

PROJECT MANUAL

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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.

FOR:

Phase 2 – Bond Improvements

At

**Bedford
Fox Lane Campus
Maintenance Building**

BEDFORD CENTRAL SCHOOL DISTRICT
TOWN of BEDFORD, WESTCHESTER COUNTY

**NEW YORK STATE EDUCATION
DEPARTMENT NUMBER:**

66-01-02-06-5-0-027-001 (23-131K)

B.B.S. PROJECT NUMBER:

23-131 K

BID PICK-UP DATE:

January 12, 2026



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PROJECT DIRECTORY

Architects/Engineers:

BBS Architects, Landscape Architects
and Engineers, P.C.
244 East Main Street
Patchogue, NY 11772
(631) 475-0349
(631) 475-0361 Fax

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Bedford, New York 10506
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Poughkeepsie, NY 12603

Construction Manager:

Arris Contracting Company, Inc.
Joe Cilenti
189 Smith Street
Poughkeepsie, NY 12601
(845) 473-3600

DRAFT AIA® Document A701™ - 2018

Instructions to Bidders

for the following Project:

(Name, location, and detailed description)

Bedford Central School District - Phase 2a
632 South Bedford Rd
Bedford, NY 10506

THE OWNER:

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

Bedford Central School District
632 South Bedford Rd
Bedford, NY 10506

THE ARCHITECT:

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

BBS Architects, Landscape Architects & Engineers, P.C.
244 E. Main Street
Patchogue, NY 11776

THE CONSTRUCTION MANAGER:

Arris Contracting Company, Inc.
189 Smith Street
Poughkeepsie, New York 12601

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

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

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

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



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ARTICLE 1 DEFINITIONS

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

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents, apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, including all required allowances, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bidder has evaluated and satisfied itself as to the conditions and limitations under which the Work is to be performed, including without limitation (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, and (4) availability and cost of materials, tools and equipment;
- .6 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .7 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

§ 2.2 To be considered qualified, the Bidder must demonstrate to the Owner's satisfaction the following:

- .1 The corporation, partnership, sole proprietorship of other business entity in whose name the Bid is submitted has been in business, continuously, for no less than the previous five (5) years performing or coordinating the work which it is bidding on;
- .2 The Bidder has satisfactorily completed no less than five (5) projects of comparable size, complexity and type to this Project, within the last five (5) years, as a prime contractor to project owner;

- .3 The Bidder is not currently involved in bankruptcy proceedings.
- .4 The Bidder is licensed to perform the work it is bidding on in the jurisdiction where the work will take place;
- .5 The Bidder is capable of and intends to perform at least 25% of the Work with its own forces;
- .6 The Bidder is able to perform the Work with manpower available to it; and
- .7 The Bidder and its subcontractors have a minimum of five (5) years' experience in the Work and applicable trades.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders may obtain Bidding Documents as designated in the Advertisement or Invitation to Bid, for the deposit sum and method stated therein.

(Paragraphs deleted.)

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within thirty (30) days following the award of the Contract or the rejection of the Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded. Good condition as used in this section means that the Bidding Documents must be returned bound as issued, legible, and containing only the markings necessary for bidding purposes.

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

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

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

§ 3.1.6 All materials submitted as part of the bid shall become the property of the Owner and will not be returned to the Bidder. The Bidder is responsible for making its own copies of any or all parts of the Bid Documents for its files.

§ 3.2 Modification or Interpretation of Bidding Documents

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

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing via email and shall be received by the Architect at least seven working days prior to the date for receipt of Bids, as follows:

John Prentice
AIA Senior Associate, Architecture
Email: prentice@bbsarch.com
BBS Architects, Landscape Architects & Engineers, P.C.
244 E. Main Street
Patchogue, NY 11776

With a copy to:
Alexis Smith and Allison Canfield
Emails: ASmith@arriscontracting.com and acanfield@arriscontracting.com
Arris Contracting Company, Inc.
189 Smith Street
Poughkeepsie, NY 12601

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner, including phone calls, shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 In the absence of an interpretation, correction or change, should the Drawings disagree in themselves or with the Specifications, the better quality, the costlier or the greater quantity of work or materials shall be estimated upon, and unless otherwise ordered, shall be furnished.

§ 3.2.5 Communications regarding the Bidding Documents shall be directed to:

John Prentice
AIA Senior Associate, Architecture
Email: prentice@bbsarch.com
BBS Architects, Landscape Architects & Engineers, P.C.
244 E. Main Street
Patchogue, NY 11776

With a copy to:

Alexis Smith and Allison Canfield
Emails: ASmith@arriscontracting.com and acanfield@arriscontracting.com
Arris Contracting Company, Inc.
189 Smith Street
Poughkeepsie, NY 12601

§ 3.2.6 Equivalents

§ 3.2.6.1 In the Specifications, if two or more kinds, types, brands, or manufacturers or materials are named, they shall be regarded as the required standard of quality, and are presumed to be equal. The Contractor may select one of these items or, if the Contractor desires to use any kind, type, brand, manufacturer or material other than those named in the Specification, he shall indicate in writing to the Architect and Owner, and prior to the award of Contract, what kind, type, brand or manufacturer is included in the Base Bid for the specified item. Refer to Specification 012519 Equivalents for Equivalent Certification Form.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect no later than ten days prior to the date for receipt of Bids. Requests shall be submitted in the manner established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; (4) all supporting data including technical information, catalog cuts, warranties, installation instructions, operating procedures, significant qualities of proposed substitution (e.g. performance, weight, size, durability and visual effects); (5) samples, if applicable and requested; and (6) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.2.4 By making a request for substitution, the Bidder:

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

- .2 represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product;
- .3 certifies that the cost data is complete and includes all related costs under the Contract to be awarded, including professional services necessary and/or required for the Architect to implement the proposed substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent;
- .4 represents that it will coordinate the installation of the accepted substitute, making all such changes to the Drawings effected by the change and to all Specifications as required for the work to be completed in all respects;
- .5 shall submit an affidavit stating that (a) the proposed substitution conforms and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings and (b) the Bidder accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect; and
- .6 represents the proposed substitution will have no effect on the construction schedule.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents through the print method stated in the Advertisement or Invitation to Bid.

All Bid Addenda will be transmitted to registered plan holders via email and will be available at www.revplans.biddyhq.com.

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

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

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

§ 3.4.5 The failure of any Bidder to receive any such Addenda will not relieve the Bidder of any obligation contained in the Addenda. Any Addenda issued shall become part of the Bidding Documents and Contract Documents.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

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

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

§ 4.1.8 In accordance with the Wicks Reform 2008, for Single Prime Contracts for projects under the monetary threshold of \$1,500,000, the bid shall be accompanied by a separate sealed envelope naming each subcontractor for the Plumbing, HVAC and Electrical work, and providing the amount to be paid to such subcontractors. After the low bid is announced, the sealed list of subcontractors submitted with such low bid will be opened and the names of such subcontractors shall be announced. Thereafter, any change of subcontractor or agreed-upon amount to be paid to each subcontractor shall require the approval of the public owner that is based on the Bidder or Contractor demonstrating to the public owner a legitimate construction need for the change sought, which demonstration shall be open to public inspection. Legitimate construction need includes a change in the Project specifications, a change in material costs, a change to subcontractor status as determined pursuant to NY Labor Law Section 222(2)(e), or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. Once the low bidder's list is opened, it must be open for public inspection. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

4.1.9 Pursuant to Section 220-i, each Bidder must provide proof of their registration with the Department of Labor of the State of New York, which proof must, at a minimum, include their certificate of registration. Failure to include proof of their registration will disqualify their bid from consideration for award and will result in rejection of their bid as nonresponsive.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security: Bid Security of not less than five percent (5%) of the total Base Bid (including all allowances) plus the sum of all alternates, in the form of a Bid Bond or a Certified Check made payable to the Owner.

Either a certified check drawn on a solvent bank with an office in the State of New York, or a bid bond equal to five percent (5%) of the total amount of the Bid, and payable to the "Bedford Central School District." This amount shall be the measure of liquidated damages sustained by the Owner as a result of the failure, negligence or refusal of the Bidder to whom the Contract is awarded to execute and deliver the Contract. The Bid must also be accompanied by a certified statement that the bonding company meets or exceeds the requirements set forth in Article 11 of the General Conditions of the Contract for Construction in the proposed Contract Documents.

§ 4.2.2 Except as stated under Section 4.4.3 hereof, the Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid, with the understanding that the Bid Security shall guarantee that the Bidder will not withdraw its Bid for a period of forty-five (45) days after the scheduled closing time for the receipt of Bids, and that if its Bid is accepted, the Bidder will enter into a formal contract with the Owner in accordance with the terms stated in the Bid and will furnish any required performance and payment bonds at the time required. In the event of the withdrawal of said Bid within the forty-five (45) day period or the failure of the successful Bidder to enter into the Contract with the Owner or the failure of the successful Bidder to furnish required performance and payment bonds at the time required, the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty, which represents the damage the Owner incurred as a result of the Bidder's default.

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

§ 4.2.4 The Bid Securities shall be returned to all Bidders except the three (3) lowest Bidders within three (3) days after the formal opening of bids. The remaining Bid Securities will be returned within forty-eight (48) hours after the Owner and the successful Bidder have executed the Contract and executed performance and payment bonds have been

approved by the Owner. If a Contract has not been executed or performance and payment bonds have not been approved by the Owner within forty-five (45) days after the scheduled closing time for the receipt of bids, and the Bidder notifies the Owner that its bid is withdrawn and requests return of its Bid Security, then the Bid Security will be returned by the Owner within three (3) days after the request for its return unless the Bid Security has been forfeited under § 4.2.2.

§ 4.3 Submission of Bids

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

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

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

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

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids. The Bidder assumes the risk of any delay in the mail or in the handling of the mail by employees of the Owner and the employees of the mail or delivery service used.

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

§ 4.4 Modification or Withdrawal of Bid

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

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

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within three days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect and Owner, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be returned.

§ 4.4.4 Unless a Bid error complies with Section 4.4.3, a Bid may not be modified, withdrawn or canceled by the Bidder for a period of forty-five (45) days following the time and date designated for the receipt of Bids, and each Bidder agrees to this requirement in submitting a Bid.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available for the Project. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests. The responsibility of Bidders and of their proposed subcontractors will be considered in making the award. The Owner, through the Architect and Construction Manager, may make such investigation as the Owner deems necessary to determine the responsibility of any Bidder or to determine the ability of any Bidder to perform the Work.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

§ 6.1.1 The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform its obligations under the Contract, and the Bidder shall furnish the Owner all such information and data for this purpose as the Owner may request. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified and capable to carry out properly the terms of the Contract. The issuing of Bid Documents and acceptance of the Bidder's payment by the Owner shall not be construed as pre-qualification of that Bidder. If the Bidder is later discovered to have misrepresented or provided false or incorrect information with regard to any material party of the information submitted to the Owner, including but not limited to information regarding experience, debarment, claims, lawsuits, arbitrations, mediations, finances, license, contract termination, the Owner reserves the right to reject the Bid of such Bidder and, if a construction contract has been awarded, it will become automatically voidable at the sole discretion and election of the Owner.

§ 6.1.2 Within forty-eight (48) hours after the Bids are opened, the two (2) apparent low Bidders for each Prime Contract must submit the required pre-award submittal package described below to the Construction Manager via email:

- .1 Workforce and Work Plan – Provide a detailed written Work Plan which shall demonstrate the Contractor's understanding of overall Project scope.
- .2 Sequential listing of specific Project activities required to successfully complete the Work of the Contract Documents.
 - .1 Include Schedule and list Critical Milestones.
 - .2 Include phasing of the Work, if required.
 - .3 Include listing of long lead items.
 - .4 Statement the Project can be completed in the established time.
- .3 Resumes for the Bidder's proposed supervisory staff, including qualifications for specialized expertise or any certification(s).
- .4 Any special coordination requirements with other trades.
- .5 Any special storage and/or staging requirements for construction materials.
- .6 Detailed Cost Estimate: A copy of a Detailed Cost Estimate outlined in CSI format by material and labor.
- .7 A copy of the Bidder's two (2) most recent financial statements audited by a CPA or, if the Bidder has no audited financial statements, then the two (2) most recent financial statements prepared and/or reviewed by a CPA.
- .8 A properly completed and executed AIA Document A305™-2020, Contractor's Qualification Statement.
- .9 Required insurance certificates.
- .10 A designation of the Work to be performed by the Bidder's own forces.
- .11 Names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each.
- .12 Names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
- .13 Names, addresses and phone numbers of the subcontractors that the Bidder proposes to use on the Project;
- .14 A description of the Bidder's experience with at least five similar projects (completed in the last five years) of comparative size, complexity and cost together with documentary evidence showing that said projects were completed to their respective owner's satisfaction and were completed in a timely fashion

- listing type and scope of work. Provide names, addresses and current phone numbers of owners, architect and Construction manager associated with each project.
- .15 The Bidder's proposed site safety plan.
 - .16 Proposed list of submittals and a proposed schedule for making and issuing them, within the Bidder's proposed work plan and schedule;

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 Intentionally omitted

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

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

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

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 The Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 The cost of the bonds shall be included in the Bid.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies licensed and admitted to do business in New York State and lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall each be equal to one hundred (100) percent of the Contract Sum and shall be increased if and when the Contract Sum is increased by any Modification (as defined in AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as revised for this Project) issued after award of the Contract.

