Betts Series 5100 and Series 3800 or other approved. All fittings for flexible steel conduits and flexible armored cables shall be of standard steel set screw and single locknut type or of the steel double locknut 'O' ring type and shall be approved for grounding purposes by the Local Inspector. Fittings for rigid non-metallic conduit shall be of the non-metallic thread type and/or of the non-metallic solvent weld type. Where, required, provide cast non-metallic support fittings for all rigid non-metallic conduits installed above grade or within building. The ends of the conduits terminating at motor, starters, and similar apparatus and devices shall be furnished with fittings as specified above and as suitably required in each case. Provide expansion fittings on all conduits passing through or crossing building expansion joints. Expansion fittings for steel, conduit shall be OZ Catalog No. "DX" (rigid) and "TX" (thin wall) or other approved. Expansion fittings for non-metallic conduits shall be of the 'O' ring non-metallic expansion coupling type as manufactured by Carlon or other approved.

F. The conduits for all branch circuit and feeder wiring shall be run concealed except in machine rooms, boiler rooms, equipment rooms, and similar space; where indicated or specified otherwise; where the lack of a hung ceiling and the presence of mechanical equipment and ducts makes a concealed installation from the slab impossible or impractical; where permission is granted by the Engineer to run exposed. Exposed conduits shall run parallel to walls and ceilings using hot dipped galvanized conduits, fittings, or pull boxes for taps and direction changes. All exposed conduits must be securely fastened in place by means of substantial galvanized supports and fasteners. Where conduits are to be fastened to masonry walls, ceilings, or partitions, the use of wooden plugs will not be permitted; provide malleable iron pipe clips with screws and expansion sleeves. Banks of conduits shall be supported from Unistrut trapeze hangers fastened to structural member by rods. The arrangement and method of fastening all conduits shall be subject to the direction and approval of the Architect and shall be supported free from outlets, pull boxes, etc. No "Hit On" clamps or squeeze connections shall be accepted. All fittings shall be nut and bolt connected.

1.05 WIRE AND CABLE

A. Furnish and install all wire and cable for receptacles, equipment, panels, etc. for a complete wiring system as indicated on the Drawings and as required and specified.

B. All wire and cable shall be new, manufactured of soft drawn copper of not less than 98% conductivity, conforming to ASTM

specifications and the latest requirements of N.E.C. Wire, and cable shall have 600 volt insulation (unless otherwise noted or specified) of the type specified and shall be of the standard AWG sizes as called for on drawings or specified. All wire and cable shall be delivered to the site or the building(s) in their original unbroken packages or reels plainly marked or tagged as follows:

1. Underwriters' labels and words "National Electrical Code Standard."

2. Size, code type, insulation, and maximum working voltage of the wire.

3. Name of manufacturing company and the trade name of the wire.

4. Date of manufacture (month and year) which shall be within eight (8) months of installation.

C. 600 volt class wire and cable shall be as manufactured by American Insulated Wire, Triangle, General Cable, or Anaconda. High voltage cables, 5,000 volts and above shall be as specified by the local electric utility and as may be further specified by the engineer when such specification section is included in this project manual.

D. Wire and cable insulation shall be as follows and, in all cases, the insulation shall be suitable for the operating temperature of the equipment served.

1. No. 12 AWG and larger, dry locations: **THHN**.

2. No. 12 AWG and larger, wet location in conduit direct bury or in conduit in concrete slabs on earth: **THHW**.

3. For service conductors serving local utility equipment and all service related CT cabinet, disconnectors and or main distribution center: **XHHW** or **USE**.

4. For continuous runs in fluorescent fixtures listed as a raceway or installed in non-plenum spaces: **RHH**, or **THHN**.

5. For recessed outdoor lighting fixtures: **XHHW** (to junction box in hung ceiling).

6. For recessed indoor lighting fixtures: **AF** or **THHN** (to junction box in hung ceiling).

7. Areas of high ambient temperature (i.e., boiler rooms, auxiliary heater rooms, etc.): **RHH**.

8. Within 3 feet of boilers, heater, etc.: **AVA**.

9. Special systems (fire alarm, sound, etc.): Size and insulation as specified and/or indicated on the Drawings for each special system. All such wiring shall be plenum rated.

10. Pendants and flexible cords: SJ or SJO (both with ground wire).

11. Other wire and cables: All other wire and cable shall be as indicated on the Drawings or as required by the particular equipment manufacturer or Utility Company.

E. Unless otherwise noted or indicated all light and power wiring shall be #12 AWG size: light and power wiring home runs shall be #10 AWG if longer than 100 feet measured between the local switch and the panelboard or the nearest outlet and the Panelboard. All cable #8 AWG and larger shall be stranded: all wire #10 AWG and smaller shall be solid.

F. All wire and cable #6 AWG and small shall be factory color coded. Cables #4 AWG and larger shall be field color coded utilizing colored pressure sensitive tape at switchboards, panelboards, pullboxes, junction boxes, outlet boxes, and equipment served. Colors for each phase and neutral shall be consistent throughout the system. Where two or more neutrals are run in any one conduit, each neutral shall be taped to associated line conductors in each outlet. Neutrals and/or ground may not be combined and shall be installed continuous to panelboards, switchboard, etc. Each circuit on the drawings has been given a reference number. Connections at Panelboard, distribution equipment, etc., shall be that no neutral wire or cable shall serve more than one branch circuit wire or cable from the same phase. Color code, where not otherwise required by the inspection authorities, shall be as follows (where multiple circuits are run in a single conduit, additional color sequence shall be provided as approved):

	120/208V	277/480v
Phase A	Blue	Brown
Phase B	Black	Orange
Phase C	Red	Yellow
Neutral	White	White or Gray
Traveler or Switch Leg	Black with red colored stripe	Black with red colored stripe
Ground	Green	Green

G. All polyphase installations shall be phase rotation checked before and after work conduct to assure connect rotation or maintenance of existing rotation, as suitable. Verify correct phase rotation prior to activating any 3-phase device.

1.06 WIRE AND CABLE CONNECTIONS AND DEVICES

A. Feeder circuit cables shall be continuous from distribution equipment, etc. to panel, etc. served. Splicing and intermediate

pull boxes and manholes will not be permitted without the written permission of the Engineer. Branch circuit wiring shall be continuous except splices will be permitted at outlets, junction boxes, etc. six hundred volt, solderless mechanical splicing devices, as hereinafter specified, shall be used for splicing joints, taps, and connections of 600 volt wire and cables used for feeder and branch circuit wiring. The same devices shall be used for splicing joints, taps, and connections of sound, fire alarm, and other special system wire and cables except at terminal strip cabinets, sound racks, etc. where such connections shall be made with the terminal strips specified with the strip cabinets, etc. Wire nuts or crimp-on connectors shall not be permitted for splicing. Sufficient slack wire and cable shall be left for all outlets, distribution equipment, panelboards, controllers, amplifiers, control panels, etc. to facilitate connections to device or equipment served without putting a strain on the wire or cable. For wire #8 AWG and smaller, use steel spring solderless connectors with semi-rigid insulating shell taped with vinyl Scotch #88 tape (Scotch brand "Scotchlok" Types "Y", "R", and "B" as required or other approved). For cable #6 AWG and larger, use heavy duty Hy-press Barrel crimping tubes, (Thomas & Betts, Burndy, O.Z., or other approved). All connections shall be insulated with 3m type cold shrinks or other approved heat shrinks. The method used must provide insulation equivalent to 150% of the conductor's insulation. Other devices used for splicing other special wires and cables shall not be as specified elsewhere herein. **Use of split bolt connectors (bug nuts) is disallowed**.

B. All wires and cables within all panelboards, distribution equipment control panels, terminal strip cabinets, pullboxes, junction boxes, outlets, and other equipment shall be neatly laced and bound in an orderly, workmanlike manner with Thomas & Betts Ty-rap and identified using Thomas & Betts E2 code self-laminating type Series WSL vinyl wire markers.

C. No wires or cables shall be installed in conduits until conduits are free from condensate, moisture, and/or water. The only permissible wire pulling lubricant is Ideal Industries "Yellow 77."

D. All circuits, regardless of being in conduit of any type, shall contain a bond wire. Use of (metallic) conduit as a bond is disallowed.

1.07 OUTLET BOXES

A. Furnish and install an outlet box for each and every outlet, device fixture, etc. called for on the drawings, specified and required by Code. Outlet boxes shall be approved design, construction, form and dimension suitable for its specific location, the kind of wiring device, fixture, etc. to be used, the number of wires contained, and the arrangement type conduit and/or raceway they are connected to.

B. Unless noted otherwise, hereinafter **all** outlet boxes shall be galvanized or sherardized pressed steel boxes. Outlet boxes for surface raceways shall be galvanized steel prime painted boxes

and shall be compatible with the size and type surface raceway used.

C. All outlet boxes shall be a minimum of 4" square or round by 1 ½" deep unless indicated otherwise on the drawings and unless a local condition requires a small box (metal and glass partition work, etc.). Use deeper boxes where required by the number of wires, splices, bushings, special fixture, wiring devices, and as specified hereinbefore.

D. Pressed steel boxes and accessories shall be as manufactured by Thomas & Betts, Steel City, or National Electric. Outlet boxes and accessories for surface raceways shall be as manufactured by Panduit, Wiremold, National Electric, Hubble, or other approved.

1.08 PULL AND JUNCTION BOXES

A. Furnish and install all pull boxes and junction boxes in the various electrical conduit systems where specified, where indicated on the drawings, and wherever required to facilitate the proper installation of the wires and cables.

B. Junction boxes shall meet all the requirements of and be installed in a manner identical to that specified elsewhere herein for outlet boxes except: 1) that with the exception of junction boxes used for surface raceways, generally all junction boxes shall be installed only in unfinished areas or behind lay-in ceilings where they shall be accessible (whether junction boxes are installed in finished areas or unfinished areas they shall be flush mounted in masonry or non-masonry walls except in machine rooms, equipment rooms, and boiler masonry walls where they may be surface mounted cast boxes or non-metallic boxes as specified for outlet boxes); 2) that minimum size pressed steel junction box shall not be less than 4 11/16" square by 2 1/8" deep. 3) and that all pressed steel junction boxes shall be provided with blank aluminum cover plates having an anodized finish similar to those specified under Wiring Devices (except pressed steel boxes above hung ceilings which shall be provided with flat galvanized or sherardized steel plates). Special junction boxes shall be in accordance with these specifications and as specified elsewhere herein or on the drawings.

C. Pullboxes shall be constructed of standard type and size code gauge boxes and covers and shall be employed where practical unless specified otherwise. Pullboxes other than standard (for both steel and non-metallic conduit systems) shall be constructed of not less than 12 gauge galvanized sheet steel with suitable angle iron reinforcing frame. Access for surface mounted pullboxes (standard and non-standard) shall be provided by means of removable screw-on covers and sides. Flush type pullboxes shall always be of the non-standard type and shall have single door with trim and lock as specified elsewhere herein for panelboards. Pull boxes shall be sized as indicated on the drawings and/or in accordance with the N.E.C. and shall be phosphate treated and finished as specified elsewhere herein for panelboards. Other pull boxes shall be in accordance with these specifications and as specified elsewhere herein or on the

drawings. Pull boxes shall be as manufactured by Empire, Lexington, Standard, or other approved.