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than ten (10) days after the Bidder has received notice of the acceptance of its Bid but in no event shall bonds be delivered later than the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond and shall contain the following modifications in a rider to each bond or stated in the Modifications section of each bond (Section 16 of the Performance Bond and Section 18 of the Payment Bond):

- .1 The Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Any addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.
- .2 Notwithstanding any prior provision of this bond, the Surety also agrees that no meeting is required to be offered, arranged or held with the Owner, Contractor and/or Surety prior to termination of the Contract or the Contractor. The Surety agrees that it is obligated under the bonds to any successor, grantee, or assignee of the Owner
- .3 Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have fourteen (14) days from receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within fourteen (14) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to the Owner.

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

- .1 AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, as revised for this Project and completed for the Contractor.
- .2 AIA Document A132™-2019, Exhibit A, Insurance and Bonds as revised for this Project.
- .3 AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as revised for this Project.
- .4 Not used.
- .5 Drawings

Number	Title	Date
Project Manual Section 000115	List of Drawings	

- .6 Specifications

Section	Title	Date	Pages
Project Manual Section 000110	Table of Contents		

- .7 Addenda:

Number	Date	Pages

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

AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:

(Insert the date of the E204-2017.)

[] The Sustainability Plan:

Title	Date	Pages

[] Supplementary and other Conditions of the Contract: Document Title

Document	Title	Date	Pages

.9 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

- « Advertisement or Invitation to Bid
- Instructions to Bidders
- Contractor’s Bid Form
- Contractor’s Payment and Performance Bonds »

ARTICLE 9: NEWFORMA REQUIREMENTS

§ 9.1 After notification of selection for the award of the Contract, the Bidder shall be required to use the Newforma Info Exchange for the transfer of Submittals, Shop Drawings and RFI’s. There will be no exceptions to this requirement. The Contractor will be given a Login and Password free of charge.

ARTICLE 10: TAXES

§ 10.1 The Owner is an organization, which is exempt from New York State and Local Sales and Use Taxes. Materials purchased for use in fulfilling this Contract will be exempt from New York Sales Tax. The Owner will provide the Contractor with a completed Form ST-119.1, Exempt Organization Certification. The Contractor shall present a copy of this Form and a completed Form ST-120.1, Contractor Exempt Purchase Certificate, to each supplier.

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. Construction Manager Special Provisions – Prepared by Arris Contracting Company, Inc., 189 Smith Street, Poughkeepsie, NY 12601, 845-473-3600. Document follows this section.
- B. Site Survey at Fox Lane School Campus - Prepared by Link Land Surveyors PC, 21 Clark Place – Suite 1-B, Mahopac, NY 10541, 845-628-5857
- C. The surveys and subsurface investigations were prepared for the Owner of the use in design. These documents are not part of the Construction Contract Documents and are provided by the Owner for informational use only.
 - 1. The enclosed report and log of borings and any interpolations of conditions between test borings is not a warrant or guarantee by the Owner or Architect/Engineer of subsurface conditions.
 - 2. The Contractor should visit the site and become acquainted with the existing conditions. Bidders are encouraged to make their own investigations to satisfy themselves as to the site conditions. Any additional information, needed by the Contractor, shall be obtained by the Contractor at no cost to the Owner.

END OF SECTION

PHASE 2a BOND IMPROVEMENTS – MAINTENANCE BUILDING AT THE FOX LANE CAMPUS

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 **Bedford Central School District**, Town of **Bedford, 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: _____

Clarification No. _____ Dated: _____

Clarification 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 2a BOND IMPROVEMENTS – MAINTENANCE BUILDING AT THE FOX LANE CAMPUS

in strict accordance with the contract documents:

BASE BID GC-1 – GENERAL CONSTRUCTION

The General Contractor shall state the complete price to perform all work including, but not limited to, all general construction, all site construction, all mechanical construction, all electrical construction, and all plumbing construction, as shown on the drawings and as specified herein.

BASE BID GC-1 BID PRICE = \$ _____

Lump Sum Allowance (See Section 012100) \$ _____

**TOTAL GENERAL CONSTRUCTION
BASE BID GC-1 BID PRICE =** \$ _____
Total Bid price in dollars and cents

\$ _____
Bid price written in words

ALTERNATES FOR BASE BID GC-1

1. ALTERNATE No. 1

The General Contractor shall state the complete price to be **(added to)** the base bid to provide all labor and materials required for the interior fit-out of the Office, Handicapped Toilet Room, and the Storage Room as shown on the drawings and as specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

2. ALTERNATE No. 2

The General Contractor shall state the complete price to be **(added to)** the base bid to provide all labor and materials required for the furnishing and installation of the HVAC Unit ERV-1 and associated ductwork as shown on the drawings and as specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

3. ALTERNATE No. 3

The General Contractor shall state the complete price to be **(subtracted from)** the base bid to provide all labor and materials required for the surrounding area adjacent to the proposed building to receive Item No. 4 Gravel in lieu of the Asphalt Paving as shown on the drawings and as specified herein.

SUBTRACT: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

UNIT PRICES

Should the contract work be increased or decreased as per the General Conditions of the Contract, Article 7, 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 Base Bid GC-1 (General Construction)

The General Contractor shall state the complete amount to provide and install the following:

- 1. Unit Price: Contractor shall state the amount to
Mechanically Demolish and Excavate of trench rock \$ _____ /cy
- 2. Unit Price: Contractor shall state the amount to
Furnish and install select backfill and compaction of same \$ _____ /cy
- 3. Unit Price: Contractor shall state the amount to
Hand excavation \$ _____ /cy

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.

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, Bedford Central School District 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

BEDFORD CENTRAL SCHOOL DISTRICT BID PROPOSAL FORM

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: _____

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 _____

20____

Notary Public: _____

**DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH
THE IRAN DIVESTMENT ACT**

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

Name of the Bidder: _____

Address of Bidder: _____

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

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

Have the investment activities ended? _____

If so, what was the date of the last investment activity? _____

If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran
and to refrain from engaging in any new investments in Iran? _____

If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any
and a copy of the formal plan. _____

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

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

SIGNED

SWORN to before me this
_____ day of _____

20____
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) has 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

DRAFT AIA® Document A305® – 2020

Exhibit A

General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

§ A.1 ORGANIZATION

§ A.1.1 Name and Location

§ A.1.1.1 Identify the full legal name of your organization.

« »

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

« »

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

« »

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

« »

§ A.1.2 Legal Status

§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

« »

- .1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.
« »
- .2 If your organization is a partnership, identify its partners and its date of organization.
« »
- .3 If your organization is individually owned, identify its owner and date of organization.
« »

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

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- 4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

<< >>

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

<< >>

§ A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

<< >>

§ A.1.3.2 How many full-time employees work for your organization?

<< >>

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

<< >>

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

<< >>

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

<< >>

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

<< >>

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

<< >>

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

<< >>

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

<< >>

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

<< >>

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

<< >>

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

<< >>

§ A.4 REFERENCES

§ A.4.1 Identify three client references:

(Insert name, organization, and contact information)

<< >>

§ A.4.2 Identify three architect references:

(Insert name, organization, and contact information)

<< >>

§ A.4.3 Identify one bank reference:

(Insert name, organization, and contact information)

<< >>

§ A.4.4 Identify three subcontractor or other trade references:

(Insert name, organization, and contact information)

<< >>

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Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

« »

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

« »

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

« »

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.

(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

« »

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than \$75,000?
(If the answer is yes, provide an explanation.)

« »

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

- .1 failed to complete work awarded to it?

« »

- .2 been terminated for any reason?

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« »

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than \$75,000?

« »

.4 filed any lawsuits or requested arbitration regarding a construction project?

« »

.5 not been awarded a contract for which you submitted the lowest bid? If you have answered yes, provide project name, contract description, contact information for project Owner, Architect and/or Construction Manager and reason for not being awarded the contract.

« »

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2: (If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

« »

.2 had any business or professional license subjected to disciplinary action?

« »

.3 been penalized or fined by a state or federal environmental agency?

« »



DRAFT AIA® Document A305® – 2020

Exhibit C

Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

PROJECT:

(Name and location or address.)

« »
« »

CONTRACTOR'S PROJECT OFFICE:

(Identify the office out of which the contractor proposes to perform the work for the Project.)

« »

TYPE OF WORK SOUGHT

(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

« »

CONFLICT OF INTEREST

Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

« »

§ C.1 PERFORMANCE OF THE WORK

§ C.1.1 When was the Contractor's Project Office established?

« »

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

« »

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

« »

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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<< >>

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

<< >>

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

<< >>

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

<< >>

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

<< >>

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

<< >>

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

<< >>

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

<< >>

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

<< >>

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

<< >>

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

<< >>

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

<< >>

§ C.5.2 Surety company name:

<< >>

§ C.5.3 Surety agent name and contact information:

<< >>

§ C.5.4 Total bonding capacity:

<< >>

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

<< >>

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Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work			
PROJECT DELIVERY METHOD	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input checked="" type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input checked="" type="checkbox"/> CM advisor <input type="checkbox"/> Other:
SUSTAINABILITY CERTIFICATIONS				

DRAFT AIA® Document A305® – 2020

Contractor's Qualification Statement

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

SUBMITTED BY: (Organization name and address.)
« »

SUBMITTED TO: (Organization name and address.)
« »

TYPE OF WORK TYPICALLY PERFORMED

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

« »

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:

(Check all that apply.)

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

CONTRACTOR CERTIFICATION

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

Organization's Authorized Representative
Signature

« »

Date

« »

Printed Name and Title

NOTARY

State of: « »

County of: « »

Signed and sworn to before me this « » day of « » « »

Notary Signature

My commission expires: « »

ADDITIONS AND DELETIONS:

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CERTIFICATION REGARDING WORKPLACE SEXUAL HARASSMENT/TRAINING

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of section two hundred one-g of the labor law.

If this is submitted by a corporate entity, the certification shall be deemed to have been authorized by the board of directors (or comparable entity) of the bidder, and such authorization shall be deemed to include the signing and submission of this bid and the inclusion therein of this certification as the act and deed of the corporate entity.

Name of Bidder: _____ (Print)

_____ (Signature)

_____ (Print Name)

_____ (Print Title)

Date: _____

Labor Law Section 220-i Certification

This Certification is provided pursuant to Section 220-i of the New York Labor Law, which requires contractors and subcontractors submitting bids or performing work on a covered project to be registered with the New York State Department of Labor (NYSDOL). This Certification must be completed and submitted as part of your bid proposal.

- NYSDOL Registration Number: _____
- Registration Expiration Date: _____

By signing below, the person authorized to sign on behalf of the Bidder hereby certifies, under penalty of perjury, that the Bidder and each of its subcontractors are registered with the New York State Department of Labor pursuant to Section 220-i of the New York Labor Law.

Bidder further represent that it included with this Certification, a copy of the Certificate(s) of Registration issued by the Commissioner of the Department of Labor for the Bidder and each of its subcontractor(s).

I further certify that I will provide immediate written notice to the Owner if the contractor or any subcontractor's registration becomes suspended, revoked, or expired at any point prior to or during the course of the project.

Project: _____

Signature: _____

Bidder Name: _____

Bidder Title: _____

Company Name: _____

Date: _____

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

AGREEMENT made as of the ____ day of _____ in the year Two Thousand Twenty-Two
(In words, indicate day, month, and year.)

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

Bedford Central School District
632 South Bedford Road
Bedford, NY 10506

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

<< >>< >
<< >>
<< >>
<< >>

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

Bedford Central School District
2022 Bond Referendum Capital Project

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

Arris Contracting Co., Inc.
198 Smith Street
Poughkeepsie, New York 12601

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

BBS Architects, Landscape Architects and Engineers P.C.
244E Main Street
Patchogue, NY 11772

The Owner and Contractor agree as follows.

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

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

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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

DRAFT

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. It is the intent of the parties to include within the Work any and all labor, materials, equipment and services that, although not expressly indicated in the Contract Documents, are reasonably inferable therefrom to construct complete and workable systems for the satisfactory performance, execution, final completion and use of the Work and Project.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

The date of this Agreement.

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

Established as follows:

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

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

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

§ 3.3 Substantial Completion of the Project or Portions Thereof

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

(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

The Contractor shall achieve Substantial Completion of the entire Work in accordance with the Milestone Schedule set forth in the Project Manual.

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

Portion of Work

Refer to Section _____ – Milestone Schedule

Substantial Completion Date

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§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:

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

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

[] By the following date: in accordance with Section _____ – Milestone Schedule set forth in the Project Manual.

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

Portion of Work

Refer to Section _____ – Milestone Schedule

Date to be substantially complete

§ 3.4.3 Time is of the essence in the performance of the Contract Documents, including, without limitation, the Substantial Completion dates established herein. The Contractor shall proceed expeditiously with adequate forces and shall use its best efforts to keep the Project on schedule, and the Contractor shall achieve the completion times established within the Contract Documents.