1.09 WIRING DEVICES

A. Unless noted otherwise elsewhere, herein, or on the drawings, the Division 16 Contractor shall furnish and install all wiring devices. Wiring devices furnished by the Division 16 Contractor shall be as manufactured by Hubbell, Leviton, or Arrow Hart, unless noted otherwise, and shall be of the specification grade and type indicated hereinafter or on the drawings and in compliance with the following specifications:

1. Switches: (Unless otherwise noted on drawings and specifications)

   Switches: Hubbell 1221-I
   Key Switches: Hubbell 1221L and Key

   Switches shall be located at the strike side of doors as finally hung, whether indicated on the drawings or not. All three-way and four-way switches shall have ivory toggles unless otherwise noted on drawings.

2. Standard Receptacles: (Unless otherwise noted on drawings or specifications, provide tamper resistant receptacles as follows):

   Duplex Receptacle 20A-125V: Hubbell HBL 5362TR
   Ground Fault Interrupter 20A-125V: Hubbell GF 5362TR

3. Key Switches:

   Check with building custodian and install keyed units where indicated. Provide a key for each switch and receive a signed receipt for records.

B. All other incidental wiring devices shall be of the same make and quality of those as specified herein.

C. Furnish and install cover plates fro each switch, receptacle, and other wiring devices being installed unless noted otherwise. Several wiring devices located at the same location shall be installed in ganged type boxes as specified under outlet boxes, and such devices shall be provided with multi-gang cover plates of the types specified hereinafter. All cover plates shall be stainless steel “302” plates and shall have a brushed finish as selected by the Engineer for each particular room or area. Plates shall be .04 thick, of same manufacture and device.

1.10 PANELBOARDS

A. Furnish and install lighting equipment and power panelboards as indicated on the floor plan and in the schedule on the drawing. Panelboards shall be suitable for 120/208 volts, 3 phase, 4 wire service or 277/480 volts, 3 phase, 4 wire or as may otherwise be specified.

B. The panelboards shall be of the dead front type mounted in a 12 gauge (minimum) galvanized sheet steel cabinet or enclosure suitable for surface mounting as shown on the drawing. Enclosure shall be equipped with sheet steel trims having hinged doors. Trim shall be provided with angle supports, which engage the flange of the cabinet and shall be fastened to the cabinet by means of approved clamps. The use of screws engaging holes in the flange of the cabinet for fastening trim will not be acceptable. Door shall have concealed hinges and paracentric cylinder lock. Panel shall be finish painted with baked-on gray enamel. On the inside of the panelboard, provide a typewritten numerical directory, in a metal frame having a transparent plastic face. Directory shall indicate service controlled by each circuit, voltage service to panel, and feeder size serving panel.

C. Ample gutter space shall be provided in accordance with the National Electric Code and these specifications, with minimum gutter space of six inches.

D. Minimum width of panel including gutter space shall be 20 inches. All lugs for incoming and outgoing terminals shall be of the solderless type. Feeder lugs shall be single or multiple types as required. Where cable lug connections are made directly to the bus bars, they shall be made via cast type lugs manufactured of the proper metal alloys so as not to cause a galvanic reaction when connecting the copper cables to the aluminum bus bars.

E. Panelboards shall be of the bolt on circuit breaker type. Circuit breakers shall be molded case type and shall be of the individual unit construction complete with quick-make, quick-break mechanism; thermal magnetic trip; ambient compensation and shall be interchangeable in the panelboard assembly in ratings from 15 through to 100 amperes on 120/208 volt panels without necessitating bus, line, or assembly rearrangements. All circuit breakers shall have suitable bolt type line terminals so that they can be held in positive contact with their respective links or bus. **Plug-in breakers shall not be acceptable**. All single pole breakers in panel shall be so arranged and connected to the main bus that any three adjacent breakers are connected to Phase A, B, and C respectively and that same relationship of phase sequence is maintained. All branch circuit breakers shall have the number of poles and circuits as indicated on the drawing and shall be as specified hereinafter. Connect all circuits on all panels so as to balance the load as much as possible on all phases.

F. Panelboards shall be as specified herein. Provide ten (10) circuit breaker handle lock dogs for Custodian’s use (per panel).

G. All busing shall be of high conductivity silver-plated solid copper. Bus bar carrying capacity shall be at least equal to the capacity of the protective device on the panel feeder. Where feeders are oversized in capacity to compensate for feeder length, the panel shall be equipped with lugs equal to the oversize feeder conductors. Alternately, the feeder may be spliced with compression indent splices to transition from the oversize conductor to the normal size conductor (that matches the

panel bus) in a splice box external to the panel. This technique may also be employed at the originating protective devices. **Shaving of conductors to fit lugs is specifically disallowed**.

H. Panelboards shall be as specified and/or similar to Eaton, Siemans, or G.E. in compliance with these specifications.

I. Where a flush mounted panel is being provided, the Division 16 Contractor shall check the depth of block walls containing same and shall have the panel fabricated to suit space available.

J. Provide door-in-door panelboard cover unless otherwise specified.

K. New circuit breakers installed in existing panelboards shall listed for, and shall match the interrupting rating of the intended panel.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the panelboards as specified and as shown on the contract drawings.

1.02 RELATED SECTIONS

A. Not Used.

1.03 REFERENCES

A. The panelboards and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows:

1. UL 67 -- Panelboards
2. UL 50 -- Cabinets and boxes
3. NEMA PB1
4. Fed. Spec. W-P-115C
5. Circuit breaker -- Type I class I
6. Fusible switch -- Type II class I.

1.04 SUBMITTALS -- FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:

1. Breaker layout drawing with dimensions indicated and nameplate designation
2. Component list
3. Conduit entry/exit locations
4. Assembly ratings including:

    a. Short-circuit rating
    b. Voltage
    c. Continuous current

5. Cable terminal sizes.

B. Where applicable the following additional information shall be submitted to the Engineer:

1. Key interlock scheme drawing and sequence of operations.

C. Submit three (3) copies of the above information.

1.05 SUBMITTALS -- FOR INFORMATION

A. When requested by the Engineer the following product information shall be submitted:

1. Descriptive bulletins

2. Product sheets.

1.06 SUBMITTALS -- FOR CLOSEOUT

A. The following information shall be submitted for record purposes:

1. Final (as-built) drawings and information for items listed in section 1.04

2. Installation information

3. Seismic certification and equipment anchorage details.

B. Submit three (3) copies of the above information.

1.07 QUALIFICATIONS

A. The manufacturer of the panelboard shall be the manufacturer of the major components within the assembly, including circuit breakers and fusible switches.

B. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. The panelboards shall be suitable for and certified to meet all applicable seismic requirements of Uniform Building Code (UBC)] for zone 2 application. Guidelines for the installation consistent with these requirements shall be provided by the switchgear manufacturer and be based upon testing of representative equipment. The test response spectrum shall be based upon a 5% minimum damping factor, UBC: a peak of 0.7g, and a ZPA of 0.38g. The tests shall fully

envelope this response spectrum for all equipment natural frequencies up to at least 35 Hz.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 OPERATION AND MAINTENANCE MANUALS

A. Three (3) copies of the equipment operation and maintenance manuals shall be provided.

B. Operation and maintenance manuals shall include the following information:

1. Instruction books and/or leaflets

2. Recommended renewal parts list

3. Drawings and information required by section 1.06.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Cutler-Hammer

B. Square D

C. General Electric

D. Siemens

2.02 RATINGS

A. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 22,000-amperes RMS symmetrical.

B. Panelboards rated 480 Vac shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 22,000-amperes RMS symmetrical.

C. Panelboards shall be labeled with a UL short-circuit rating. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:

1. Size and type of upstream device

2. Branch devices that can be used

3. UL series short-circuit rating.

2.03 CONSTRUCTION

A. Interiors shall be completely factory assembled devices. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.

B. Trims for lighting and appliance panelboards shall be supplied with a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Doors shall have a semiflush cylinder lock and catch assembly. Doors over 48 inches in height shall have auxiliary fasteners.

C. Distribution panelboard trims shall cover all live parts. Switching device handles shall be accessible.

D. Surface trims shall be same height and width as box. Flush trims shall overlap the box by 3/4 of an inch on all sides.

E. A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.

F. All locks shall be keyed alike.

2.04 BUS

A. Main bus bars shall be plated copper sized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above an ambient of 40 degrees C maximum.

B. A bolted ground bus shall be included in all panels.

C. Full-size (100%-rated) insulated neutral bars shall be included for panelboards shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection. 200%-rated neutrals shall be supplied for TVSS panels designated on drawings.

2.05 DISTRIBUTION PANELBOARDS -- CIRCUIT BREAKER TYPE

A. Distribution panelboards with bolt-on devices contained therein shall have series or integrated rated interrupting ratings as indicated on the drawings. Panelboards shall be Cutler-Hammer type Westinghouse Pow-R Line C, PRL-3a or PRL-4B. Panelboards shall have molded case circuit breakers as indicated below.

B. Distribution panelboards with plug-on devices contained therein shall have series rated interrupting ratings as indicated on the drawings. Panelboards shall be Cutler-Hammer type Pow-R Line C, PRL-5P. Panelboards shall have molded case circuit breakers permanently affixed to plug on breaker adapter, as indicated below.

C. Molded case circuit breakers shall provide circuit overcurrent protection with inverse time and instantaneous tripping characteristics and shall be Cutler-Hammer type Westinghouse Series C or approved equal. Ground fault protection shall be provided where indicated.

D. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

D. Circuit breakers shall have a minimum symmetrical interrupting capacity as indicated on the drawings.

F. Where indicated, circuit breakers shall be UL listed for series application.

G. Where indicated, circuit breakers shall be current limiting.

H. Circuit breakers below 400° ampere frame shall be Cutler-Hammer type Westinghouse Series C, with thermal-magnetic trip units, and inverse time-current characteristics.

I. Circuit breakers 400 ampere and above ampere frame shall be Cutler-Hammer type Westinghouse Series C, with microprocessor-based RMS sensing trip units.

1. Each molded case circuit breaker microprocessor-based tripping system shall consist of three current sensors, a trip unit, and a flux-transfer shunt trip. The trip unit shall use microprocessor-based technology to provide the adjustable time-current protection functions. True RMS sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time delay settings are reached.

2. Interchangeable rating plugs shall establish the continuous trip ratings of each circuit breaker. Rating plugs shall be fixed or adjustable as indicated. Rating plugs shall be interlocked so they are not interchangeable between frames, and interlocked such that a breaker cannot be closed and latched with the rating plug removed.

3. The microprocessor-based trip unit shall have thermal memory

capabilities to prevent the breaker from being reset following an overload condition until after a preset time delay.

4. When the adjustable instantaneous setting is omitted, the trip unit shall be provided with an instantaneous override. Internal ground fault protection adjustable pick-up ratings shall not exceed 1200-amperes. Provide neutral ground fault current sensor for four wire loads.

5. Breakers shall have built-in test points for testing the long-time delay, instantaneous, and ground fault functions of the breaker, by means of a 120-volt operated test set. Provide one test set capable of testing all breakers 400-ampere frame and above.

6. System coordination shall be provided by the following microprocessor-based time-current curve shaping adjustments:

   Adjustable long-time pick-up

   Adjustable short-time pick-up and delay, with

   selective curve shaping

   Adjustable instantaneous pick-up

   Adjustable ground fault pick-up and delay, with

   selective curve shaping.