§ 3.4.4 If the Contractor fails to substantially and finally complete the Work of this Contract, or portions thereof, as provided in Section 3.4 herein and the Milestone Schedule in the Project Manual, liquidated damages shall be assessed as set forth in Section 4.3 herein and Section 8.3.6.1 of the AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified (the “General Conditions” or “AIA Document A232–2019”).

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, in accordance with Section 4.3 below

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

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

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents. See Contractor’s Form of Proposal, which is attached hereto as **Exhibit A**.

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

§ 4.2.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price

§ 4.2.4 Unit prices, if any:

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

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

§ 4.3 Liquidated Damages. The Contractor recognizes that achieving Substantial Completion of the Work in accordance with the time limits set forth in this Agreement and as further set forth in the Project Manual and/or Bidding Documents is a material condition of this Agreement, and that if the Contractor fails to achieve Substantial Completion of the Work, or designated parts thereof, in accordance with such schedule, the Owner will incur damages as a result. The Owner and Contractor agree that the amount of such damages is difficult to ascertain with any precision. Because of the difficulty of ascertaining all resulting and corresponding damages, it is hereby agreed that the Contractor shall be assessed in the amounts provided in Section 8.3.6.1 of the General Conditions for each day the Project, or a specific Work item, is not substantially complete after expiration of the Contract Time for Substantial Completion, and for each day the Project is not finally complete after the expiration of the Contract Time for final completion.

§ 4.3.1 The Contractor acknowledges that the liquidated damages amounts set forth in Section 8.3.6.1 of the General Conditions represent a fair and reasonable estimate of the Owner’s probable losses, damages and/or expenses, and are not a penalty, for late completion of the Work and the phases thereof.

§ 4.3.2 The Owner shall be entitled to offset any liquidated damages owed by the Contractor against any amounts owing by the Owner to the Contractor.

§ 4.3.3 The Owner’s right to liquidated damages shall survive abandonment of the Work by the Contractor and the Owner’s termination of the Contract.

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.

§ 5.1. Provided that an acceptable Application for Payment, including all required lien waivers and certified payroll, is received by the Construction Manager not later than the twenty-first day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the thirtieth day of the next month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than 60 days after the Construction Manager receives the Application for Payment.

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

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

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

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

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

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

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

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Owner, Construction Manager or Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

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

Five percent (5%)

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

None.

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

No retainage reduction prior to Substantial Completion of the entire Work.

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

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

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, as modified, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; and
- .3 the Contractor has fully performed and complied with the final payment and closeout provisions of Specifications.

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

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

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, as modified.

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

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

Litigation in a court of competent jurisdiction in Westchester County, NY.

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 A232–2019, as modified.

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner’s representative:
(Name, address, email address, and other information)

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Tom Cole
Interim Assistant Superintendent for Business and Administrative Services
Bedford Central School District
632 South Bedford Road
Bedford, New York 10506
tcole0206@bcSDny.org

§ 8.3 The Contractor’s representative:
(Name, address, email address, and other information)

<< >>
<< >>
<< >>
<< >>
<< >>
<< >>

§ 8.4 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days’ prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in Article 11 of AIA Document A232–2019, as modified, and elsewhere in the Contract Documents.

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

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

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

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

§ 8.7 Intentionally omitted.

§ 8.8 Other provisions:

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

- .1 that it and its Subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;
- .2 that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;
- .3 that it is authorized to do business in the State of New York and the United States and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;
- .4 that its execution of this Agreement and its performance thereof is within its duly authorized powers;
- .5 that its duly authorized representative has visited the site of the Project, is familiar with the local and special conditions under which the Work is to be performed and has correlated on-site observations with the requirements of the Contract Documents; and
- .6 that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence or projects of the size, complexity and nature of the particular Project, and that it will perform the Work with the care, skill and diligence of such a contractor.

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

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
- .2 Not used
- .3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition
- .4 Not used
- .5 Drawings

Refer to the attached Exhibit B, List of Drawings – Project Manual, all of which drawings listed therein are incorporated herein by reference.

- .6 Specifications

Refer to the attached Exhibit C, Table of Contents – Project Manual, all of which sections listed therein are incorporated herein by reference.

- .7 Addenda, if any:

Number	Date	Pages

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

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

[] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[« »] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

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

Document	Title	Date	Pages

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.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

Exhibit A Contractor’s Form of Proposal
Exhibit B List of Drawings
Exhibit C Specifications Table of Contents

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

OWNER (Signature)

Edward Reder, Board of Education President
(Printed name and title)

CONTRACTOR (Signature)

« »
(Printed name and title)

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AIA® Document A232™ – 2019

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

for the following PROJECT:

(Name, and location or address)

Bedford Central School District
2022 Bond Referendum Capital Project

THE CONSTRUCTION MANAGER:

(Name, legal status, and address)

Arris Contracting Co., Inc.
198 Smith Street
Poughkeepsie, New York 12601

THE OWNER:

(Name, legal status, and address)

Bedford Central School District
632 South Bedford Road
Bedford, NY 10506

THE ARCHITECT:

(Name, legal status, and address)

BBS Architects, Landscape Architects and Engineers P.C.
244E Main Street
Patchogue, NY 11772

ADDITIONS AND DELETIONS:

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

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter, the “Agreement”), and consist of the Bidding Documents (including, but not limited to, Invitations to Bid, Instructions to Bidders, sample forms, the Contractor’s bid or portions of the addenda relating to bidding requirements), the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction (hereinafter, the “Contract”). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and the Construction Manager or the Construction Manager’s consultants, (3) between the Owner and the Architect or the Architect’s consultants, (4) between the Contractor and the Construction Manager or the Construction Manager’s consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties. Subcontractors shall assume the same obligations to the Contractor as the Contractor has to the Owner and the Architect, including but not limited to the obligations set forth in these General Conditions. All relationships and responsibilities of the Contractor to the Owner, Construction Manager or Architect as defined in these General Conditions shall become those of the Subcontractor to the Contractor.

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

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

§ 1.1.3 The Work. The term “Work” means the construction and services required by the Contract Documents, or as reasonably inferable therefrom, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project. The Work includes all of the Contractor’s responsibilities as to all labor, parts, supplies, equipment, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct, and fully complete the Contractor’s Work identified by the Contract Documents.

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

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

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

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams. The Drawings are as listed within the “List of Drawings” provided with the drawing set. All Work under

the Contract shall be executed in accordance with the Contract Documents, which are complimentary as described herein. The “List of Drawings” is incorporated in the Standard Form of Agreement Between the Owner and the Contractor.

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

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

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

§ 1.1.11 Miscellaneous Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 1.1.11.18 “Project Manual” is a volume assembled for the Work that includes the Instructions to Bidders, General Conditions, Supplementary General Conditions, the Specifications, and all Addenda issued prior to execution of the Contract. The Project Manual will additionally include bidding requirements and documents and sample forms.

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

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. It is intended that all plumbing, mechanical, electrical, and other systems will be complete and in proper operation, and that all construction components, whether part of such systems or otherwise, will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Drawings or Specifications, but are normally required for proper operation of plumbing, mechanical, electrical, and other systems, or to complete otherwise incomplete construction, or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract shall be construed, to the fullest extent permitted by law, to give effect to the parties’ intentions and purposes in executing the Contract.

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

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Instructions and other information furnished in the Specifications including without limitation, items in connection with prefabricated or prefinished items, are not intended to supersede work agreements between employers and employees. Should the Specifications conflict with such work agreements, the

work agreements shall be followed, provided such items are provided and finished as specified. If necessary, such work shall be performed on the project Site, instead of at the shop, by appropriate labor and in accordance with the requirements of the Drawings and Specifications. It shall be the Contractor's responsibility, when subcontracting any portion of his Work, to arrange or group items of work under particular trades to conform with the then prevailing customs of the trade, regardless of the particular Divisions and Sections of the Specifications in which the work is described.

§ 1.2.2.1 The Work on the Project will be separated into individual and separate contracts. It is the intent of these requirements to include all items of Work for a complete Project in the separate contracts. The Contractor shall be responsible for understanding and knowing under which contract each item of Work is included.

§ 1.2.2.2 Each section or division of the Specifications has been assigned to one of the contract scopes. Where a section of the Specification is referenced in the contract scope, then any and all items necessary for the proper and normal installation of the item referenced in the Specification section shall be included whether specifically indicated in the Contract Documents or not.

§ 1.2.2.3 The reference of the "Specifications" regarding the division or separation of the work among types of trades or occupations is only for the suggested purpose of coordinating the work of the different trades, etc. but it shall be the Contractor's entire responsibility for the proper coordination and completion of all the Work described in the "Specifications" whether performed by the Contractor or its Subcontractors, if any. It shall be the Contractor's responsibility to settle definitely with each of its Subcontractors the portions of the Work, which each will be required to do and the Owner and Architect assume no responsibility whatever for any jurisdiction claimed by any of the trades involved in the Work. The Contractor shall provide each item listed, of quality noted and subject to the qualifications noted, and shall perform operations prescribed according to the conditions stated, including specified operations, processes or methods, furnishing all necessary labor, materials, equipment and incidentals required to complete the Work.

§ 1.2.2.4 The Contractor acknowledges that the coordination requirements and the construction schedule of this Project will require close cooperation and coordination between all Contractors on the Project site.

§ 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.

§ 1.2.4 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- .1 Change Orders;
- .2 The Agreement between Owner and Contractor;
- .3 Addenda, with those of later date having precedence over those of earlier date;
- .4 The Supplementary, Special, or other Conditions as may be part of the Contract Documents;
- .5 The General Conditions of the Contract for Construction;
- .6 Drawings and Specifications. In the case of an inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. If a work item or component is present in the Drawings but not the Specifications, or vice versa, that work or component shall be provided.

§ 1.2.5 Notwithstanding Section 1.2.4, in the event of inconsistencies within or between parts of the Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of work or (2) comply with the more stringent requirements; either or both in accordance with the Architect's interpretation. Where the Contractor perceives a conflict, it shall inform the Architect and Owner thereof and request a decision from the Architect, which shall be promptly communicated by the Architect to the Contractor so as not to cause any delay in the performance of the Work. Any Work performed after perceiving the conflict and prior to resolution by the Architect shall be at the Contractor's risk. The terms and provisions of this Section 1.2.5, however, shall not relieve the Contractor of any of the obligations set forth elsewhere herein.

- .1 The Contractor shall not scale Drawings. Dimensions on large scale drawings take precedence over dimensions on small scale drawings. The Contractor shall notify the Architect if additional dimensions are needed. The Contractor shall field verify all dimensions.
- .2 Before ordering any materials or doing any work, the Contractor and each Subcontractor shall verify measurements at the Project Site and shall be responsible for the correctness of such measurements.

The Contractor shall confirm all dimensions by field measuring. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Architect for resolution before proceeding with the Work.

- .3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for the approval by the Architect before making the change.
- .4 Certain portions of the Specifications are written in condensed outline form and omitted words are to be supplied by inference. Naming of an article or operations shall have the effect of stating “Contractor shall furnish, install and complete” said operation or article unless it is further qualified in the context in which it appears.
- .5 When reference is made to specifications of a manufacturer, trade association, governmental agency, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) such is made part of the Drawings and Specifications, having the force and effect as though reproduced therein, and upon entering into the Contract the Contractor acknowledges his familiarity with those pertaining to its Work. Furthermore, all Work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of the Contract unless it is specifically indicated in the Contract Documents that such work is to be done by others. All Work shall conform to the National Electric Code, New York State Uniform Fire Prevention and Building Code, and amendments thereto, New York State Energy Conservation Construction Code, State Education Department Manual of Planning Standards, New York State Department of Transportation, Office of Engineering, Standard Specification, Construction and Materials, latest edition, Life Safety Code – NFPA, and applicable City and State Building Codes and Authorities having jurisdiction. The date of the reference standard shall be the latest edition at the time of signing the Contract except as specifically indicated otherwise.
- .6 The Contract Drawings are intended to show the general arrangement, design, and extent of the Work and are partly diagrammatic. They are not intended to be scaled for any purpose, or to serve as shop drawings. The Contractor and its Subcontractors will cooperate with all other contractors and their respective subcontractors in determining the construction of systems, running of pipe, and locating equipment. The Contractor agrees that the failure to repeat typical details, figures, or notes on all Contract Drawings or other Contract Documents will not be a basis for claims for additional cost or time.
- .7 Any necessary variations in routing or installation shall be made to conform to the intent of the Contract Documents without additional costs. Where there are intersections or obstructions involving ducts, piping, or any other equipment requiring offset of materials, the Contractor acknowledges that it gave particular consideration to clearances in advance of submitting its bid, and that no additional costs for these issues will be considered by the Owner.
- .8 If conflicting conditions or interferences develop, the Contractor and its Subcontractors will confer with the other contractors and their respective subcontractors whose work is affected to determine a solution acceptable to all interested parties. The suggested solution shall be submitted to the Architect for comment and, if necessary, written approval.
- .9 The Contract Documents intend a first class finished product of such character and quality as described in and reasonably inferred from the Contract Documents. The Contractor will perform its Work to be complete and operable, fitting with the work of other contractors and the Owner, and in compliance with best construction practices and the ordinances, codes, and regulations of all bodies or persons having governmental or regulatory authority over the Contractor and its Work.