7. Circuit Breakers shall be Cutler-Hammer type Westinghouse Series C circuit breakers, microprocessor-based RMS sensing trip units type Digitrip RMS 310.

2.06 BRANCH CIRCUIT PANELBOARDS

A. The minimum integrated short-circuit rating for branch circuit panelboards shall be 22,000 ampere.

B. Bolt-in type, heavy-duty, quick-make, quick-break, single- and multi-pole circuit breakers of the types specified herein, shall be provided for each circuit with toggle handles that indicate when unit has tripped.

C. Circuit breakers shall be thermal magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame and through 100-ampere trip sizes shall take up the same pole spacing. Circuit breakers shall be UL listed as type SWD for lighting circuits.

   1. Circuit breaker handle locks shall be provided for all

circuits that supply exit signs, emergency lights, energy management, and control system (EMCS) panels and fire alarm panels.

D. Circuit breakers shall have a minimum interrupting rating of 10,000-amperes symmetrical at 240-volts, and 14,000-amperes symmetrical at 480-volts.

2.07 ACCESSORIES

A. When specified on plans provide transient voltage surge suppression as specified in section 16671.

2.08 ENCLOSURE

A. Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electric Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

B. Enclosures shall be provided with blank ends.

2.09 NAMEPLATES

A. Provide an engraved nameplate for each panel section.

2.10 FINISH

A. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

PART 3 - EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16472 - MANDATORY UL PARTICIPATION

Part 1 - GENERAL

1.01 SCOPE

A. This section addresses a mandatory site survey of electrical power panel retrofits and/or switchgear bus taps when such work is performed. The contractor shall engage the services and pay related fees of the UL field evaluation group (ULFE), or a similar firm engaging is this type of work on a regular basis.

1.02 TIME LINE

A. The contractor is advised that UL field evaluation response time is generally one to two weeks.

1.03 REGULATORY REQUIREMENTS

The specific issues addressed in panel retrofits are:

A. Panelboard interiors not marked for use in the existing back box revert to a 10 K AIC rating. If higher AIC rating is required per the project specifications and/or drawings, ULFE shall determine the actual AIC rating of the new panelboard interior back box combination, in conformance with original parameters.

B. ULFE shall specify corrective steps as required to achieve code compliance, and meet the original engineering design intent. The cost of such corrective work shall be paid for by electrical contractor as part of this project.

1.04 ULFE WORK

A. ULFE shall field examine proposed bus taps for compliance with bus mechanical and power capacity ratings. They shall specify corrective actions as required.

1.05 RESPONSIBILITY

A. The contractor shall coordinate with the owner and utility company to minimize down time of electrical service for ULFE work. All electrical service outages shall be done as specified by the owner and utility company. Premium time fees if apply shall be the responsibility of the contractor.

1.06 SUBMITTALS

A. The ULFE response and related contractor response shall be part of the project final closeout submission.

1.07 UL CONTACT INFORMATION

Program Manager
Chuck Mello
877-854-3577, ext. 55578
chuck.mello@ul.com

Staff Engineer
Bob Starasinich
847-224-0852
robert.m.starasinich@ul.com

Field Evaluation Service
http://www.ul.com/global/eng/pages/offerings/services/globalfieldservices/fieldservices/fieldevaluationservices/

1.08 UL FIELD EVALUATIONS PROJECT DATA SHEET:

Field Evaluations Project Data Sheet

Date	

Person Contacting UL	
Title:	

Applicant Information
(Company that assumes financial obligation for the cost of the project)

Legal Company Name **Address** **City, ST, Zip**	

Taxpayer Identification Number (TIN)	
Phone No:	
Fax No:	
Cell No:	
E-Mail:	

Requested Date for FE to start	

Preliminary Field Evaluation Site (optional if requested)
(Usually taking place at the manufacturers location prior to being installed)

Company Name Address City, ST, Zip	
Contact on Site	
Phone No:	
Cell No:	
Are there any security steps necessary for the engineer to be on site (background check, NDA, ETC)	
Are there any specific safety policies we need to be aware of? (Personal Protective Equipment, Fall Protection, Required Safety classes, ETC)	

Final Installation Site
(Where the product is permanently installed & label applied)

Company Name Address City, ST, Zip	

Contact on Site	
Phone No:	
Cell No:	
Are there any security steps necessary for the engineer to be on site (background check, NDA, ETC)	
Are there any specific safety policies we need to be aware of? (Personal Protective Equipment, Fall Protection, Required Safety classes, ETC)	

Authority Having Jurisdiction
Local City / County Electrical Inspector (This is Mandatory)

AHJ Jurisdiction **Address** **City, ST, Zip**	
Name of Inspector	
Phone No:	
Fax No:	
Cell No:	
E-Mail:	

Equipment Information on Following Page

List of Equipment to be evaluated

Product Description & purpose	
Number of Units	
Manufacturer Name:	
Model Number:	
Serial Number:	
Volts & Amps Ratings	Voltage, A or FLA, Phase, Wire, (Hz), Power
Motor (how many & HP)	
Pending Litigation	*Yes [ ] No [ ]*
Hazardous Location:	Yes [ ] No [ ]
Equipment Condition:	New [ ] Used [ ]
Security/Signaling Equipment	Yes [ ] No [ ]
Product Under Current UL Evaluation	Yes [ ] No [ ]
Homeland Security Equipment	Yes [ ] No [ ]
E85 Gasoline Equipment	Yes [ ] No [ ]

Product Description & purpose	
Number of Units	
Manufacturer Name:	
Model Number:	
Serial Number:	
Volts & Amps Ratings	Voltage, A or FLA, Phase, Wire, (Hz), Power
Motor (how many & HP)	
Pending Litigation	*Yes [ ] No [ ]*
Hazardous Location:	Yes [ ] No [ ]
Equipment Condition:	New [ ] Used [ ]
Security/Signaling Equipment	Yes [ ] No [ ]
Product Under Current UL Evaluation	Yes [ ] No [ ]
Homeland Security Equipment	Yes [ ] No [ ]
E85 Gasoline Equipment	Yes [ ] No [ ]

Product Description & purpose	
Number of Units	
Manufacturer Name:	
Model Number:	
Serial Number:	
Volts & Amps Ratings	Voltage, A or FLA, Phase, Wire, (Hz), Power
Motor (how many & HP)	
Pending Litigation	*Yes [ ] No [ ]*
Hazardous Location:	Yes [ ] No [ ]
Equipment Condition:	New [ ] Used [ ]
Security/Signaling Equipment	Yes [ ] No [ ]
Product Under Current UL Evaluation	Yes [ ] No [ ]
Homeland Security Equipment	Yes [ ] No [ ]
E85 Gasoline Equipment	Yes [ ] No [ ]

Product Description & purpose	
Number of Units	
Manufacturer Name:	
Model Number:	
Serial Number:	
Volts & Amps Ratings	Voltage, A or FLA, Phase, Wire, (Hz), Power
Motor (how many & HP)	
Pending Litigation	*Yes [ ] No [ ]*
Hazardous Location:	Yes [ ] No [ ]
Equipment Condition:	New [ ] Used [ ]
Security/Signaling Equipment	Yes [ ] No [ ]
Product Under Current UL Evaluation	Yes [ ] No [ ]
Homeland Security Equipment	Yes [ ] No [ ]
E85 Gasoline Equipment	Yes [ ] No [ ]

Product Description & purpose	
Number of Units	
Manufacturer Name:	
Model Number:	
Serial Number:	
Volts & Amps Ratings	Voltage, A or FLA, Phase, Wire, (Hz), Power
Motor (how many & HP)	
Pending Litigation	*Yes [ ] No [ ]*
Hazardous Location:	Yes [ ] No [ ]
Equipment Condition:	New [ ] Used [ ]
Security/Signaling Equipment	Yes [ ] No [ ]
Product Under Current UL Evaluation	Yes [ ] No [ ]
Homeland Security Equipment	Yes [ ] No [ ]
E85 Gasoline Equipment	Yes [ ] No [ ]

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16475 - CIRCUIT BREAKERS

PART 1 - GENERAL
(NOT USED)

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Cutler-Hammer
B. Square D
C. General Electric
D. Siemans

2.02 MOLDED CASE PROTECTIVE DEVICES

A. Protective devices shall be molded case circuit breakers with inverse time and instantaneous tripping characteristics and shall be Cutler-Hammer type Westinghouse Series C or approved equal.

B. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

C. Circuit breakers shall have a minimum symmetrical interrupting capacity as indicated on the drawings, but less than 10,000 amperes RMS symmetrical.

D. Circuit breakers below 400 ampere frame and below shall be Cutler-Hammer type Westinghouse Series C with thermal-magnetic trip units and inverse time-current characteristics.

E. Circuit breakers 400 and greater ampere frame shall be Cutler-Hammer type Westinghouse Series C with microprocessor-based RMS sensing trip units.

F. Circuit breakers frame size and lug size shall be sized per cable size as shown on plans and as installed.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16511 – FIRE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

A. Only tested fire stop systems shall be used in specific locations as follows:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Safing slot gaps between edge of floor slabs and curtain walls.

C. Openings between structurally separate sections of wall or floors.

D. Gaps between the top of walls and ceilings or roof assemblies.

E. Expansion joints in walls and floors.

F. Openings and penetrations in fire-rated partitions or walls containing fire doors.

G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03300 - Cast-In-Place Concrete
2. Section 07900 - Joint Sealers
3. Section 04200 - Masonry Work
4. Section 09200 - Lath and Plaster
5. Section 09250 - Gypsum Drywall Systems
6. Section 13080 - Sound, Vibration and Seismic Control
7. Section 13900 - Fire Suppression and Supervisory Systems

8. Section 15050 - Basic Mechanical Materials and Methods
9. Section 15250 - Mechanical Insulation
10. Section 15300 - Fire Protection
11. Section 15400 - Plumbing
12. Section 16100 - Basic Electrical Materials and Methods

1.05 REFERENCES

A. Test Requirements: ASTM E-814-02, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:

a. Fire stop Devices (XHJI)
b. Fire Resistance Ratings (BXUV)
c. Through-Penetration Fire stop Systems (XHEZ)
d. Fill, Voids, or Cavity Material (XHHW)
e. Forming Materials (XHKU)

2. Alternate "Omega Point Laboratories Directory" (updated annually)

C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems" (July 1998.)

D. Test Requirements: ASTM E 1966-01, "Standard test method for Fire Resistive Joint Systems"

E. Inspection Requirements: ASTM E 2174 – 01, "Standard Practice for On-site Inspection of Installed Fire Stops."

F. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

G. ASTM E-84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.

H. All major building codes: ICBO, SBCCI, BOCA, and IBC.
(Note to specifier: Retain or delete building codes listed above as applicable)

I. NFPA 101 - Life Safety Code

J. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.

B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Hilti, Inc., Tulsa, Oklahoma (or equal)
800-879-8000

2.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type,

annular space requirements, and fire-rating involved for each separate instance.