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

§ 1.2.6.1 The Contractor certifies that it is experienced and familiar with the requirements and conditions imposed during the construction of similar work in the area. This includes, but is not limited to, “out of sequence” or “come back” work for the removal of plant, equipment, temporary wiring or plumbing, etc. This “out of sequence” work

may also include phasing of construction activities to accommodate the installation of the Work at various locations and orderly fashion and the completion of Work at various locations or levels at various times. This “phasing,” “out of sequence,” or “come back” work shall be done at no cost to other Contractors, the Owner or Architect.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers do not own and cannot claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect’s consultants. Nothing in this Section 1.5 shall be construed to alter the rights of the Owner toward the Instruments of Service and other documents prepared by the Architect and the Architect’s consultants as set forth in the agreement between the Owner and the Architect.

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

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement. Notices given pursuant to this Section which are given by the attorney for the Owner shall have the same force and effect as notices given by the Owner.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite

AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the 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.

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 All permits and fees, approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities are the responsibility of the Contractor under the Contract Documents with the exception of the building permit, which the Owner will obtain from the New York State Education Department. The Contractor shall furnish the Construction Manager with original copies of all permits prior to the commencement of the work, and shall prominently display a copy of all permits at a location approved by the Construction Manager.

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

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

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

§ 2.3.5 The Owner shall make available for inspection, upon request, field survey or testing information of existing conditions that is known to be available and that is held by the Owner at its offices. Such records and documents are not Contract Documents, and the Owner makes no representation as to their accuracy or completeness. Notwithstanding the foregoing, information furnished by the Owner in the form of surveys, subsurface investigation reports, soil borings, and other material of a similar nature, is for general information only and is not a guarantee of the completeness or accuracy of such information, unless specifically noted otherwise herein. The Contractor shall verify all existing grades, conditions, and dimensions of existing physical conditions and structures and shall report any inconsistencies in writing to the Architect. The Contractor shall establish all lines and levels required to execute the Work and shall bear all costs involved, and shall be responsible for their accuracy and maintenance. The Contractor represents that it is familiar with the Project site and has received all information it needs concerning the conditions of the Project site.

§ 2.3.6 Intentionally omitted.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor five (5) sets of Contract Drawings, three (3) sets of Project Manuals, and three (3) sets of all Addenda materials for use during construction for their own use and for purposes of making reproductions pursuant to Section 1.5.2. The Owner shall furnish additional sets upon a Contractor's written request. Such additional sets will be provided at the cost of printing, postage and handling. Payment is due upon receipt of the additional documents. Partial sets will not be provided. Subcontractors and other entities desiring copies of Drawings will be provided sets at the cost of printing, postage and handling. For expediency, at the discretion of the Architect, the Contract 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.

§ 2.3.7.1 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.

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

§ 2.4 Owner's Right to Stop the Work

If the Contractor (1) fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2, or (2) fails to carry out Work in accordance with the Contract Documents as determined by the Owner, Architect or Construction Manager, or (3) fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time, or (4) fails to remove and discharge (within seven (7) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) fails to perform the Work in a safe manner and in compliance with all applicable health and safety requirements and the Contractor's site specific health and safety plan or (6) disregards the instructions of the Architect, Owner or Construction Manager, as determined by the Owner, Architect or Construction Manager, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. Such order or stoppage by the Owner shall not constitute grounds for termination by the Contractor under Article 14 and shall not be a basis for an extension of the Contract Time under Section 8.3 or Article 15.

§ 2.5 Owner's Right to Carry Out the Work

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

§ 2.5.1 Where the Contractor's default and/or neglect to carry out its Work in accordance with the Contract Documents threatens the health, safety and/or welfare of the occupants of the Owner's facilities and/or threatens the structural integrity and/or preservation of the Owner's facilities, the Owner may proceed to carry out the Contractor's Work upon twenty-four (24) hours' notice of its intention to do so to the Contractor. In such case an appropriate Change Order or Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies and defaults, including the Owner's expenses and compensation for the Architect's and its respective consultants' additional services and other expenses made necessary by such default, neglect or failure.

§ 2.6 Extent of Owner's Rights

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

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

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" when used herein refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

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

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

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

§ 3.2.1.4 The representations of the Contractor as set forth in these General Conditions shall survive expiration or termination of the Agreement.

§ 3.2.2 The Contractor shall be presumed to have examined the Project site(s) to consider fully all conditions that may have a bearing on the Work and to have accounted for these conditions its proposal. The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work, and that the Drawings, the Specifications, and all Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws, statutes, building codes, and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Manager and the Architect at once. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect, Construction Manager or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, the Contractor shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner. Except as to any reported errors, inconsistencies or omissions, and except as to concealed or unknown conditions, by executing the Agreement, the Contractor represents to the Owner, Construction Manager, and the Architect:

- .1 The Contract Documents are sufficiently complete and detailed for the Contractor to perform the Work required and to comply with all the requirements of the Contract Documents.
- .2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedure and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to Work; (3) the requirements of any warranties applicable to the Work; and (4) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

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

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

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

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

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

§ 3.2.7 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or RFIs pursuant to Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall make a Claim as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or the Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.8 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

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

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

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

§ 3.2.11 The Architect or Construction Manager may require that the Work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed Work or the Work in progress.

§ 3.2.12 Notwithstanding any other provision herein, the Owner, Construction Manager and the Architect assume no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for safety and providing a safe place for the performance of the Work. The Owner assumes no responsibility for any erroneous conclusions or interpretations made by the Contractor based on information made available by the Owner. No adjustments will be made in either the Contract Sum or Contract Time for any failure by the Contractor or any Subcontractor to comply with the requirements of this Section.

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

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention, and shall complete the Work in a good and workmanlike manner in accordance with the Contract Documents. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work subject to the coordination of the Construction Manager. Where the Drawings or Project Manual make reference to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in connection with the Contractor's Work, such reference is intended only to indicate that the Contractor's Work is to produce at least the quality of the work implied by the operations described, but the actual determination as to whether or not the described operations may

be safely or suitably employed in the performance of the Contractor's Work shall be the sole responsibility of the Contractor. All loss, damage, liability, or cost of correcting defective Work arising from the employment of a specific construction means, method, technique, sequence, or procedure shall be borne solely by the Contractor.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, Suppliers, and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors, Suppliers or Sub-subcontractors, and for any damages, losses, costs and expenses resulting from such acts or omissions, including but not limited to reasonable attorneys' fees.

§ 3.3.3 The Contractor shall be responsible for coordinating the work of its own forces and the work of Subcontractors engaged by it to perform the Work of the Project on its behalf. The Contractor shall supply to its own work forces, and Subcontractors engaged by it to perform portions of its Work, copies of the Drawings and Project Manuals for the work to be performed by such individuals/entities on its behalf. The Contractor shall be responsible to the Owner for the acts or omissions of the Contractor's employees, the Contractor's Subcontractors, the Contractor's material suppliers, their respective agents and employees, and any other persons performing portions of the Work on behalf of the Contractor.

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

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

- .1 Review of all specified construction and installation procedures with its employees and/or Subcontractors, including, without limitation, those recommended by manufacturers, prior to the commencement of the relevant portion of the Work to be performed.
- .2 Advising the Construction Manager and the Architect:
 - .1 if a specified procedure deviates from best construction practice;
 - .2 if following a procedure will affect any warranties, including the Contractor's general warranty; or
 - .3 of any objections the Contractor may have to a procedure.
- .3 Proposing alternative procedures, as appropriate, which procedures shall be covered by the Contractor's warranty as described in Section 3.5 hereof.
- .4 The Contractor shall be responsible for organizing and conducting pre-installation conferences and must coordinate such conferences with the Architect and the Construction Manager.

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

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

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

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

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

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

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

§ 3.3.10 **Shutdowns:** Such work as connections to existing sewers, plumbing, heating, and electrical systems shall be coordinated at a time agreeable to the Owner, the Architect, and the Construction Manager, and shall be determined and agreed to well in advance of the actual performance of such work so as to interfere as little as possible with the operation and use of the Owner's existing facilities. Shutdowns must be coordinated through the Construction Manager. The continued uninterrupted operation of all facilities of the Owner's buildings is essential. If any existing facilities must be interrupted, the Contractor for the Work shall provide all necessary temporary facilities and connections necessary for maintaining these existing facilities at no increase in the Contract Sum except as otherwise specified. No mechanical, heating, plumbing, sprinkler, or electric service shall be interrupted at any time except as approved in advance by the Owner or when the buildings are not occupied and shall be coordinated with the Owner, as well as the Construction Manager. All communication systems must be maintained without interruption. As much related work as possible shall be performed prior to shutdowns, so as to minimize the period of shut down. All material, equipment, and manpower necessary in the performance of a shutdown shall be on site prior to interruption of service.

§ 3.3.11 The Contractor represents that it is familiar with and shall adhere to the "Uniform Standards for School Construction and Maintenance Projects" set forth at 8 New York Code of Rules and Regulations §155.5 (8 NYCRR 155).

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor (at applicable prevailing wage rates), materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The Contractor shall work continuously and expeditiously through completion of the Work. Time is of the essence.

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

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

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

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them, or persons who within the last two weeks (a) having been exposed to someone having been diagnosed with a COVID-19 infection; or (b) having had a persistent cough, shortness of breath, or a

fever of 100.4 or higher. The Owner reserves the right to have any persons removed from the Project upon reasonable objection.

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

§ 3.4.4 All mechanics employed on the Project shall be persons skilled in that work which they are to perform. Work will not be approved if it does not meet the quality of workmanship as called for in the Contract Documents. If this quality of workmanship is not exactly defined herein, it shall be assumed to be the best standards of workmanship for the trade. The Contractor shall check all materials and labor entering into the Work site and shall keep full detailed accounts thereof.

§ 3.4.5 Employees of the Contractor or its Subcontractors whose work is unsatisfactory to the Owner, Construction Manager or Architect, or considered by them to be unskilled or otherwise objectionable, will be immediately dismissed from the Project upon notice from the Construction Manager. Those dismissed employees shall be immediately replaced by the Contractor so as not to delay progress of the Work and at no additional cost to the Owner.

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

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

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

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

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

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

§ 3.4.6.6 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Owner reserves the right to object to the Contractor's use of persons who appear unfit or not skilled in the tasks assigned to them. Should any disorderly, incompetent, unfit, unskilled or objectionable person be hired or employed by the Contractor or its Subcontractors, upon or about the premises of the Owner, for any purpose or in any capacity, they shall, upon request of the Owner, be removed from the Project and not again be assigned thereon without the written permission of the Owner.

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

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

- .1** make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect, the Construction Manager or the Owner, any conflict between its Agreement with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade;
- .2** requiring employees, Subcontractors, suppliers and others to use reserve gates which shall be established for the Project;
- .3** rearranging work schedules for the Contractor's Work or the work of its Subcontractors; and
- .4** including in the Contractor's agreements with its Subcontractors the right to fully implement all provisions of this Section.

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

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

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

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

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

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

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

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

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

§ 3.4.13 All Work shall be executed in complete accordance with the manufacturer's most recent recommendations unless otherwise specified or permitted by the Architect. A sufficient force of competent workmen, foremen, and superintendents shall be employed at all times to permit the Work to be pursued with diligence until completion and within the Contract Time.

§ 3.4.14 The Contractor shall provide the labor necessary to install his work within the terms of this Contract and the Contract Time.

§ 3.4.15 The Contractor shall be responsible for the care and protection of all equipment and materials for the Contractor's Work including equipment and material furnished by the Owner and installed by the Contractor.

§ 3.4.16 All articles, materials and equipment shall be applied, installed, connected, used, cleaned, and conditioned in accord with directions of manufacturer unless otherwise specified herein.

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§ 3.4.17 Equivalents and Substitutions

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

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

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

§ 3.4.18 The Contractor shall prepare and maintain daily inspection records to document the progress of the Work on a daily basis. Such daily records shall include a daily accounting of all labor and all equipment on the site for the Contractor and all Subcontractors, at any tier. Such daily records shall make a clear distinction between Work being performed under Change Order, base scope work, and/or disputed work.

§ 3.4.18.1 In the event that any labor or equipment is idled, solely as a result of the Owner's actions or inactions, the daily records shall record which laborers and equipment were idled and for how long. In the event that specific work activities were stopped, solely as a result of the Owner's actions or inactions, and labor and equipment was reassigned to perform work on other activities, the daily records shall make a clear record of which activities were stopped and where labor and equipment were redirected.

§ 3.4.18.2 All such daily records shall be copied and provided to the Owner at the end of every week.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of the Owner. If required by the Architect, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise provided in the Contract Documents. The Contractor shall perform the Work in strict accordance with the Contract Documents and best industry practices. The Contractor, at its expense, shall upon demand by the Owner, Construction Manager or Architect remove and replace materials not meeting specifications or materials failing to perform as represented or warranted by the manufacturer, regardless of whether incorporated into the Work. The Contractor shall promptly replace or correct any Work or materials that the Owner, Construction Manager or Architect rejects as failing to conform to the requirements of the Contract Documents. The foregoing warranty obligations shall survive completion or termination of the Contract, are not limited by the provisions of Article 12, and are in addition to and not in limitation of any other warranty, right or remedy set forth in the Contract Documents or otherwise prescribed by law.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4. The Contractor shall assign to the Owner at the time of final completion of the Work any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties. The Contractor shall fully cooperate with the Owner in the event the Owner pursues remedies under any warranties assigned to the Owner. The Contractor acknowledges that its obligations to the Owner under Section 3.5 are joint and several with its Subcontractors, suppliers, and material or equipment manufacturers of all materials and equipment supplied on account of the Work.

§ 3.5.3 No warranties or guarantees by the Contractor will deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. Neither final payment nor provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibilities for faulty or defective materials or workmanship.

§ 3.5.3.1 The Contractor shall deliver to the Owner upon completion of all work under its Contract, its written guarantee made out to the Owner in a form acceptable to the Owner, guaranteeing (and it does so guarantee) all of the Work under the Contract to be free from faulty materials, and free from improper workmanship, and guarantees against injury from proper and usual wear and aging.

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

§ 3.5.5 The Contractor shall in case of work performed by its Subcontractors, and where guarantees are required, secure warranties from Subcontractors and deliver copies of same to the Construction Manager countersigned by the Contractor.

§ 3.6 Taxes

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

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

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

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

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

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

§ 3.7.1 The Owner shall secure a building permit from the State Education Department as required for the Project. The Contractor shall secure and pay for all other permits and governmental fees, licenses, and inspections necessary for proper execution of and completion of the Contract that are legally required when bids are received. The Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings.

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

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (a) the Owner, its consultants, employees, officers and agents and (b) the Architect and its consultants, employees, officers and agents against any resulting fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder.

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

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and its Subcontractors shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or its

Subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner, Construction Manager or the Architect.

§ 3.7.3 If the Contractor performs Work that it knows or should know (in the exercise of good construction practice) is contrary applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear all costs attributable to the correction thereof or related thereto, including reimbursement to the Owner for any additional services required of the Architect and Construction Manager, as well as all fines and penalties, if any.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall give prompt written notice to the Owner, Construction Manager, and the Architect of such conditions before they are disturbed or affected work is performed and in no event later than five (5) business days after first observance of the conditions; provided that, in the case of a condition at the site that involves hazardous or toxic substances, as those terms are defined by OSHA or AHERA, notice to the Owner, Construction Manager and Architect shall be given immediately upon discovery of such hazardous or toxic substance. The Architect or Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, it may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum will be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, and reviews, or (2) inspections, tests, and reviews the Contractor had the opportunity to make or should have performed in connection with the Project.

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Lump Sum Allowances, Unit Cost Allowances and Quantity Allowances: the 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;
- .3 Contingency Allowances: the Contractor's costs, including all such subcontractor costs, for receiving and handling at Project site, labor, installation, and similar costs related to products and materials under allowance shall be included as part of the allowance. The Contractor, and its Subcontractors, overhead and profit related to the allowance shall be included as part of the Contract Sum and not part of the allowance; and

- 4 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2. The Contractor is not entitled to overhead and profit on unexpended allowance amounts or any portions thereof.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness. Allowances shall be used only upon written authorization of the Architect and Owner.

§ 3.9 Superintendent

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

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

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

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

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

§ 3.9.6 The Contractor recognizes and acknowledges that job meetings will be held at the job site weekly as set forth in the Project Manual, unless otherwise designated by the Owner, Construction Manager or the Architect. The Contractor shall have responsible representation at the mandatory weekly job progress meetings held at the Construction Manager's job office. These progress meetings will be held to arrange for satisfactory coordination of all trades on the Project so as not to impede job progress. If the Contractor or its Subcontractors fail to attend job meetings, the Contractor shall be responsible for delays and expenses incurred due to coordination difficulty.

§ 3.9.7 The Contractor shall provide copies of its daily construction reports to the Construction Manager's Field Superintendent. These reports shall be submitted no later than 10:00 am the following workday. The daily reports shall provide detailed information concerning the Contractor's activities and operations, including Work activities on site and manpower.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly, but in no event later than 14 days, after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work in electronic format with predecessor logic. The construction schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The Contractor's construction schedule shall provide for the orderly progression of the Work to completion, and shall not exceed time limits current under the Contract Documents. The Contractor 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. The Contractor's construction schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project but the Contract Time and any applicable Milestone Date shall not be changed except by fully executed Change Order.

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

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

§ 3.10.1.3 The Contractor's construction schedule shall be in a detailed precedence style critical path management ("CPM") or Primavera-type format satisfactory to the Owner and Construction Manager that shall also: (i) provide a graphic representation of all activities and events that will occur during the performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents. Submission of an accepted construction schedule shall be a prerequisite to initial payment.

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

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

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Construction Manager so that all Work can be completed in the time set forth in the Contract Documents. The accepted construction schedule shall be dated to reflect actual conditions (sometimes referred to as progress reports) as set forth in Section 3.10.1 or if requested by the Owner, Construction Manager or Architect. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, or any milestone date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

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

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

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

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

§ 3.10.8 If the Contractor fails to maintain the approved construction schedule or Project Schedule and meet all critical path dates for the Work, the Owner may request a recovery plan from the Contractor and reserves the right to withhold payment until such time as the Contractor submits a recovery plan. The recovery plan must show how the Work may plausibly be brought on schedule, including, as necessary, acceleration of the Work by means of overtime, additional crews, additional shifts, additional equipment or re-sequencing of the Work to achieve completion of the remaining critical path dates in the construction schedule or Project Schedule. The Contractor shall submit as part of its recovery plan: (i) a "resource loaded" schedule showing the Contractor's plan to deploy manpower per trade, per work area, per day, together with essential materials and equipment, and other resources necessary to timely accomplish the Work; and (ii) a two-week "look ahead" schedule identifying tasks to be accomplished within the coming two week period, the work areas and categories of work, and necessary manpower resources, together with other data necessary to demonstrate to the Owner the viability of the Contractor's recovery plan ("2 Week Plans"). The Contractor shall continue to submit 2 Week Plans until either the Contractor demonstrates that the Project Schedule has recovered from the unexcused delay, or the Owner notifies the Contractor in writing that further 2 Week Plans are no longer required. The cost of preparing and performing the recovery plan shall be borne solely by the Contractor. No approval or consent by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor shall constitute a waiver by Owner of any damages or losses which the Owner may suffer by reason of such resequencing or the failure of the Contractor to meet the Substantial Completion Date or the final completion date.

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

§ 3.10.10 Due to the ongoing COVID-19 pandemic and the resulting uncertainty with regard to, among other things, (a) what restrictions, if any, will be applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) and (b) the duration of any restrictions imposed on construction activities, the Owner may modify the schedule set forth in the Contract Documents and the Project Schedule. Similarly, restrictions, if any, that will be or are applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) may cause the Owner to have the Work or the Project commence later than the date specified in the Contract Documents. The Contractor acknowledges and agrees that there should be no additional compensation paid for schedule modifications caused directly or indirectly by the COVID-19 pandemic. The Contractor further acknowledges and agrees that its sole remedy for any schedule modifications or delays caused directly or indirectly by the COVID-19 pandemic shall be an extension of the Contract Time, if warranted. The Contractor further acknowledges and agrees that it shall have on file and provide a copy to the Owner of its written COVID-19 business reopening plan, and it shall comply in all respects with such plan for the duration of the

Project. The Contractor, not the Owner, shall be responsible for compliance with its COVID-19 business reopening plan and all safety requirements associated with COVID-19 protections for workers and the general public.

§ 3.11 Documents and Samples at the Site

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

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

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

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work. Each submittal shall bear written confirmation that the Contractor has satisfied its obligations under the Contract Documents with respect to the Contractor's review and approval of the submittal. The Contractor shall comply with the provisions and procedures for Shop Drawings, Product Data, and Samples set forth in the Project Manual. 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.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, operating and maintenance procedures, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to (1) demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents, and (2) show a system or product's ability to meet applicable criteria for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the

Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.4.1 Shop drawings and product submittals for all site improvement, architectural, structural, mechanical, electrical and signal work shall be submitted to the Architect for its review.

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

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, with copies to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors. All submissions shall be in accordance with Section 01300 Submissions.

§ 3.12.5.1 No extension of time will be granted to the Contractor because of failure to have Shop Drawings, Product Data, and Samples submitted in ample time to allow for review by the Architect or its consultants.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall be responsible for verification of field dimensions and conditions and shall furnish such information to the Architect when requested. Before the Contractor proceeds with the Work in question, the Contractor should field verify all dimensions. In case of doubt about dimensions, the Contractor should notify the Architect immediately for instructions.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect. Resubmission of rejected documents shall be performed within 10 calendar days, or sooner if required by the progress of construction as determined by the Architect or Construction Manager. No claim for delay or cost shall be accepted as a result of rejected submittal documents. If the Architect is required to review the Contractor's submittal more than twice, the Contractor shall bear the cost and expense associated with such additional review as set forth in the Project Manual.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions. Resubmission of rejected documents shall be performed within 10 calendar days or sooner if required by the progress of construction as determined by the Architect or Construction Manager. No claim for delay or cost shall be accepted as a result of rejected documents.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's

responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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

§ 3.12.11 The Contractor shall approve all Shop Drawings, Product Data, and Samples prior to submitting them to the Architect. 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.

§ 3.12.12 The Contractor is required to provide all submittals for the Architect's review; all submittals to be provided to the Architect by the submittal deadlines noted in the Contract Documents.

§ 3.12.13 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals, and for evaluation of submittals for which the initial submission is received after the submittal deadlines noted in the Contract Documents.

§ 3.13 Use of Site

§ 3.13.1 The Owner shall not be liable to the Contractor, Subcontractors of any tier, suppliers, their employees or anyone else with respect to the condition of the Project site. The Owner shall have the right to refuse admittance to the site to any agent or employee of the Contractor, its Subcontractors of any tier, or its suppliers whose presence the Owner reasonably deems hostile to the Owner's interests. The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The use of the Owner's assets and property are extremely limited. The Contractor shall fully comprehend the intent of the Contract Documents pertaining to site and building limitations including, without limitation, Division 1 Specifications sections, the phased construction plan, and the site safety and logistics plan(s).

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

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

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

- .1 In accordance with New York State law, smoking is prohibited anywhere on school property. Violators will be subject to arrest and/or fine of \$1,000 per occurrence. No alcoholic beverages or controlled substances are permitted on school property, and persons under the influence of alcoholic beverages or controlled substances may not enter in or remain on school property.
- .2 In accordance with the United States Gun-Free School Zones Act of 1994, no firearms are permitted within 1,000 feet of any school building, with certain limited exceptions as set forth therein. In addition to such limitations, no firearms shall be brought on school property without the Owner's express prior consent.
- .3 Appropriate protective gear (hard hats, safety shoes, goggles, etc.) are to be worn as required by OSHA standards, the New York State Department of Labor, and prudent practice. Shirts are to be worn at all times. No short pants are permitted.
- .4 Any person who uses inappropriate language, or who is disruptive to the school environment, will be banned from the site.
- .5 The Contractor's and its Subcontractors' personnel shall not converse with school employees, students and or local residents.
- .6 All persons on the Project site will comply with all reasonable instructions regarding conduct and safety which are given by the Architect, the Construction Manager or the Owner's school administrators.
- .7 All construction materials shall be stored in a safe and secure manner. No deliveries will be allowed during school bus drop off or pick up hours as determined by the Owner. All deliveries shall be scheduled and coordinated with the Construction Manager and the Owner's security department. Unexpected or uncoordinated deliveries may be turned away by the Owner or the Construction Manager at the discretion or necessity of the Owner. The Owner's enforcement of this provision shall not be construed by the Contractor or Subcontractor as the basis for a claim of delay in time or monetary damages alleged to have been incurred as a result of refusal of delivery.
- .8 Use of the existing building facilities during construction is prohibited, specifically including toilet rooms, telephones and water fountains.
- .9 The Contractor's schedule shall allow for blackout dates during which no noisy Work will be allowed, as determined by the Construction Manager. The Contractor may consult the Owner's school calendar for all test and examination dates, but these dates are subject to change.
- .10 To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Any vehicles or trucks in non-designated areas may be towed at the Contractor's expense. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
- .11 Should it become necessary to obtain access to the existing building during construction hours for measurements or other non-disruptive work, the Contractor shall be escorted by the Construction Manager.
- .12 All persons must wear photo identification badges at all times while working at the site. Identification badges must be provided by the Contractor for its personnel, including subcontractors, consultants, visitors and others.
- .13 No asbestos containing products are to be used anywhere on this Project.
- .14 No lead containing products are to be used anywhere on this Project.
- .15 Asbestos manifests showing the locations of all known asbestos bearing materials are available in each building, and should be consulted prior to the commencement of any work, including but not limited to demolition.
- .16 Demolition is to occur only when the building is unoccupied. Dust partitions and negative air are to be installed prior to commencing demolition. The Contractor must obtain Construction Manager approval on dust partitions and negative air prior to commencing demolition work. Debris shall be removed by using an enclosed chute or similar sealed system.
- .17 (a) Prior to the commencement of Work, the Contractor must submit construction plans, which show the location of dust particles, exhaust & fresh air fans and describe in detail the operation procedures during demolition and construction which may generate dust.
(b) All entrances to classrooms shall be sealed with at least 6 mil. polyethylene sheeting to prevent dust created by demolition and construction work from entering the classrooms. Entrances and egress to the work zone shall be covered with a triple flap 6 mil. polyethylene doorway to allow access to the area without the release of dust. The Contractor is, additionally, responsible for all debris and dust infiltrating adjacent and undisturbed areas of the building.