B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:

1. Hilti CP 680 Cast-In Place Firestop Device
   a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.

2. Hilti CP 681 Tub Box Kit for use with tub installations.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 604 Self-leveling Firestop Sealant
3. Hilti CP 620 Fire Foam
4. Hilti CP 606 Flexible Firestop Sealant
5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601s Elastomeric Firestop Sealant
2. Hilti CP 606 Flexible Firestop Sealant
3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti CP 677 Speed Plugs
2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Fire stop Sealant
2. Hilti CP 618 Fire stop Putty Stick
3. Hilti CP 620 Fire Foam
4. Hilti CP 601s Elastomeric Fire stop Sealant
5. Hilti CP 606 Flexible Fire stop Sealant

I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti CP 618 Fire stop Putty Stick

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Fire stop Putty Pad

K. Fire stop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 642 Fire stop Collar
2. Hilti CP 643 Fire stop Collar
3. Hilti CP 645 Wrap Strips

L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti CP 637 Trowelable Fire stop Compound
2. Hilti FS 657 FIRE BLOCK
3. Hilti CP 620 Fire Foam

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Fire stop Sealant
3. Hilti CP 606 Flexible Fire stop Sealant
4. Hilti CP 604 Self-Leveling Fire stop Sealant

O. Provide a fire stop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

P. Provide a fire stop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which fire stop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate location and proper selection of cast-in-place Fire stop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place fire stop devices without interferences.

3.03 INSTALLATION

A. Regulatory Requirements: Install fire stop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL fire stop systems that might hamper the performance of fire dampers as it pertains to duct work.

3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing fire stop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess fire stop materials and soiling as work progresses.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16671 - TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the Transient Voltage Surge Suppression (TVSS) equipment having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings.

1.02 RELATED SECTIONS

A. Section 16429 – Switchboards.

1.03 REFERENCES

A. The TVSS units and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of the following:

1. UL Listed under UL 1449 and UL 1283
2. CSA certified per CSA 22.2

B. The UL 1449 suppression voltage ratings (SVR) and CSA label shall be permanently affixed to the TVSS unit.

1.04 SUBMITTALS

A. The following information shall be submitted to the Engineer:

1. Provide verification that the TVSS device complies with the required UL 1449 and UL 1283 SVR.

2. Provide actual let through voltage test data in the form of oscillograph results for both the ANSI/IEEE C62.41 Category C3 (combination wave) and B3 (ringwave) tested in accordance with ANSI/IEEE C62.45.

3. Provide spectrum analysis of each unit based on MIL-STD-220A test procedures between 50 kHz and 200 kHz verifying the device's noise attenuation exceeds 50 dB at 100 kHz.

4. For retrofit mounting applications, electrical/mechanical drawings showing unit dimensions, weights, installation instruction details, and wiring configuration.

5. Provide test report from a recognized independent testing laboratory verifying the suppressor components can survive published surge current rating on both a per mode and per phase basis using the IEEE C62.41, 8 x 20 microsecond current wave. Note that test data on individual module is not accepted.

B. Submit ten (10) copies of the above information.

1.05 SUBMITTALS -- FOR INFORMATION

A. When requested by the Engineer the following product information shall be submitted:

1. Descriptive bulletins
2. Product sheets.

1.06 SUBMITTALS -- FOR CLOSEOUT

A. The following information shall be submitted for record purposes:

1. Final as-built drawings and information for items listed in section 1.04.

1.07 QUALIFICATIONS

A. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

B. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.08 REGULATORY REQUIREMENTS

A. TVSS units shall be Underwriters Laboratories listed.

1.09 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Three (3) copies of the equipment operation and maintenance manuals shall be provided.

B. Operation and maintenance manuals shall include the following information:

1. Instruction books and/or leaflets
2. Recommended renewal parts list
3. Drawings and information required by section 1.06.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Cutler-Hammer
B. Square D
C. General Electric
D. Siemans, or as specified on plans

2.02 TRANSIENT VOLTAGE SURGE SUPPRESSION -- GENERAL

A. Transient Voltage Surge Suppression (TVSS) equipment shall be Cutler-Hammer type Clipper Power Systems (CPS) or approved equal meeting all ratings and features specified herein.

B. Electrical requirements:

1. Unit Operating Voltage -- Refer to drawings for operating voltage and unit configuration.

2. Maximum Continuous Operating Voltage (MCOV) -- The MCOV shall be greater than 115% of the nominal system operating voltage.

3. Protection Modes -- For a wye configured system, the device must have directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G). For a delta configured system, the device must have suppression elements between line to line (L-L) and line to ground (L-G).

4. UL 1449 SVR -- The maximum UL 1449 SVR for the device must not exceed the following:

Models	208Y/120	480Y/277	600Y/347
L-N; L-G; N-G	400 V	800 V	1200 V
L-L	800 V	1500 V	2000 V

5. ANSI/IEEE Cat C3 Let Through Voltage -- The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

Models	208Y/120	480Y/277	600Y/347
L-N	470 V	900 V	1300 V

6. ANSI/IEEE Cat. B3 Let Through Voltage -- Let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6 kV, 5000 amps) shall be less than:

Models	208Y/120	480Y/277	600Y/347
L-N	150 V	200 V	300 V

C. TVSS Design:

1. Balanced Suppression Platform -- The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating TVSS modules which do not provide a balanced impedance path to each MOV shall not be acceptable.

2. Electrical Noise Filter -- Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 55 dB at 100 kHz using the MIL-STD-220A insertion loss test method. The unit shall be complimentary listed to UL 1283. Products not able to demonstrate noise attenuation of 55 dB @ 100 kHz shall be rejected.

3. Internal Connections -- No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.

4. Safety and Diagnostic Monitoring -- Each unit shall be equipped with 200 kAIC internal fuses. Each unit shall provide the following three levels of monitoring:

   a. Continuous monitoring of fusing system

   b. Internal infrared sensor system for monitoring individual MOVs (including neutral to ground). The system must be capable of identifying open circuit failures not monitored by conventional fusing systems.

   c. Thermal detection circuit shall monitor for overheating in all modes due to thermal runaway.

      A green/red solid state indicator light shall be provided on each phase. The absence of a green light and the presence of a red light, shall indicate which phase(s) have been damaged. Fault detection will activate a flashing trouble light. Units which can not detect open-circuit damage, thermal conditions and over current will not be accepted.

5. Warranty -- The manufacturer shall provide a full five (5-) year warranty from the date of shipment against any TVSS part failure when installed in compliance with manufacturer's written instructions and any applicable national or local electric code.

6. TVSS devices shall be mounted such that they are seismically qualified for UBC Zone 2 applications.

7. The unit must be equipped with transient event counter and audible alarm.

8. Remote Status Monitor -- The TVSS device must include form C dry contacts (one NO and one NC) for remote annunciation of unit status. The remote alarm shall change state if any of the three monitoring systems described detect a fault condition.

9. Push-To-Test Feature -- Each suppression unit shall incorporate an integral test feature which verifies the operational integrity of the unit's monitoring system.

2.03 SYSTEM APPLICATION

A. The TVSS applications covered under this section include distribution and branch panel locations and switchboard assemblies. The branch panel located TVSS shall be tested and demonstrate they are suitable for ANSI/IEEE C62.41 Category C1 environments.

B. Surge Current Capacity -- The minimum total surge current 8 x 20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

Application	Min. Surge Current Per Phase	Min. Surge Current Per Mode*
Service Entrance (Switchboards Main Entrance) CPS-H	250 kA	125 kA
Branch Locations (Panelboards) CPS-S	120 kA	60 kA

*L-G, L-N and N-G (WYE system);
L-L, L-G (Delta system)

C. Panelboard Requirements

1. Related Section 16475 - Circuit breakers and fusible switches.

2. The TVSS application covered under this section include distribution, branch panel and bus plug locations. The TVSS units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.

3. Withstand -- Each unit must be capable of surviving more than 2500 category C1 transients without failure or degradation of UL 1449 Suppression Voltage Rating.

4. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 22,000 amperes RMS symmetrical.

5. Panelboards rated 480 Vac shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 22,000 amperes RMS symmetrical.

6. Panelboards shall be labeled with a UL short-circuit withstand rating. When series ratings are applied with integral or remote upstream devices, a label shall be provided. Series ratings shall cover all trip ratings or installed frames. It shall state the conditions of the UL series ratings including:

   a. Size and type of upstream device
   b. Branch devices that can be used
   c. UL series short-circuit rating.

7. Branch panels shall be UL labeled as "suitable for non-linear loads".

8. Distribution and panel suppressors shall be installed inside the panelboards or bus plugs at the manufacturer's factory.

9. A direct bus bar connection shall be used to mount the TVSS component to the panelboard bus bar or the bus plug disconnect to reduce the impedance of the shunt path.

10. The TVSS panelboard shall be constructed using a direct bus bar connection (cable connection between bus bar and TVSS device is not acceptable). TVSS units that use a wire connection do not meet the intent of this specification.

11. Suppression shall be included and mounted within the panelboard and bus plug by the manufacturer of the panelboard or bus way.

D. Retrofit Installation (externally mounted suppressor)

1. Maximum conductor lead length between breaker and suppressor shall not exceed 14 inches. Comply with manufacturer's recommended installation and wiring practices.

E. Switchgear Requirements

1. The TVSS application covered under this section is for switchboard locations. The service entrance TVSS shall be tested and suitable for ANSI/IEEE C62.41 Category C3 environments.

2. Service entrance suppressor shall be installed by assembly manufacturer.

3. Withstand. Each unit must be capable of surviving more than 2500 ANSI/IEEE C62.41 Category C1 transients without failure or degradation of UL 1449 Suppression Voltage Rating.

4. Service entrance suppressors shall be installed in the assembly.

5. Locate suppressor on load side of main disconnect device, as close as possible to the phase conductors and ground/neutral bar.

6. Provide a 30-amp disconnect. The disconnect shall be directly integrated to the suppressor and assembly bus using bolted bus bar connections.

7. The suppressor and integral disconnect shall be installed to the switchboard using a direct bus bar connection (no cable connection between bus bar and TVSS device). TVSS units that use a wire connection do not meet the intent of this specification.

8. All monitoring diagnostics features such as indicator lights, trouble alarms and surge counter (if specified) shall be mounted on the front of the switchboard.

2.04 ACCESSORIES

A. Push to test feature to verify operational integrity.

B. Form C dry contacts one NO, one NC for remote status monitoring

C. Provide audible alarm and surge counter as shown on the contract drawings

2.05 ENCLOSURES

A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 1 surface or flush-mounted general purpose enclosures primarily intended for indoor use

PART 3 - EXECUTION

3.01 FACTORY TESTING

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16720EX – FIRE ALARM SYSTEM – (EXPAND EXISTING SYSTEM)

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.

2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes, but not limited to:
1. Conduit and wiring necessary to connect the existing FACP to alarm initiating devices, notification appliances and auxiliary equipment
2. Addressable manual fire alarm stations
3. Addressable analog area smoke detectors
4. Addressable analog duct smoke detectors
5. Addressable analog heat detectors
6. Carbon Monoxide Detectors
7. Connections to sprinkler waterflow alarm switches
8. Connections to sprinkler supervisory switches and tamper switches
9. Audible and visual combination notification appliances
10. Air handling systems shutdown relays
11. Elevator recall/shunt relays (if the building has an elevator)
12. Battery standby

C. Work scope:

1. Work shall include any or all of the following:

a. Removal of existing devices no longer required as a result of demolition activities in the project area, as indicated in the Drawings. Demolition work shall include removal of device(s), the removal or surface mounted or exposed backboxes, or the abandonment of recessed backboxes, and removal of any associated wiring, and raceways rendered obsolete by the demolition. It shall also include any programming required to remove such devices from the system. All removed devices shall be turned over to the Owner, unless otherwise noted.

b. Removal and re-installation of existing devices and/or associated wiring to accommodate new finish work or equipment replacements by others.

c. Re-location of existing devices and/or wiring associated with renovated areas. Work shall include all wiring extensions as per code and manufacturer specifications to serve the device at its new location.

d. Addition of new devices, backboxes and wiring to serve new or renovated areas as shown on the drawings. Included in this work shall be all programming required to integrate the new devices into the system.

2. It is the declared intent of this specification that the end result of the system modifications shall be a complete and operational fire alarm system. Provide all required expansion modules, power supplies, batteries, interfaces, programming, inspections, testing, etc. to achieve the result whether or not shown on the drawings.

3. Maintain existing fire alarm devices affected by Project Work for renovated space, including areas affected by asbestos abatement within existing zones. This would require disconnection, reconnection and commissioning of existing devices during installation of new ceiling systems.

1.2 DEFINITIONS

A. LED: Light-emitting diode.

B. NICET: National Institute for Certification in Engineering Technologies.

1.3 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.

2. Unless otherwise noted, the edition of the referenced code or standard that is current at the time of the "date of record" for the Work shall be considered the effective code or standard for the duration of the project.

3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

4. Refer to specific Division 26 Sections for additional referenced codes and standards:
   ANSI/NFPA 70 - National Electrical Code.
   ANSI - American National Standards Institute.
   ASME A17.1 Safety Code for Elevators and Escalators
   FM - Factory Mutual System.
   NFPA – National Fire Protection Association
   NFPA 72 - National Fire Alarm Code
   UL – Underwriters' Laboratories:

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.

2. Include battery-size calculations for revised service.

3. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

4. Include revised riser diagram complete with devices labeled with Project room numbers and device address number.

5. Include floor plans to indicate final device locations and showing address of each addressable device. In addition, indicate applicable candela settings and tap settings of each notification device.

C. General Submittal Requirements:

1. Shop Drawings shall be prepared by persons with the following qualifications:
   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, Level III minimum.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," deliver copies to authorities having jurisdiction and include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.

B. Operational Documentation:

1. Program Software Backup: On magnetic media or compact disk, complete with data files.

2. Device address list.

3. Updated O&M Manual.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.

2. Keys and Tools: One extra set for access to locked and tamper-proofed components.

3. Fuses: Two of each type installed in the system.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.8 WARRANTY

A. Provide and submit written warranty, signed by the manufacturer, agreeing to replace/repair, within the warranty period, all equipment with inadequate and/or defective materials and workmanship, including leakage, breakage, improper assembly or failure to perform as required; provided that the manufacturer's instructions for handling, installing protecting and maintaining units have been adhered to during warranty period. Warranty shall include all component replacement costs, including labor and wring for removal and reinstallation. Such warranty shall be required of the installing contractor even if in excess of original manufacturer warranties.

1. Warranty period: One (1) year, beginning upon completion of equipment installation and commissioning.

1.9 PROJECT CONDITIONS

A. The existing fire alarm system shall remain in service throughout the project, except as described below.

B. Interruptions of Existing Fire Alarm service: Coordinate any required shutdowns with Owner to tie in new fire alarm devices. Outages shall only be scheduled during off hours, weekends, holidays etc. when the building is not in use. Include all premium time on bid. Provide any required fire watches.

1. Notify Architect, Construction Manager, Owner no fewer than two-days in advance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work. The manufacturer's equipment must be listed for use and function with the existing FACP.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices as applicable to the facility:

1. Manual stations.
2. Smoke detectors.
3. Duct smoke detectors.
4. Heat Detectors.
5. Beam Detectors.
6. Fire suppression system operation
7. Automatic sprinkler system waterflow device activation.

B. Fire-alarm signal shall initiate the following actions as applicable to the facility. Any operation sent out from the main FACP shall remain as is prior to this project.:

1. Continuously operate alarm notification appliances.
2. Identify alarm at fire-alarm control unit and remote annunciators.
3. Send alarm signal to central monitoring station
4. Release fire and smoke doors held open by magnetic door holders.
5. Shutdown of fans rated 1000cfm or greater.
6. Close smoke dampers in HVAC duct systems.
7. Recall elevator(s) to primary or alternate recall floors.

C. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Loss of primary power at fire-alarm control unit.
3. Ground or a single break in fire-alarm control unit internal circuits.
4. Abnormal ac voltage at fire-alarm control unit.
5. Break in standby battery circuitry.
6. Failure of battery charging.
7. Abnormal position of any switch at fire-alarm control unit.
8. Activation of any Carbon Monoxide Detector.

D. System Trouble and Supervisory Signal Actions: Any operation sent out from the main FACP shall remain as is prior to this project.

1. Annunciate at fire-alarm control unit and remote annunciators. Send trouble / supervisory signal to central monitoring station.
2. For carbon monoxide detector activation – in addition to above, activate local sounder base of the affected device.

2.3 FIRE-ALARM CONTROL UNIT - EXISTING

A. The existing FACP is as shown on the drawings.

B. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class B.
   a. Initiating Device Circuits: Style B.
   b. Notification Appliance Circuits: Style Y.
   c. Signaling Line Circuits: Style 4.
   d. Install no more than 80% addressable devices on each signaling line circuit.
2. Serial Interfaces: Two RS-232 ports for printers.

C. Notification Appliance Circuit: Operation shall remain as is prior to this project. Operation shall sound in a temporal pattern. All visual notification devices shall be synchronized. Provide NAC Extenders as required.

D. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.

E. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

F. Transmission to Remote Alarm Receiving Station: Maintain existing automatic transmission of alarm, supervisory, and trouble signals to a remote alarm station.

G. Primary Power: Existing primary power shall remain as is, unless otherwise indicated.

H. Secondary Power: Provide battery calculations to verify if the existing batteries are adequate to meet code requirements after system expansion.

2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key-operated switch.

3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Unless otherwise noted lifting covers shall be non-alarmed. Where alarmed covers are called for, lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation. Provide STI Stopper II or equal.

4. Design Make: Compatible with and listed for use on the existing system.

2.5 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall match and be of the same manufacturer as the existing smoke detectors on the system.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
   a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.
   b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
   c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).
3. Each sensor shall have multiple levels of detection sensitivity.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.
6. Each duct sensor shall have a Remote Test Station with an alarm LED and test switch.

2.6 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.
   1. Temperature sensors shall test for and communicate the sensitivity range of the device.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.
   1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
   2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.
   1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
   2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.7 CARBON MONOXIDE DETECTORS

A. Listed to UL 2075 for Gas and Vapor Detectors and Sensors

B. The detector shall be equipped with sounder base and trouble relay. The detector base shall be able to mount to a single gang electrical box or direct mount to wall or ceiling.

C. The detector shall provide dual color LED indication which blinks normal, alarm or end-of-life. When sensor supervision is in trouble or end-of-life condition, the detector shall send a trouble signal to the

panel. In alarm mode the red LED shall blink in a Temporal 4 pattern and the sounder will sound in in a Temporal 4 pattern.

D. The detector shall provide a means to test CO entry into the CO sensing cell.

E. Operating voltage shall be 12/24 VDC.

2.8 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections. Where used on an existing system containing addressed notification devices, any new devices shall likewise be addressable as well.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

2. Wall mounted notification appliances shall be red color with white lettering. Ceiling mounted notification appliances shall be white color with red lettering.

B. Horns/Strobe: Unless otherwise required for compatibility with the existing system: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol. Match existing system devices

C. Visible Notification Appliances: Unless otherwise required for compatibility with the existing system: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

1. Rated Light Output:

a. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.

3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

4. Flashing shall be in a temporal pattern, synchronized with other units.

5. Strobe Leads: Factory connected to screw terminals.

6. Mounting Faceplate: Factory finished, red.

7. Match existing system devices.

2.9 MAGNETIC DOOR HOLDERS

A. Magnetic door holders shall be UL Listed, flush or surface mounted in a single gang box, aluminum color.

B. Magnetic door holders shall be low voltage, AC or DC and compatible with the existing fire alarm system.

C. Magnetic door holders shall have a holding force of 25lbf and shall hold the door open while energized. Doors shall be released upon power failure, or de-energized by means or fire alarm-controlled relay or other switch.

D. Provide with all required hardware for complete operation – including adjustable contact plates etc.

2.10 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Supervised IAM: Match existing system device, or provide compatible device listed for use on the system.

2.11 DEVICE GUARDS

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, notification device, or other device requiring protection.

B. Factory fabricated and furnished by device manufacturer.

C. Finish: Paint of color to match the protected device.

D. Provide device guards to devices installed in areas subject to physical damage. This shall include, but not limited to, Gymnasiums, Wrestling Rooms, Weight Rooms, Locker Rooms, Shops, Receiving / Loading Areas, Exterior devices.

2.12 FIRE ALARM WIRE AND CABLE

A. Fire Alarm circuits: Install cables in metal J hooks above accessible ceilings and in Wiremold 500 exposed in finished spaces

B. Manufacturers: Subject to fire alarm system manufacturer’s requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Comtran Corp.
   2. Genesis Cable Products; Honeywell International, Inc.
   3. West Penn Wire/CDT; a division of Cable Design Technologies.
   4. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

C. Signaling Line Circuits: Twisted, shielded pair, not less than No . 18 AWG size as recommended by system manufacturer.

D. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.

E. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.

2. Line-Voltage Circuits: No. 12 AWG, minimum.

3. Multi-conductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NTRL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

PART 3 - EXECUTION

3.1 FIELD CONDITIONS

A. Prior to installation carefully inspect the installed work of other trades, whether pre-existing or part of this project and verify that such work is complete to the point where the installation of the fire alarm system may properly commence

3.2 EQUIPMENT INSTALLATION

A. General:

1. Comply with NEC, NFPA 72 and manufacturer requirements or installation of fire-alarm equipment.

2. Follow Division 16 Section “Common Work Results for Electrical”, for anchorage requirements.

3. Verify dimensions in the field. Lay out work in the most direct and expeditious manner to avoid interference.

4. Coordinate necessary shutdowns of existing systems by notifying the Construction Manager or Owner’s Representative a minimum of 10 working days before rendering such systems inoperative. Do not render inoperative any system without the prior approval.

5. Coordinate fire alarm detectors and associated equipment with existing ceiling or roof materials, lighting, ductwork, conduit, piping, suspended equipment, structural and other building components.

6. Coordinate installation of fire alarm system with work of other trades. Protect fire alarm equipment with suitable coverings until completion of Project and remove prior to system turnover.

7. Install initiating devices, control panels, audible signals, connections to equipment provided under other divisions, and related work following equipment manufacturers' requirements for a complete and properly functioning system that will perform specified functions.

B. Install wall-mounted equipment, with tops of cabinets not more than 72 inches above the finished floor.

C. Devices and raceways installed in new walls or existing stud walls shall be flush mounted with concealed wiring. Devices installed on existing block wall construction shall be surface mounted.

D. Smoke-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.

2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing

3. Smooth ceiling spacing shall not exceed 30 feet. Greater spacing in corridors in accordance with NFPA 72 is permitted.

4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.

5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.