- (c) Shut down and lock out all electrical and HVAC in the work area. Cut, cap, and seal all duct work where it enters the work area from another space. All duct work and conduit within the space shall be removed during demolition work.
- (d) The Contractor shall install dust protection barriers and poly sheeting. There shall be no or minimum damage to adjacent surfaces. The Contractor is responsible to repair any damage to existing surfaces.
- .18 Painting or other chemical applications shall be done in the Owner's existing building only when it is unoccupied. Storage of chemicals and painting shall be outside the Owner's existing or new structures, and shall follow manufacturer's storage guidelines.
- .19 Oxygen or other gas containers shall be properly stored and secured per OSHA requirements, to the satisfaction of the Construction Manager. Failure to do so will result in a \$250 back-charge, per occurrence.
- .20 The Contractor is responsible for cleaning its own materials and debris. Failure to maintain a clean work site daily will result in others performing the work at the Owner's request, and the Contractor will be backcharged for the cleaning cost plus construction administration fees. This may be done without the typical 3-day notice to the Contractor.
- .21 The Contractor must send a qualified representative, knowledgeable in the Project and authorized to make decisions on behalf of the Contractor, to every Project meeting.
- .22 The Contractor shall cooperate with the Owner's school principal and custodial staff; however, if any additional work is requested the Contractor shall not proceed unless written approval is received from the Owner. The Contractor will not be compensated for any additional work performed without the Owner's prior written approval.
- .23 Deliveries sent to the Project site will not be signed for or unloaded by the Owner. They will be directed to the construction site and if no employee is on site, the delivery will be rejected, at the Contractor's expense.
- .24 The General Construction Contractor shall be responsible for managing dust and dirt. On the exterior, site shall be watered down frequently to prevent dust clouds from rising. Streets shall be maintained clean per the Construction Manager's request.
- .25 All hot tar roofing shall be installed after school hours or on weekends/holidays only. Kettles shall not be lit until all students have left the Owner's building.
- .26 The Contractor shall submit a weekly work schedule indicating workdays, work hours and manpower allocation.
- .27 No storage of materials will be permitted within the Owner's buildings at any time during construction. The Contractor must provide exterior storage containers when required. The Contractor shall be responsible for securing appropriate space for its material with the Construction Manager prior to delivery. Final location of storage containers shall be determined by the Owner and/or Construction Manager. If insufficient space is available on the site, the Contractor shall provide local off-site storage, storage containers, etc. at its own cost and expense. Should any of the material stored on-site obstruct the progress of any portion of the Work or the Project, this material shall be removed by the Contractor without reimbursement of cost, from place to place or from the premises, as the Construction Manager may direct.
- .28 The General Construction Contractor shall be responsible for maintaining all appropriate site safety signage.
- .29 The Contractor shall be responsible for protecting the Owner's property. All existing shrubs, trees, lawn fixtures, sculptures and miscellaneous equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by the Owner in writing.
- .30 The General Construction Contractor shall provide and service portable lavatories for the duration of construction as provided in the Contract Documents. Lavatories shall be serviced by the General Construction Contractor on a regular basis to maintain sanitary conditions.
- .31 The General Construction Contractor shall protect all existing roofs during construction and shall be responsible for any damage to roofs during construction. The General Construction Contractor shall make all repairs to any damaged areas, as required by the manufacturer of the roof system.
- .32 The General Construction Contractor shall be responsible for providing weather-proof protection over all rough openings, including windows.
- .33 The Contractor shall be responsible for conducting pre-construction walk-throughs and videotaping existing conditions. The Contractor shall schedule a representative of both the Owner and the Construction Manager to be present at this taping. In the absence of this record, the Contractor shall be responsible for paying the costs associated with any and all repairs in an area where the Contractor is working or has worked, as may be deemed necessary by the Owner or the Construction Manager.

- .34 Manufacturers Material Safety Data Sheets (MSDS) shall be available at the site for all products used in the Project.
- .35 No weapons are permitted on the Owner's property by law.
- .36 Neither the Contractor nor any person on its behalf shall, in any manner, engage in discrimination, intimidation or harassment of any person on the Project site.
- .37 Proper attire is required for personal safety and clothing must not sexually explicit or contain messages of a vulgar nature, disrespectful of ethnic or religious groups, or which promote the use of tobacco, alcohol or drugs.
- .38 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.
- .39 The Contractor will ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor will use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the Owner's building in the event of partial occupancy, as more specifically described in Section 9.9.
- .40 The Contractor is required to protect its own Work and work areas, preconstruction, during construction and post construction.
- .41 During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
- .42 The Contractor shall exert utmost care and diligence when working in or near any existing buildings or site work. The absence of protection around such items shall not excuse the Contractor from its liability to provide protection. Any damage to existing buildings, sitework or facilities due to the actions or inactions of the Contractor shall be repaired by and charged to the Contractor.
- .43 The Contractor shall be responsible for the removal and replacement of existing ceiling tiles and grid in areas of the existing building where its Work is required and new ceilings are not scheduled for installation. In the event that the existing ceilings are damaged and cannot be replaced to the satisfaction of the Owner, the responsible contractor shall be liable for the costs of replacing in kind, the existing ceilings with new tile and grid.
- .44 The General Construction Contractor shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The General Construction Contractor shall submit its means and methods of security to the Construction Manager for review and comment. The Project site must be secured 24 hours a day, 7 days a week including holidays. The General Construction Contractor's failure to secure the site as required by this paragraph will result in the Owner engaging the services of such necessary personnel so as to provide such security. No notice will be given the General Construction Contractor of the Owner's intention to engage such security services and all costs and expenses associated with the Owner's security of the site in this regard will be back charged to the General Construction Contractor. While the Owner may have security guards patrolling the project areas, the function of such security guards is not for the purpose of specifically guarding the Contractor's property or operations of work.
- .45 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of the Owner.
- .46 Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner or Construction Manager in connection with the use and occupancy of the Project site and the buildings, as amended from time to time by the Owner or the Construction Manager.

§ 3.13.5 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

§ 3.13.6 The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the building in the event of partial occupancy, as more specifically described in Section 9.9.

§ 3.13.7 The Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories and toilets. To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Owner's building(s), as amended from time to time by the Owner.

§ 3.13.8 Construction areas that are under the control of the Contractor and therefore not occupied by the Owner's staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the Owner's building(s). Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

§ 3.13.9 Prior to starting Work, the Contractor shall submit a written report to the Owner, Construction Manager and Architect identifying existing damage to roads, walks, lawns, buildings and other property to be affected by this Contract. Failure to submit the report shall render the Contractor responsible for existing damage. The Contractor may request and schedule an inspection with the Owner, Construction Manager and Architect prior to submittal of the report. The Contractor shall obtain the consent of adjoining property owners regarding temporary easements of any other manner of physical encroachment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 The word "new" used herein shall mean Work which has been or is to be installed under the terms of the Contract for this Project. The word "existing" used herein shall mean existing conditions previous to the award of a Contract for this Project. In order to eliminate cutting and patching as much as possible, the Contractor shall, during the progress of its Work, provide and set proper sleeves, inserts, and other fixtures as required for its new Work and shall give proper and detailed instructions to others where the Work may be affected by their work, with adequate notice prior to the erection of new Work. Cutting and patching work as required to install new Work or remove existing work shall be done carefully and neatly with as little damage as possible. The Contractor shall refer to the Specifications for proper cutting and patching requirements. Any costs caused by defective or ill-timed Work of the Contractor shall be borne by the Contractor. Cutting and patching of any Work shall be made in such a manner as to not breach any provisions of any guaranty or warranty on existing work left in place or any guaranty or warranty required for the Contractor's new Work. Patching of work shall match existing adjacent surfaces and patchwork shall be disguised completely to hide any trace of patching. All new Work on existing roofs must be provided by a company specializing in performing the Work and approved by the existing roofing material manufacturer. It shall be the responsibility of the Contractor performing the cutting and patching to maintain any existing roofing warranty.

§ 3.14.4 Only trades persons skilled and experienced in cutting and patching shall perform such work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. On a daily basis, the Contractor shall clean the areas in which it has performed work and shall remove all waste, materials, rubbish, its tools, construction equipment, machinery and surplus materials. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall completely clean the site of the Work, removing and disposing of all construction-related debris and rubbish, and cleaning all Work-related stains, spots, marks, dirt, mortar smears, plaster smears, paint smears, caulking smears, and other foreign materials from exposed surfaces inside and outside the Owner's buildings and within the Project limit lines.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor. At its option, the Owner may deduct the cost of clean-up pursuant to this Section 3.15.2 from any payments otherwise due to the Contractor pursuant to this Contract.

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§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located. Federal, state, and local agencies with jurisdiction over the Project shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide for such access so that such agencies may perform their functions. The Contractor shall also allow access for all required tests and inspections.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall, and cause its Subcontractors to, defend, indemnify and hold harmless the Owner, Construction Manager, Architect, and their consultants, officers, directors, board members, agents and employees of any of them (collectively, "Indemnitees," individually, "Indemnitee") from and against all losses, damages, liabilities, actions, causes of action, claims, demands, fines, penalties, judgments, costs (including but not limited to attorneys' fees and expenses incurred in connection therewith and in the enforcement of this indemnification), charges, expenses and demands of whatever kind in connection with or arising from or out of (a) any negligent, willful or wrongful act or omission resulting in bodily injury (including death), personal injury or property damage (including loss of use) by the Contractor, its Subcontractors, Suppliers, their respective officers, employees, servants, agents, suppliers, invitees, successors and assigns (collectively, "Contractor Parties," and individually, "Contractor Party"), (b) performance of or failure to perform the Work or any breach of this Contract or infringement of any patent right by any Contractor Party, or (c) any statutorily imposed liability for injury to employees or failure to comply with any laws or regulations affecting the Work, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Nothing contained herein shall be construed to obligate the Contractor to indemnify, defend, and hold an Indemnitee harmless for claims caused solely by the Indemnitee's negligent acts or omissions.

The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a Subcontractor, and to require that Subcontractor to include such provision in each contract it enters into with any lower tier Sub-subcontractor: "To the fullest extent permitted by law, sub-contractor shall defend, indemnify and hold harmless the Contractor, Owner, Owner's Consultants, Construction Manager's and Architect's consultants, and each of their respective representatives, board members, employees, directors, officers, and agents, from and against any and all claims, suits, actions, damages, losses, fines, penalties, costs, charges and expenses, including but not limited to attorneys' fees and the costs of any proceeding, arising out of or resulting from any performance of or failure to perform the Work, acts or omissions of the Subcontractor, its lower-tier Sub-subcontractors, and others for whom the Subcontractor is responsible, provided that such claim, damage, loss or expense is attributable to bodily

injury, sickness, disease or death, or economic losses or damages, damage to or destruction of property, and for environmental damage, or to injury to or destruction of tangible property and nuisance, but only to the extent caused by the acts or omissions or a breach of contract of the a Subcontractor, a Sub-Subcontractor to Subcontractor, and any person or entity directly or indirectly employed by them or any person or entity for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.”

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 The Contractor’s defense and indemnity obligations under this Section 3.18 shall specifically include all claims and judgments that may be made against the Indemnitees under the Labor Law of the State of New York, and similar laws of other state or governmental bodies having jurisdiction; and further, against claims and judgments arising from violation of public ordinances and requirements of governing execution of the Work.

§ 3.18.4 Claims by Governmental Authorities. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against claims, damages, losses, and expenses arising out of any claims made against the Indemnitees under the laws of federal, state, or other governmental bodies having jurisdiction over the Work, including but not limited to claims arising from violation of public ordinances and other requirements of governing authorities, due to the Contractor’s method of execution of the Work or implementation of any of the Contractor’s other obligations under the Contract Documents.

§ 3.18.5 Liens and Security Interests. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any actions, lawsuits, or other proceedings brought against Indemnitees as a result of liens or security interests of any type arising from the Work and filed against the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor, or any portion of the property of any of the Indemnitees.