6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

E. Duct Smoke Detectors: Comply with NFPA 72. Install sampling tubes so they extend the full width of duct.

F. Visible Alarm-Indicating Devices: Install with lens at no less than 80” and not more than 96” above finished floor or on the ceiling as indicated. Install all devices at the same height unless otherwise indicated.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 PATHWAYS

A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.

B. Exposed pathways located in finished areas shall be installed in surface metal raceway and in EMT in storage, mechanical and utility spaces.

C. Exposed EMT shall be painted to match adjacent areas.

D. Exposed box covers in non-public areas shall be painted red.

3.4 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation

connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated air-conditioning duct systems.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

3.6 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction (AHJ).

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.

b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.

5. Test visible appliances for the public operating mode according to manufacturer's written instructions.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

DIVISION 17

SECTION 17010 - TECHNOLOGY IMPLEMENTATION

Part I - GENERAL

1.01 GENERAL NOTES

A. The intent of the specification section is to outline the scope of work products and execution relating to furnishing and installing Network Cabling at the new or remodeled buildings and/or building additions. This includes, but is not limited to Backbone and Horizontal cabling comprised of Copper and Fiber Cabling, and support systems are covered under this document and the Division 16 contractor shall complete as part of their bid and subsequent required design, implementation, service and installation.

B. All work associated with Division 17 and its intent shall be coordinated with all other work as furnished and installed by other trades that may or may not interface, interact or be dependent upon the work herein.

C. The Division 16 contractor shall meet all required deadlines for installation and implementation and shall notify the Architect/Engineer of any difficulty that he or she faces that may alter these deadlines.

D. The Division 16 contractor shall also notify the Architect/Engineer or the Owner’s designated representative of any design discrepancy, site limitation, or configuration, which would prohibit the contractor from a successful and timely installation. Failure to notify these parties shall result in the contractor's sole responsibility for it.

E. The Division 16 contractor shall be solely responsible for ascertaining, determining and subsequently paying the appropriate prevailing wage rates for the work herein. The Architect/Engineer and the Owner will be held harmless from these and any decisions that the contractor reaches that pertain to the contractor's work.

F. The Division 16 contractor shall be responsible for the copper and fiber data cable, cable management and terminations of such as shown on all E/T series drawings.

G. The Division 16 contractor shall be responsible for the data power and surface raceway as shown on all E/T series drawings.

H. All technology power and data wiring shall be performed by the division 16 contractor. All references made to the Division 16 contractor shall mean the electrical contractor.

1.02 PROJECT DESCRIPTION

A. The Network Infrastructure Design is as follows:

- Category 6/6A UTP and STP cabling to the Workstation Locations

B. Category 6/6A Unshielded Twisted Pair Copper cabling shall be used to connect the workstations to the nearest Telecommunications Closet (TR), Category 6/6A Unshielded Twisted Pair Copper cabling shall be used for the horizontal structured cabling.

1.03 BIDDERS QUALIFICATIONS

A. All prospective Bidders must possess a minimum of five (5) years continuous experience as a firm doing business under the same name, engaged principally as a contractor for the work proposed.

B. All prospective Bidders must maintain an experienced technical and in house organization for the project, and must maintain an office facility with full-time employees in a commercial space.

C. All data wire installers shall be certified CAT 6/6A and Fiber installers, and the contractor shall provide copies of the certifications from manufactures of UTP/STP copper cabling systems and optical fiber cabling systems such as Hitachi Cable of America or equivalent.

D. All systems, equipment or products herein specified shall be provided and installed by an Authorized Factory Installer for this system, equipment or product.

E. All prospective Bidders shall be able to provide the Owner with the appropriate manufacturers warranty and service on the proposed equipment. Structured cable manufacturer’s warranty shall be a minimum of 20 years.

F. All prospective Bidders will maintain a staff of trained, certified technicians for equipment being specified for this project.

G. A minimum of five years experience in the application of specified equipment is required.

H. A list of projects completed within the last year with contact names and telephone numbers is to be provided upon request.

I. All prospective Bidders shall use licensed electricians for any electrical work being performed within this contract.

1.04 CONTRACT SUPERVISION

A. The Division 16 contractor will assign a competent full-time superintendent to the project, and that superintendent shall be maintained on the project for its duration.

1.05 GENERAL PROVISIONS

A. All Division 16 installations shall be performed by an electrical contractor who is certified in the product specified. A copy of certification documents must be submitted with the bid in order for such bid to be valid. The Division 16 contractor is responsible for workmanship and installation practices in accordance with the wiring program specified. At least 30 percent of the copper installation and termination crew must be certified by the manufacturer specified. In addition, at least 10 percent of the optical fiber installation and termination crew must have technicians level of training and must be certified by the manufacturer specified or other approved organizations in Optical Fiber installation and termination practices.

B. All electrical installations shall be performed by a Division 16 electrical contractor possessing a New York State Electrical license.

C. Any specifications that apply to the electrical contractor will be referred to Division 16 specification.

D. Where the word "Provide" is used, it shall be defined as requiring the furnishing and installing of all items indicated complete in all respects and ready for operation unless otherwise specifically noted.

E. The Division 16 contractor shall be responsible for furnishing all labor, superintendence, materials, tools, equipment and sources necessary for the complete installation of all data work for this technology implementation project as shown on the plans and as herein specified.

F. The Clerk of the works or Construction Manager will be assigned to the project by the Owner and will be clearly defined to the contractor before any work commences.

G. It is the intent of this specification and the accompanying plans that the Division 16 contractor provides a data cabling system complete in every respect and ready to operate. All miscellaneous items and accessories required for such installation whether or not such items or accessories are shown on the plans or mentioned in these specifications shall be furnished and installed.

H. Where the words inactive components is used it refers to all network materials such as patch panels, jacks, patch cords, etc. that are passive to the network (Infrastructure).

I. The Division 16 contractor shall, in writing, accompanying his/her bid, report to the Architect/Engineer of any discrepancy or existing condition which would prohibit him/her from performing his/her work to its full extent - a complete and acceptable system.

J. No "Waiver of Responsibility" for inadequate, incomplete, or defective work will be considered or accepted by the Architect/Engineer unless written notice of a difficulty arising from any existing condition is made part of this Contractor's bid.

K. At each location that a new voice/data or audio/video cable is provided two (2) patch cords shall be provided. One (1) for the closet side and one (1)

for the device side. Patch cord lengths and colors shall be coordinated and finalized with the Owner.

1.06 GENERAL SPECIFICATIONS

A. The following Drawings and accompanying specifications are for the sole purpose of providing the Owner with a complete and thorough infrastructure solution.

B. All inactive components such as the cabling, jacks, racks and such are part of this contract and are the responsibility of the Division 16 contractor to supply and install according to industry standards and accompanying specifications.

C. Workstations and any software running within the workstations are outside of this scope and thus not part of this contract.

D. It is the intent of this specification and accompanying DWG's to show an overall network infrastructure design but not a complete detail of all components within the design. It is the responsibility of the Division 16 contractor to provide, install and configure all materials and components in order to have a complete and thorough data network infrastructure system.

E. The Division 16 contractor will provide the specified manufacturer solution for the CAT-6/6A copper cabling in order to provide the Owner with an extended warranty. Alternate manufacturer solutions will be accepted at the discretion of the owner/engineer.

F. The Division 16 contractor will provide the specified manufacturer solution for the fiber cabling in order to provide the Owner with an extended warranty. Alternate manufacturer solutions will be accepted at the discretion of the owner/engineer.

G. Wherever a discrepancy occurs in the specifications or the drawings or between the drawings and the specifications the contractor will accept the architect/engineer's interpretation of such issue(s).

H. Neither the drawings nor the specifications shall take precedence over the other. Where conflict occurs between both, the one with the more stringent standards shall supercede the other.

1.07 MATERIALS

A. All materials, active or inactive, mentioned for this project are described by specific brand names. It is the intent of the architect/engineer to set a performance standard based on the specific brand name mentioned. The contractor may submit any other brand name

just as long as the equipment or materials meet the performance standards as that of the specific brand that the architect/engineer has chosen.

B. It is the responsibility of the contractor to provide, install and configure all materials or equipment mentioned or not mentioned through out this package in order to achieve a complete and thorough structured cabling system as described previously.

C. The cabling system described in this specification is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:

1. ANSI/TIA 568.0-D, Generic Telecommunications Cabling for Customer Premises
2. ANSI/TIA 568.1-D, Commercial Building Telecommunications Cabling Standard
3. ANSI/TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standard
4. ANSI/TIA-568C.3 Optical Fiber Cabling Components Standard
5. ANSI/TIA-568C.4 Coaxial cabling Components Standard
6. ANSI/TIA 606B, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
7. ANSI/TIA 607-C, Commercial Building Grounding/Bounding Re ANSI/TIA 942-A Telecommunications Infrastructure Standard For Data Centers
8. TIA-862-A, Building Automation Systems Cabling Standard
9. ANSI/TIA 569-D, Commercial Building Standard for Telecommunications Pathways and Spaces
10. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) – 13th Edition
11. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) -2017 Edition

D. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Division 16 contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

E. This document does not replace any code, either partially or as a whole. The Division 16 contractor must be aware of local codes that may impact this project.

F. It is the responsibility of the Division 16 contractor to notify the architect in writing if there are any conflicts with the materials or products the architect/engineer has specified that will make a complete network system installation impossible or difficult.

1.08 ALTERNATES

A. Although the Owner does not restrict, by use of a brand name or model, it does have certain features, which it deems desirable. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. Bidders wishing to submit alternate equipment shall submit to the Architect/Engineer the system proposed to provide an equivalent functional alternate to meet specifications. Bidders shall provide all pertinent information including: manufacturer specification sheets, working drawings, shop drawings and a demonstration of the system.

C. Contractors bidding equipment or systems other than those items specified shall submit those items as equivalents or substitutions to those specified on the Bid Proposal Form in the applicable location. Complete specifications and literature describing alternates MUST be attached to the Bid Form on each item bid. Contractors bidding on substituted or equivalent items may be required to provide a sample of same for evaluation.

D. No substitutions will be considered after the Contract award.

1.09 CODES

A. All work included within the specification package and in the drawings shall be governed by the following rules, guidelines, standards and authorities. All documents listed are believed to be the most current:

NEC	National Electric Code 2017 Edition
OSHA	Occupational Safety & Health Administration
ANSI	American National Standards Institute
NFPA	National Fire Protection Association
ASA	American Standards Association
IEEE	Institute of Electrical & Electronics Engineers
NEMA	National Electronics Manufacturers Association
UL	Underwriters' Laboratory
ELT	Electrical Testing Laboratories Inc.
EIA	Electrical Industries Association
TIA	Telecommunications Industries Association
FCC	Federal Communications Commission
ISO	International Standards Organization
BICSI	Building Industry Consulting Service International

B. All equipment or material that is subjected to UL listings shall be properly labeled.

Part II – Scope of Work

2.01 INSTALLATION CHECKLIST

A. The Division 16 contractor shall have the following information in order to install a complete and accurate job:

- The Drawing Set
- The Design Documentation Project Manual.

2.02 WORK INCLUDED

A. All work required to install and configure a complete data network infrastructure system as described previously will be the Division 16 contractors responsibility. The work included under this specification consists of furnishing all labor, equipment, materials/supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Division 16 contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install a complete telecommunications wiring infrastructure as specified later in this specification package according to industry standards.
2. Furnish, install and terminate all UTP cable.
3. Furnish and install all wall plates, jacks, patch panels and patch cords.
4. Furnish and install all required cabinets and/or racks as required and as indicated.
5. Furnish any other material required to form a complete system.
6. Perform link or channel testing (100% of horizontal and/or backbone links/channels) and certification of all components.
7. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
8. Adhere and comply with all requirements of specified programs.

C. The Division 16 contractor will provide and install all cabling at the teacher drop locations where applicable. This includes all video and audio jumpers and video and audio patch cables.

D. The Division 16 contractor will terminate all data cabling as specified later in this specification package according to industry standard in specified surface raceway provided and installed by the Division 16 electrical contractor.

E. The Division 16 contractor shall coordinate with the electrical contractor all data drop location setup components as mentioned in specification section 17010 and drawings.

F. The Division 16 contractor will provide and install all specified materials at all specified wire closet locations.

G. The division 16 contractor will be responsible for any damage done to any part of the buildings during the installation of the network wiring.

H. All building penetrations used for the network wiring infrastructure shall be the responsibility of the Division 16 contractor. This includes core drilling and access to any rooms.

I. The electrical contractor will be responsible for the removal and relocation of any smart boards, tack boards, tack strips, etc.

J. The electrical contractor will be responsible for any cutting and trimming that may be required to install specified surface raceway in all data drop locations. The contractor shall be responsible for all patching and painting to restore to original condition.

K. The Division 16 contractor will provide all testing results for the specified equipment and products.

L. The Division 16 contractor will follow all industry standards for the installation of all materials and equipment.

2.03 GUARANTEE/WARRANTY

A. The Division 16 contractor will be able to provide two separate extended warranties for the data cabling being installed, one for the CAT-6/6A copper cable installation and one for the Fiber Optic cable installation.

B. The extended warranty must be backed by the manufacturer and shall be no less than 20 years.

C. If the Division 16 contractor is submitting alternate materials or equipment, the substituted material or equipment shall provide the extended warranty that is required of the system.

D. Any failed network equipment or material shall be the responsibility of the Division 16 contractor and shall be replaced immediately.

E. Besides the extended manufacturer warranty, the Division 16 contractor will provide the Owner with a separate warranty notifying the Owner that all work performed by this contractor or any of his/her subcontractors or anyone the contractor employed for any installation of the network infrastructure for the Owner was done according to the specifications of the project and in accordance with all applicable industry standards. This warranty will guarantee all work against faulty and improper material and workmanship. This warranty shall be no less than 1 year and any other warranties for longer terms that apply to any of the components or materials shall apply.

F. The Division 16 contractor will provide the extended manufacturer's warranty and his/her own personal warranty no longer than 15 days after he/she has stated in writing and the architect or engineer have verified that the full network installation and configuration has been finished and completed.

2.04 WORK SCHEDULING

A. The Division 16 contractor must submit, in writing to the Owner, a schedule of the work that will be performed throughout the project by building. The work schedule shall be submitted for approval to the clerk of the works or construction manager no later than 7 days after the award has been issued.

B. The Division 16 contractor must adjust his/her work schedule and working hours according to the Owner's schedule. It is the responsibility of the contractor to coordinate his/her schedule with that of the Owner.

C. The Division 16 contractor's work will not be allowed to interfere with the Owners daily work schedule unless given direct permission from the clerk of the works or construction manager.

D. The Division 16 contractor will be responsible for cleaning up any debris caused during the installation after each work period (daily).

E. No data cables shall be left exposed at the end of each work period and any equipment specified for the network design shall not be left accessible to the public. The Division 16 contractor must secure all data wiring and network components at the end of the work period.

F. The clerk of the works or construction manager shall perform a visual inspection at the end of the workday in order to determine that the Division 16 contractor is following proper procedures for securing and cleaning the work area.

G. Any drilling that has to be performed must first be cleared with the clerk of the works or construction manager or architect/engineer.

H. Any relocation or removal of any existing equipment such as tables, shelves, file cabinets etc, shall first be cleared with the clerk of the works or construction manager for approval.

I. The Division 16 contractor will replace any ceiling tiles removed during the workday as to not have any exposed wires during the next Owner day.

J. No surface raceway shall be left exposed with data or electrical cables installed.

K. If the Division 16 contractor has to integrate any existing LAN(S) into the new LAN, the contractor has to notify the Owner or the clerk of the works or construction manager of any interruption that might occur during the process. The clerk of the works or construction manager will insure

that all parties are notified, which may be affected by the down time on the existing network in order to achieve a full installation and integration to the new LAN.

L. The Division 16 contractor must notify the clerk of the works or construction manager and architect/engineer of any conditions that might cause a delay in the completion of the project.

M. The Division 16 contractor must coordinate with the clerk of the works or construction manager for a storage location(s).

N. The Owner will not provide a location where the contractor can store his/her equipment. The Division 16 contractor shall provide his/her own storage facilities.

O. The Division 16 contractor will have to coordinate his/her schedule with that of the electrical contractor's since the electrical contractor will be providing and installing the surface raceway at the data drop locations.

2.05 SUBMITTALS

A. With the bid response the Division 16 contractor will submit a list of all the subcontractors that will be involved with the project.

B. With the bid response the Division 16 contractor will submit all cut sheets for all materials and equipment being proposed for installation. This list will be subject to review and approval by the architect.

C. All equipment or material in a material list shall first be approved before any shop drawings can be submitted by the contractor.

D. Before any data cables are pulled, the Division 16 contractor must submit a printed schedule of all data drops locations. The schedule shall indicate the data drop identification and termination location. The engineer or architect must review and approve the pull schedule prior to startup of any work.

E. Shop drawings shall be submitted with sufficient time for the engineer or architect to review drawings.

F. Shop drawings and cut sheets must be submitted for all equipment or material being used for project completion. The cut sheets shall be original catalog or PDF reproduced sheets clearly identifying the item submitted.

2.06 Drawings

A. It shall be understood that the details and drawings provided with the specifications are diagrammatic. They are included to show the intent of the specifications and to aid the Division 16 contractor in bidding the job. This contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.

B. The Division 16 contractor shall verify all dimensions and distances at the site and be responsible for their accuracy.

C. Prior to submitting the bid, the Division 16 contractor shall call the attention of the engineer or architect any materials or apparatus the contractor believes to be inadequate and to any necessary items of work omitted.

Part III – Material Specifications

3.01 COPPER NETWORK CABLING

A. Horizontal cabling, cable to the workstation, shall be Category 6/6A Unshielded Twisted Pair, 4 pair, as manufactured by Hitachi Cable of America or equal.

B. Cable must be plenum rated with UL, CMP listing

C. Cable must be 4 pair 23 AWG Solid UTP, FEP primary insulation and a low smoke PVC jacket.

D. The copper cable must be able to handle the following applications

- Gigabit Ethernet/1000 Base-T
- Fast Ethernet/100 Base-T
- Ethernet/10 Base-T
- 155 Mbps ATM
- IEEE 802.3
- IEEE 802.3ab
- IEEE 802.5
- IEEE 802.12
- ISDN
- Voice
- 550MHZ Broadband Video

E. The Category 6 cable shall meet or exceed ANSI/TIA Category 6 requirements for NEXT, Characteristic Impedance, SRL, Attenuation and Delay Skew, PS-NEXT, ELFEXT and PS_ELFEXT.

F. All UTP drops must be certified at 20 degrees C with a length not to exceed 90 meters.

G. All UTP drops must perform within the following parameters at 250 MHz:

Electrical Parameters (@ 250MHz)	**TIA 568-C.2 verified min. std. (additional performance margin guaranteed)**

Insertion Loss	32.8 dB
NEXT	38.3 dB (41.3 dB)
PSNEXT	36.3 dB (39.3 dB)
ACRN	5.5 dB
PSACRN	3.5 dB
ACRF	19.8 dB (22.8 dB)
PSACRF	16.8 dB (19.8 dB)
Return Loss	17.3 dB

1. Termination of the copper cable shall be at an 8-position snap-in modular jack following the T568B pin assignment. All audio/video over CAT 6 cable components shall be terminated using the color code on the back of the modules. The maximum allowable amount of untwisting during cable termination shall be less the ½ inch.

2. As an option, Category 6A cabling shall be considered. This cabling shall meet all of the specifications listed above. In addition to the above, it must support 10G base T;

Electrical Parameters (@ 500 MHz)	**TIA 568-C.2 verified min. std. (additional performance margin guaranteed)**
Insertion Loss	45.3 dB
NEXT	33.8 dB
PSNEXT	31.8 dB
ACRF	13.8 dB
PSACRF	10.8 dB
Return Loss	15.2 dB
PSANEXT	52.0 dB (58.0 dB)
PSAACRF	24.2 dB (30.2 dB)

3.02 MULTI-MODE FIBER OPTIC CABLE-

A. The backbone cable between the zone cabling box and the existing ER shall be Armored 12 strand 50/125 multimode cable OM3 or OM4 LOMM Fiber

B. All fiber optic strands shall be terminated at both ends with LC Connectors. These Optical Fiber cables shall be either Quick Crimp Connectors or Pig tails that are to be fusion spliced, as specified.

C. Certified installers for such equipment shall perform all terminations.

D. Minimum bend radius allowed of the cable shall not exceed 12 times the outside diameter of the cable which is approximately 2 inches.

E. Connectors shall have a maximum of 0.5dB loss per connection and be industry standard type designed for LOMM 50-micron fiber.

F. Provide fiber optic patch cords to connect all pairs from fiber patch panel to voice and data switches. Cables shall be LC to LC 1, 2 and 3 meter for each closet.

3.03 MAIN WIRE CLOSET Equipment Room (ER)/REMOTE WIRE CLOSET Telecommunications Room (TR) MATERIALS

A. These materials shall include but not limited to vertical cable management and support for the patch cords at the front of the rack and wire management, support and protection for the horizontal cables inside the legs of the rack.

B. Ladder Rack and Waterfall cable management shall be provided at the top of the rack for all network cable and fiber entering the rack for protection and to maintain proper bend radius and cable support.

C. Wire management shall also be mounted above each patch panel and/or piece of equipment on the rack.

D. The rack shall include mounting brackets for cable tray ladder rack to mount to the top of the rack.

E. Racks shall have EIA hole pattern on front and rear.

F. Rack shall be black in color to match the patch panels and cable management.

3.04 DATA DROP LOCATION AND MATERIAL

A. Refer to Technology Series Drawings for a list of all materials at all data drop locations.

B. All data drop network cable shall be neatly dressed, secured and concealed throughout the installation.

C. The Division 16 contractor shall install the Data Drop network cables with a maximum of 1-meter service loop (slack cable) neatly coiled and secured in ceiling space above at the station location and a 2-meter service loop at the closet end.

Part IV – Detail Specification

4.01 CABLE ROUTING AND INSTALLATION

A. The following guidelines apply to all technology cabling being installed and routed through the hallways, classrooms or any other location where the specified cable will be installed.

B. It is the responsibility of the Division 16 contractor to determine the best possible path for any cable run as long as it follows the network design set forth by the architect/engineer.

C. Wherever possible the Division 16 contractor will route all his/her cable in the cavity created by the drop ceiling, crawl spaces or attic space. All cables shall be plenum rated.