§ 3.18.6 Intellectual Property. The Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any claim or demand for patent fees, royalties, or otherwise on account of any invention, machine, article, process, copyright, or arrangement that may be used by the Contractor in performing the Work, other than as to any of the foregoing expressly called for in the Contract Documents to be so used. In the event of any injunction or legal action regarding such claim or demand that results in stopping the Work in whole or part, the Owner shall have the right to direct the Contractor to change the manner of performance of the Work to avoid such stoppage, all cost and expense occasioned thereby to be borne solely by the Contractor.

§ 3.18.7 The Contractor shall further indemnify and hold harmless the Indemnitees from and against any costs and expenses (including reasonable attorneys’ fees) incurred by any of the Indemnitees in enforcing any of the Contractor’s defense, indemnity, and hold harmless obligations under this Section 3.18 or as may otherwise be provided elsewhere in the Contract.

§ 3.18.8 Subject to Section 3.18.9, all obligations of the Contractor under this Section 3.18 to defend the Indemnitees are obligations to provide full defenses at the sole cost and expense of the Contractor, regardless of any alleged culpability on the part of any Indemnitee or any ultimate determination of relative shares of liability of any Indemnitee or limitation of the Contractor’s indemnity obligations in light of such determination.

§ 3.18.9 To the extent any defense, indemnity, or hold harmless obligations under this Section 3.18 are made void or otherwise impaired by any law controlling their construction (including but not limited to laws limiting such obligations to the extent of the portion of damages caused by an indemnitor), such obligations shall be deemed to conform to the greatest rights to defense and indemnity permitted by such law (including but not limited to New York State General Obligations Law Section 5-322.1).

§ 3.18.10 All provisions of this Section 3.18 shall survive termination of the Agreement or final completion. No obligations under this Section 3.18 shall be construed to negate, abridge, or reduce other rights or obligations to defense and indemnity, including but not limited to common law indemnity, which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.19 Existing Features and Underground Data

§ 3.19.1 The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any increase in the Contract Sum or Contract Time due to difficulties or distances encountered in the Work, which should have been foreseeable thereby.

§ 3.19.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall make no claim against the Owner, Construction Manager or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.20 Construction Stresses

§ 3.20.1 The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall, at its own expense, take whatever steps necessary to strengthen, relocate, or rebuild the structure to meet all applicable requirements.

§ 3.20.2 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, or other property damaged by its activities under this Agreement.

§ 3.21 Training and Instructions

§ 3.21.1 Upon Substantial Completion of the Work, the Contractor shall orient and instruct personnel of the Owner designated by it in the operation and maintenance of all equipment furnished by the Contractor and shall turn over all pertinent literature and operational manuals relating to the equipment. The format for organizing, binding, and delivering such manuals shall be as described in the Specifications.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 The Architect is the interpreter of the technical requirements of the Drawings and Specifications with regard to questions the Contractor may have concerning its obligations under either. The Architect shall render such interpretations with such promptness as necessary to maintain progress of the Work. All changes in the Work must be processed through the Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment and during the correction period described in Article 12. The Construction Manager and Architect have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed

is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project Schedule. The Contractor shall participate with other Contractors and the Construction Manager, the Architect and Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary by the Owner or Construction Manager. The approved construction schedules shall be integrated into the Project Schedule and constitute the schedules to be used by the Contractor, other Contractors, the Architect, the Construction Manager and the Owner until subsequently revised.

§ 4.2.4.1 The Contractor shall assume full responsibility for the execution of its Work in the allotted duration times set forth in the Project Schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 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 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly transmit to the Architect all submittals from the Contractor such as Shop Drawings, Product Data and Samples. The Construction Manager's actions will be taken in

accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12.1 The Architect's review of Contractor's submittals shall be limited to an initial submittal and one (1) resubmittal. If the Architect is required to review additional submittals because the initial submittal and resubmittal failed to conform to the information given and the design concept expressed in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the payments to the Contractor.

§ 4.2.12.2 The review will not be considered complete until an "ACTION" stamp or other written notice to that effect has been received by the Contractor.

§ 4.2.13 The Construction Manager will prepare Change Orders, Allowance Disbursements and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 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.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The 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.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction

Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.19.1 If Work is described or indicated in a manner which makes it impossible to carry out the requirements of the Contract Documents, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation before proceeding with the Work. If the Contractor fails to make such a request, no excuse will be entertained for failure to carry out the Work of the Contract Documents. Should a conflict occur in or between Contract Documents, the Contractor is deemed to have included in the Contract Sum the more expensive manner of doing the Work.

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

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing 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 Contractors or Separate Contractors or the subcontractors of other Contractors or Separate 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, within 10 days after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.1.1 In no case shall payments be made on the Contract until a complete list of Subcontractors has been submitted by the Contractor to the Construction Manager for review by the Owner, Construction Manager, and Architect. Such list shall not be considered complete if the Owner, Construction Manager or Architect has any reasonable objection to any name listed thereon. Such list shall be submitted and resubmitted if necessary until it is considered complete.

§ 5.2.1.2 Subcontractors will not be acceptable unless, when requested by the Owner, Architect or Construction Manager, evidence is furnished by the Contractor that the proposed Subcontractor has satisfactorily completed similar subcontracts as contemplated under this Contract, and has the necessary experience, personnel, equipment, plant and financial ability to complete the proposed subcontract in accordance with the intent of the Contract Documents and the Project Schedule. As verification of financial ability, the Owner reserves the right to request and

receive up to five (5) years of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager and Architect have no objection.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.2.5 The Maintenance of the Project Schedule is critical. The Contractor shall award subcontracts to entities capable of performing in a manner that will maintain the Project Schedule and require its subcontractors to complete their work in accordance with the Project Schedule.

§ 5.2.6 Upon written request from or on behalf of the Owner, the Contractor shall provide to the Owner executed, unredacted copies of all subcontracts, purchase orders or other agreements relating to the Work.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontract shall contain provision for execution of lien waivers in form and substance acceptable to the Owner as a condition of payment by the Contractor. The Contractor shall require each Subcontractor to (1) inspect the Project site, including all relevant surfaces and job conditions, before beginning the Work and (2) accept or cite necessary corrections in the Project site, including surfaces or job conditions, before beginning the Work.

§ 5.3.2 The Contractor shall promptly notify the Owner and Architect of any material defaults by any Subcontractor or whether it has terminated its agreement with any of its Subcontractors for any reason.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner pursuant to Article 14 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 60 days, through no fault of the Subcontractor, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity.

§ 5.4.4 All subcontracts over \$10,000 shall be in writing with copies of the written subcontract provided to the Owner promptly upon request.

§ 5.5 **Payments to Subcontractors; Release of Liens and Claims.** The Contractor shall pay each Subcontractor in accordance with subparagraph 9.6.2. The Contractor shall require each Subcontractor to submit with each application for payment a Release of Liens and Claims in a form approved by the Owner. The Owner shall have no obligation to pay, or to see the payment of any monies to any Subcontractor.

§ 5.6 **No Relationship with Subcontractors.** Nothing contained in this Contract shall be deemed to create any contractual relationship between the Owner and any Subcontractor or to create rights in any Subcontractor against the Owner. The Contractor shall promptly advise the Owner of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

§ 5.7 **Discharge of Construction Liens.** If any of the Contractor's Subcontractors or Sub-subcontractors file a construction lien against the Project or the Owner's Project funds, the Contractor shall within five (5) days of receipt of notice from the Owner, cause any such liens to be released by procuring and recording a bond or otherwise arrange for the removal or discharge of the lien. If the Contractor does not cause the lien to be released and discharged or removed, the Owner shall have the right to pay all sums necessary to obtain such a release and discharge, and to cause the costs it incurs in doing so (including reasonable attorneys' fees) to be paid by the Contractor. The Contractor shall indemnify, defend, and hold harmless the Owner from all claims, losses, demands, and causes of action or suits of whatever nature, including with respect to attorneys' fees incurred by the Owner, arising out of any such lien. The Contractor's obligation to indemnify in this paragraph shall be in addition to the Contractor's obligations to indemnify set forth elsewhere in this Contract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. Should the Contractor sustain any damage or delay through any act or omission of other Contractors having a contract with the Owner, or should the Contractor sustain any damage or delay through any act or omission of a Subcontractor, the Contractor shall have no claim against the Owner or its Architect or Construction Manager for such damage or delay.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.2.1 The Contractor shall provide for coordination of its activities with the activities of each other Contractor. This includes, but is not limited to, the Owner's own forces or separate the Contractor's employed directly by the Owner.

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

§ 6.1.4 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for such pre-purchased items, if any, as if the Contractor were the original purchaser. The Contract

Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the Contract Documents shall also apply to any pre-purchased items unless the Contract Documents specifically provide otherwise.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor recognizes and acknowledges that the Project is governed by and subject to the provisions of New York State General Municipal Law §101, et seq., governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other Contractors or Separate Contractors will be performing work on the Project in conjunction with it. As such, the Contractor shall afford the Owner's own forces and other Contractors or Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.1.1 The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other Contractor or Separate Contractor performing work on the Project. If the Contractor sustains any damage through any act or omission of Separate or other Contractors having a contract with the Owner for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a subcontractor of such Separate or other Contractor, the Contractor shall promptly notify the Owner and the Construction Manager of such damage

§ 6.2.1.2 The Contractor agrees to defend, indemnify and hold harmless the Owner, Architect, Construction Manager, Consultants and Sub-consultants, from all claims made against any of them arising out of the Contractor's acts or omissions or the acts or omissions of any Subcontractor of the Contractor which have caused damage to the Owner, Architect, Construction Manager, Separate Contractor or other Contractor on the Project. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the contract or by law. Further, the Owner shall withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

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

§ 6.2.2.1 The Contractor shall promptly correct discrepancies or defects in its Work identified by Separate Contractors as affecting proper execution and results of the work of the Separate Contractors.

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

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

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

§ 6.2.6 Should the Contractor or its Subcontractors cause damage to the work or property of any Separate Contractor or other Multiple Prime Contractor, the Contractor shall, upon due notice, promptly attempt to settle by agreement or otherwise resolve the dispute with the Separate Contractor or other Multiple Prime Contractor. If such Separate Contractor or other Multiple Prime Contractor sues or makes any other claim against the Owner, Construction Manager, or Architect on account of any damage alleged to have been caused by the Contractor or its

Subcontractors, the Contractor shall defend, indemnify, and hold harmless the Owner, Construction Manager, and Architect against such claim or proceedings at the Contractor's own expense. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the Contract Documents or by law. Further, the Owner shall be entitled to withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

§ 6.2.7 When the Work of the Contractor or its Subcontractors overlap or dovetail with that of other Contractors, materials shall be delivered and operations conducted to carry on the Work continuously, in an efficient, workmanlike manner.

§ 6.2.8 In case of interference between the operations of the Contractor and other Contractors, the Construction Manager will be the sole judge of the rights of each contractor and shall have the authority to decide in what manner the Work may proceed, and in all cases its decision shall be final. Any decision as to the method and times of conducting the Work or the use of space as required in this paragraph shall not be basis of any claim for delay or damages by the Contractor.

§ 6.2.9 The Contractor, including its Subcontractors, shall keep itself informed of the progress of other Contractors and shall notify the Architect or the Construction Manager immediately in writing of lack of progress on the part of other Contractors where such delay will interfere with its own operations. Failure of the Contractor to keep informed of the work progressing on the Project and failure to give notice of lack of progress by others shall be construed as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's Work.

§ 6.2.10 Delays or oversights on the part of the Contractor or its Subcontractors in getting any or all of the Work done in the proper way, thereby causing cutting, removing and replacing Work already in place, shall not be the basis for a claim for either an increase in the Contract Sum or Contract Time.

§ 6.2.11 The Contractor shall promptly correct discrepancies or defects in its Work which have been identified by Separate Contractor(s) or other Contractor(s) as affecting proper execution and results of the work of such Separate Contractor(s) or other Contractor(s).

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive or field order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. The Owner may in its sole discretion reduce the scope of the Contractor's Contract with or without any specific reasons therefor.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; a field order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.2.1 Field orders are an interpretation of the Drawings or Specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the Contract Sum. From time to time, the Architect may issue field orders to the Contractor. The work included in such field order shall be performed by the Contractor at no additional cost to the Owner and shall not form the basis for a claim for an extension of the Contract Time. Hence, the Contractor shall perform the work included in field orders so as to cause no delay to its Work and/or the work of other Contractors or Separate Contractors engaged by the Owner in connection with the Project. All field orders shall be given to the Contractor and the Construction Manager by the Architect in writing.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or field order for a minor change in the Work. Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time. No course of conduct or prior dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment of the Owner, shall be the basis for any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents. No amount shall be payable by the Owner to the Contractor for performance of work without a written and fully executed Change Order.

§ 7.1.4 Costs for changes in the Work shall not be allowed in excess of usual rentals charged in the area where the Project is located for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on Site is required for change in work only, cost of transporting equipment to and from Site will be allowed.