D. Wherever the Division 16 contractor is unable to route cables as mentioned in item C, the contractor shall run cables in architect/engineer approved surface raceway or conduit at a maximum fill capacity of 40%. For any penetrations of conduit or raceway through fire rated partitions, please refer to specification section 16511 for fire stopping requirements.

E. All cabling shall be supported in cable support system such as “J” hooks or any other approved support system. Data cables shall be bundled with plenum rated hook and loop Velcro ties to a snug fit, which does not deform the cable geometry.

F. All network cables shall be secured a minimum of six (6) inches above the ceiling T-bar grid.

G. The Division 16 contractor should maintain TIA/EIA standards which deal with the proximity of communications cabling to high voltage cabling, motors, transformers, fluorescent lighting and ballast’s, etc… If these standards can’t be met the contractor shall notify the architect/engineer. In addition to the installation standards from BICSI,

H. The Division 16 contractor shall not rest, fasten or support the data cables on; steam pipes, electrical conduit, insulated pipes or sprinkler pipes, ceiling grid supports, water pipes or HVAC ducting.

I. In areas without adequate support structures, the Division 16 contractor shall install “J” hooks or additional ceiling grid hangers on five (5) foot off center secured to a building structure.

J. Strip ties, saddles and J-hooks shall be plenum rated and must be installed as per industry standards.

K. The Division 16 contractor shall not install more than 15 individual data cables to a single hanger or “J” hook without the use of a two-inch wide saddle to eliminate strain on the individual cables.

L. The Division 16 contractor shall be responsible for replacing or patching any system that was damaged during network installation.

M. The Division 16 Contractor will not support any data cables with power cables or fire alarm cables within the same support system.

N. The Division 16 contractor must avoid installing all cable in any location that may cause any obstruction to any existing building functions.

O. If Division 16 contractor chooses to run cables in attic space, he/she must lay cables in J-Hooks or cable trays.

4.02 WALL OR FLOOR PENETRATIONS

A. The Division 16 contractor must notify the clerk of the works or construction manager of any drilling that may be required to install data cables.

B. The Division 16 contractor is responsible for drilling that is not performed by the General Contractor in all locations needed to install specified data wiring.

C. The Division 16 contractor must provide and install all sleeves and conduits that may be necessary for a proper installation of their specified data wire.

D. If necessary, the Division 16 contractor must provide his/her own separate wall or floor penetrations for data wiring. The contractor may not use existing penetrations because existing penetrations may not be sleeved and damage may be caused to existing wires at that location.

E. If conduit is being used the size of conduit must be determined by the number of cables that will be installed within conduit. Conduit fill shall not exceed 40 percent.

F. Conduit shall be installed with the appropriate bend radii to maintain the required bend radius for the Copper and Fiber Optic Cable. Install pull boxes every 100 feet and at every 90 degree turn.

G. It is the responsibility of the contractor to provide fire stopping at all penetrations made by him/her in all fire-rated and time rated walls, floors, ceilings and partition assemblies in accordance with National Electric Code.

H. The Division 16 contractor shall provide the Owner with a fire stopping system, installed to resist the spread of fire and the passage of smoke and other gases.

I. The fire stopping material shall be approved and tested by U.L. or other qualified and approved inspection agency for the designated fire resistance rating.

J. The fire stopping material shall contain no detectable asbestos and comply with all local regulations.

4.03 TELECOMMUNICATIONS ROOM (TR) INSTALLATION

A. Refer to Technology Drawings for a list of materials at all wire closet locations.

B. Wall mounted termination shall be mounted on 4’ x 8’ x .75” void free, fire resistant plywood. The plywood shall be mounted vertically 12” above the finished floor. The plywood shall be painted with two coats of white fire retardant paint.

C. The network cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B standard and best industry practices.

D. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

E. Cables shall be neatly bundled and dressed to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

F. All cables shall be routed through a cable support system, ladder rack and waterfall cable management shall be provided at the top of the rack for all network cable and fiber entering the rack for protection and to maintain proper bend radius and cable support.

G. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

H. Racks shall have EIA hole pattern on front and rear.

I. The Division 16 contractor must provide 20 percent spare ports in Category 6/6A and Fiber patch panels for future use.

J. Any cables leaving or entering the wire rack shall be neatly bundled and encased in approved cable management system.

4.04 DATA DROP LOCATION INSTALLATION

A. The Division 16 Electrical Contractor will provide and install all raceway, divider, power, receptacles and faceplates within the Data Drop Location except for the Category 6 Modular Jacks (refer to E/T series drawings).

B. All materials that will be mentioned in this section have been identified and specified earlier in this specification package under Part III.

C. Refer to Technology Drawings for a complete list of materials at all data drop locations.

D. The Division 16 Electrical contractor will install dual surface raceway in specified locations. Electrical contractor will provide and install divider wall within surface raceway. Divider wall must run continuously throughout surface raceway.

E. All surface raceway shall be mechanically anchored with appropriate fasteners.

F. Electrical contractor must terminate metal jacket of power cable/conduit properly at entrance of surface raceway.

G. All data drops shall be spaced 3’ on center. The Division 16 contractor shall notify the clerk of the works or construction manager if this setup is not possible and then contractor shall space out data drops evenly about the length of surface raceway that can be installed.

H. The Division 16 contractor will install CAT-6/6A copper cable within surface raceway and terminate it in front loading Enhanced CAT-6 modular jacks following T568B standards. Modular jacks shall be installed in snap in faceplates which will be installed in specified molded covers.

I. The Division 16 Electrical contractor is responsible for all branch circuits, receptacles and hanging device brackets if specified (refer to E/T series drawings).

J. Electrical contractor will supply and install all accessories as required for a complete installation of surface raceway (refer to E/T series drawings).

K. Cable shall be labeled at each end.

L. All label printing will be machine generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

M. The Division 16 contractor shall coordinate with the architect/engineer any surface raceway configuration changes caused by any obstacles and or casework locations.

N. Cutting and notching of any ornamental trimming will be the Division 16 electrical contractor’s responsibility. The electrical contractor must notify the clerk of the works or construction manager if any cutting for proper installation has to take place.

O. Electrical contractor shall notify the clerk of the works or construction manager if installation of surface raceway is impossible at any specified location.

P. Electrical contractor shall notify the clerk of the works or construction manager if installing a different setup than that which has been specified.

Part V – Project Close-out

5.01 GENERAL PROVISIONS FOR TESTING

A. Before final application is considered for review the Division 16 contractor must submit all test results to the architect/engineer in order for them to be reviewed and accepted.

B. The clerk of the works or construction manager can be present during such testing and will be able to inspect contractor installation and workman-ship.

C. Any work that does not comply with specifications mentioned throughout this specification package or industry standard shall be replaced and reinstalled at contractor's expense.

D. Certificate of compliance and all test results shall be provided to the Owner upon each item of testing.

E. Any failed copper cables or fiber optic cables shall be removed and re-installed. If a fiber strand fails out of the full fiber optic cable bundle then the contractor will denote that fiber strand and remove it from any termination equipment. Data contractor will then replace that failed # of strands.

F. Electrical Contractor shall submit written test reports for all types of cables and on each individual cable. All individual test reports shall be bound into a booklet form. Electrical Contractor shall submit (1) paper copy of final testing report to Architect/Engineer and all data on CD. For multiple buildings provide (1) copy for each building involved in the project.

G. Prior to the start of work, Electrical Contractor shall submit test booklet format and blank test report forms for Engineer approval.

H. Report booklet shall include final riser diagrams with cable identification numbers.

I. Provide cover sheet per building including all nodes and associated test results. Cover sheet shall include Building Name, Wiring Closet

Number, Type of Cable, Room Number, Room Name, Result (Pass or Fail), Length, etc.

5.02 Category 6/6A COPPER CABLE TESTING

A. Category 6 copper cable shall meet all manufacturing standards and all ANSI/TIA 568C.2 standards for attenuation, Propagation Delay, Delay Skew, NEXT, PSNEXT ELFEXT PSELFEXT and return loss.

B. A field tester meeting the requirements set forth in the 568C.2 standard and use the latest version of the Fluke tester or an equivalent.

C. All cabling testing shall be done at not only all points of connectivity to the network, but also at each cable for any breaks or damage to ensure connectivity and compliance with the network and EIA/TIA standards.

D. The testing certification sheets shall be made part of the required "Close-out" documentation. Testing sheets shall include wire map, resistance, length, capacities, Attenuation, NEXT, Propagation Delay, Delay Skew, Return Loss, PSNEXT.ELFEXT and PSELFEXT for installed cable. Cable results of the pass results must be submitted in an electronic and paper format. It must be the full tests results from the tester in its native format. * Pass is NOT acceptable.

5.03 FIBER OPTIC CABLE TESTING

A. The Division 16 contractor shall test all optical fiber cable before installing it. A visual continuity test shall be enough.

B. The Division 16 contractor shall use LAN test equipment such as Fluke or equivalent for all installed fiber optic cabling. This testing documentation shall be completed per the ANSI/TIA 568C.3 requirements and be made part of the required “Close-out” documentation. The tested cable shall also be certified to support the required protocols for selected network applications.

C. For complete and accurate testing for fiber optic cables the Division 16 contractor shall follow the following guidelines:

- Confirm test jumpers are of the same fiber core size and connector type as the cable system.
- Ensure that optical sources are stabilized and have center wavelengths within +-20 nm of the 850/1300 nm wavelength.
- Test set-up and performance shall be conducted in accordance with ANSI/TIA 568C.3 standards.
- Power meter is calibrated at each of the nominal test wavelengths and traceable to the National Institute of Standards and Technology (NIST)

- Contractor must confirm all system connectors, adapters, and jumpers are properly cleaned prior to the measurement.
- System loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 for singlemode fibers.
- Division 16 contractor will be testing for end-to-end attenuation. The attenuation shall not exceed manufacturer's specifications and verified by ETL to ANSI/TIA 568C.3 specifications.

D. The Division 16 contractor must measure the attenuation of each connected link after each installation.

E. If attenuation level results are not acceptable, the contractor must perform OTDR testing on failed cable in order to find out what causes the loss and where it occurs in the cable. The contractor will make appropriate adjustments or reinstallation of the cable in order for the cable to pass attenuation level results.

5.04 AS BUILT DRAWINGS

A. The Division 16 contractor must provide the architect/engineer with as built drawings in an electronic format compatible to AUTOCAD. No hand-generated drawings shall be acceptable. A paper set and an electronic set shall be provided to the Owner.

B. The Division 16 contractor may acquire the background drawings from the architect/engineer upon request. Contractor's drawings can only be used for this project and may not be altered to perform any other work at this Owner's site. A Twenty Five dollar ($25) per drawing fee will be charged for every AutoCAD drawing requested.

C. The Division 16 contractor must fill out data information charts and turn them over to the Owner. Information charts must be reproduced in written format as well as electronic format.

5.05 SYSTEM WARRANTY, GUARANTEES, AND MANUALS

A. The Division 16 contractor will provide all system and product guarantees as mentioned in section 2.03 to the Owner no later than 10 days after the contractor has submitted in writing of project completion.

B. The Division 16 contractor will provide the Owner all manufacturer manuals for all the installed equipment. Manuals should be clearly labeled and must be provided in some sort of binder or folder for storage purposes.

END OF SECTION