§ 7.1.5 When the Owner or Architect (in association with the Construction Manager) request that the Contractor perform work which is not included in the Contract Drawings or Specifications and which will result in additional cost to the Owner, the Architect shall request that the Contractor submit its proposal for performing such additional work. The Contractor shall submit its proposal to the Construction Manager and Architect for review. The Contractor's proposal shall include a complete itemization of the costs associated with performing its work including labor and materials. All proposals for any work that a Contractor, its Subcontractor(s) or Sub-subcontractor(s) perform in connection with additional work shall be properly itemized and supported by sufficient substantiating data, including but not limited to material descriptions, material quantities, material unit prices, labor trade listings, labor hour quantities, labor trade rates, equipment descriptions and equipment rates with a percentage allowance for overhead and profit as set forth in Section 7.3.11. The Contractor's proposal shall also set forth the impact on the milestone and critical path dates set forth in the Contract Documents, the construction schedule and the Project schedule, which would result from implementation of the change, and be accompanied by such other information as the Owner may request.

§ 7.1.6 Overtime, when specifically authorized by the Owner in writing, and not as a corrective measure by the Contractor to expedite the progress of construction as ordered by the Owner based on its determination that the performance of the Work has not progressed to the level of completion required by the approved Schedule, shall be paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period. Overhead and profit will not be paid by the Owner for overtime.

§ 7.1.7 Unit prices shall be submitted in the Bid Form for various items as set forth therein, and are subject to approval and acceptance by the Owner. The Owner reserves the right to reject any unit price which is unreasonable or unbalanced, as compared with prevailing costs, or as compared with the unit prices submitted by other bidders for the Project. Approved unit prices quoted shall include all profit, overhead, bonds, insurance, labor, materials, equipment, tools, applicable taxes necessary to complete the work item and shall apply to all work added or work deducted.

§ 7.2 Change Orders

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

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

§ 7.2.1.4 Changes in the Work involving additional Work or deletion of Work effecting an addition to or subtraction from the Contract Sum shall not be made until the Contractor submits to the Architect and Construction Manager the cost of the added or deleted Work with a complete and detailed listing of all Subcontractors involved, all materials, labor, overhead and profit, the impact on the Contract Time, and an appropriate Change Order has been issued. If requested, the Contractor shall submit detailed quotations for Subcontractors and material suppliers. Changes in the Work when not involving additions or deletions from the Contract Sum shall not be made until the Architect has issued an appropriate Change Order. All Change Orders must have the approval of the Owner, Construction Manager and Architect in writing. No change in Contract Time shall be allowed for Change Orders, except for

substantial changes in scope determined by the Owner. In the case of increased scope, it is expected that Change Order work shall be performed by increased manpower.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3, as well as the limitations set forth in Sections 7.3.4 and 7.3.11. The Owner shall have the right to select the method of pricing to be used by the Contractor.

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all Claims and other matters related to the change in Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change (including, without limitation, all costs of associated delay, interference, acceleration, inefficiency, overhead, as well as costs of material, labor and supervision), and any and all adjustments to the Contract Sum and the Contract Time. Payment of a Change Order shall constitute accord and satisfaction of all Claims of the Contractor in connection with the change or changes to the Contract addressed by the Change Order and it is understood and agreed that a signed Change Order shall be the complete and fully integrated agreement for all related costs and there are no oral or written understandings, reservations, representations or agreements, directly or indirectly, connected with the Change Order and not affirmatively stated on the signed Change Order. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payments as if such Work were originally part of the Contract Documents.

§ 7.2.4 Upon the Contractor's completion of the Change Order work, and prior to payment being made to the Contractor for such work, the Contractor shall provide the Owner with the following information:

- .1 Certified payrolls itemizing the labor actually utilized in connection with the Change Order work; and
- .2 Copies of invoices from its Subcontractors supplying work in connection with the Change Order work.

§ 7.2.5 Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time, except as provided in Section 7.3, and except in the case of an emergency as provided in Section 10.4.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly. A Construction Change Directive may also be used to direct the Contractor to remedy its nonconforming or defective Work.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order or to direct the Contractor to remedy its nonconforming or defective Work. In the event the Contractor and the Owner cannot agree on the sum by which the Contract Sum or the amount of time by which the Contract Time is to be increased or reduced based upon changes to the scope of the Work as described in Article 7, or due to the Contractor's failure to perform the Work in accordance with the Contract Documents, the Architect or Construction Manager shall issue a Construction Change Directive directing the Contractor to proceed with the disputed Work or correct defective Work and, if applicable, reflecting the addition to or reduction of the scope of the Contractor's Contract and the corresponding change in the Contract Sum or Contract Time, if any.

§ 7.3.2.1 If the Owner and the Contractor cannot agree that the requested Work properly forms the basis for a Change Order or on the sum by which the Contract is to be increased or reduced based upon changes to the scope of Work, the Architect or Construction Manager shall issue a Construction Change Directive signed by the Owner, Construction Manager and Architect reflecting the addition to, or removal of, the scope of Work and the Contractor shall (a) in the case of additional work to be performed by the Contractor, perform such additional work in an expeditious manner so as not to delay the Work of the Contractor or other Contractors working at the site and keep records of its performance of such additional work, and (b) in the case of work to be removed from the scope of the Contractor's Work, refrain from taking any steps in connection with the work associated with the deduction of the Contractor's Work. The Construction Change Directive shall include: (a) a description of the work being added or removed from the Contractor's scope of Work; (b) the amount the Owner has determined to be the cost associated with the additional work (as those costs are identified and limited in Sections 7.3.4 and 7.3.11) or removal of the scope of the Contractor's Work until the Owner and the Contractor agree upon the increase or decrease in the

Contractor's Contract Sum, or until a claim filed by the Contractor has been determined; and (c) the extent to which the Contract Time will be adjusted as a result of the change in the scope of Work. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 7.3.3 If the Construction Change Directive provides for a method for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon (unit prices shall be deemed to include all costs and expenses for the Contractor's changed Work, including costs of general conditions, insurance/bonds and overhead and profit attributable to the change);
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee subject to the limitations of Section 7.3.11;
- .4 As provided in Section 7.3.4 subject to the limitations of Section 7.3.11; or
- .5 As provided in Section 7.3.2.1.

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§ 7.3.4 If the Construction Change Directive provides for a reasonable expenditure and savings method of adjusting the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.11. In such case, and also under Section 7.3.3.3, 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 7.3.4 shall be limited to the following:

- .1 Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Actual costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed. Sales taxes, if any are required, shall be indicated and added after the cost of the change is calculated. No overhead or profit will be paid on sales tax;
- .3 Actual rental costs of machinery and equipment, exclusive of hand tools, rented from third parties; and
- .4 Actual costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the additional work. The Contractor shall submit with its proposal actual invoices from its insurance broker reflecting actual additional costs associated with the procurement of bonds and insurance. Bond premiums and/or credits shall be invoiced per Change Order. Lump sum bond premium requests will not be considered at the end of the Project.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Sum or Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with (1) the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time or (2) the amount of the increase or decrease in the Contract Sum and Contract Time as provided in Section 7.3.2.1. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 When the Owner or Architect request that portions of the Contractor's Work originally included in the Drawings or Specifications be deleted and which will result in a reduction of the Contract Sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such Work from the Contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such Work including labor, materials, overhead and profit. The Contractor shall not be entitled to retain its overhead or profit for such work nor shall any of its Subcontractors which were to perform the work being deducted from the Contractor's scope of Work. Additionally, the Contractor shall reflect the reduced cost of premiums on bonds which

are to be supplied herein as a result of such change. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

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

- .1 For the Contractor, for Work performed by the Contractor's own forces, fifteen percent (15%) of the direct cost for labor and materials.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractor, maximum of five percent (5%) of the amount due the Subcontractor for the Contractor's overhead and profit. For the Subcontractor, for Work performed by the Subcontractor's own forces, ten percent (10%) of the direct cost for labor and materials. The total combined overhead and profit for a change order shall be limited to 15% of the direct cost regardless if the Work is performed by the Contractor or the Subcontractor.
- .3 The markup on any part of the Work a Subcontractor subcontracts will be limited to one overhead and profit figure, in addition to the Contractor's overhead and profit markup. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.
- .4 Costs to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.
- .5 In order to facilitate checking of quotations for extras and credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and material shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also.
- .6 Overhead and profit mark-up shall include, but not be limited to, the following:
 - .1 home office expense;
 - .2 field office expense;
 - .3 supervision;
 - .4 project management & estimation;
 - .5 small tools & equipment;
 - .6 research & layout;
 - .7 inspections & permits;
 - .8 material handling;
 - .9 record drawings: and
 - .10 safety and cleanup.

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed or extended by the failure to act of the Contractor or persons or entities for whom the Contractor is responsible to act.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. The date of final completion is the date certified by the Architect and Owner in accordance with Section 9.10. Unless otherwise agreed in writing by the Owner, the Contractor agrees that Final Completion shall occur not more than 30 calendar days after the date of Substantial Completion.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.1.5 Work remaining to be completed after Substantial Completion, shall be limited to items which can ordinarily be completed within a thirty (30) day period (one month) before final payment is made.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.1.1 The Contractor recognizes that the Project Schedule is of critical importance to the Owner and that failure by the Contractor to complete the Work in accordance with the construction schedule may cause significant damages to the Owner, including but not limited to the loss of State Aid from the State Department of Education. 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, Construction Manager or Architect, that timely completion may be in jeopardy, this will mandate the Contractor to increase staff, work overtime, or use other means to recover time, at the costs of the Contractor 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.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner and the Owner’s approval of such insurance. The date of commencement of the Work shall not be changed by the effective date of such insurance. The Work can not start until the required insurance and bonds are provided and the Contract has been executed.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and final completion within the Contract Time. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure full completion thereof within the Contract Time specified and, further, to provide such protections as may be necessary. It is expressly understood and agreed by the Contractor that the time for the substantial and final completion of the Work is a reasonable time for its completion, taking into consideration, among other things, the average climatic range and usual weather conditions prevailing in the Project’s locality. The Contractor shall cooperate with the Owner, Architect, and other Contractors on the Project, making every reasonable effort to reduce the Contract Time.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, on account of changes in the Work or disputes caused by proposed or ordered changes in the Work (including the equitable value of the changes), or any disputes or disagreements as to the Work or extra work.

§ 8.2.5 The Contractor recognizes that achieving Substantial Completion and final completion of the Work in accordance with the time limits set forth in the Agreement and as further set forth in the Milestone Schedule provided in the Project Manual are material conditions of this Agreement, and that if the Contractor fails to achieve Substantial Completion and final completion of the Work in accordance with such schedule, the Owner will incur damages as a result. The Owner and Contractor agree that the amount of such damages is difficult to ascertain with any precision. The Contractor and Owner have attempted to estimate reasonable daily figures for liquidated

damages, not to penalize the Contractor for late completion, but to reasonably estimate probable losses and damages to the Owner in the event of the late completion. If the Contractor does not achieve the completion date and milestone date for each Work item in the Contract, a milestone or critical path date reflected on the Project Schedule, or the date of Substantial Completion or final completion for the Work or any part thereof, liquidated damages will be assessed in the amount of \$1,000.00 for each and every calendar day after such time allowed for completion until Substantial Completion or final completion actually occurs.

§ 8.2.5.1 The Contractor realizes that time is of the essence on this Contract and the Substantial Completion date and final completion date for each Work item in its Agreement, a Milestone Date reflected on the Project schedule, or the date of Substantial Completion or final completion of the Contractor's Work shall be no later than the date indicated therein. In the event the Contractor fails to complete any Work or substantially complete the Work by said schedule date, the sum per calendar day for each date not met, as delineated above, will be subtracted from the payment due the Contractor (or, if the amount due Contractor as payment is insufficient, any deficiency shall be paid by the Contractor to the Owner), except in cases where the Contractor has applied for and been granted an extension of the Contract Time in accordance with the provisions of the Contract Documents.

§ 8.2.5.2 The said sum per calendar day shall constitute the liquidated damages incurred by the Owner for each day of delay beyond the agreed upon dates of Substantial Completion or final completion. The foregoing liquidated damages are intended to compensate the Owner only for the loss of beneficial use of the Work of the Contract. In the event the Contractor fails to complete all Work under this Contract by said scheduled dates, in addition to the liquidated damages incurred by the Owner in connection with the Contractor's delay, to the fullest extent permitted by law, the Contractor shall be liable for all costs incurred by the Owner for additional services provided by the Architect and Construction Manager, as well as liabilities to other Contractors and Separate Contractors working on the Project.

§ 8.2.5.3 The Owner's right to liquidated damages shall survive abandonment of the Work by the Contractor or the Owner's termination of the Contract.

§ 8.2.5.4 Notwithstanding the foregoing, if one or more of the liquidated damages provisions set out in the Agreement are held to be legally unenforceable as a penalty, the Owner shall be allowed to recover actual damages caused by the Contractor's failure to achieve the applicable Contract Time requirements.

§ 8.2.6 In the event the Contractor fails to complete all Work under this Contract by said scheduled dates, the Contractor will not be permitted to perform any work during normal school hours without the express written authorization of the Owner. Such Work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied (subject to any restrictions of authorities having jurisdiction over the Project) at no additional cost of any kind to the Owner. In addition to damages incurred by the Owner in connection with the Contractor's delay, the Contractor shall be liable for all costs incurred by the Owner to provide staff, Architect and Construction Manager personnel as required to make the site available to the Contractor and perform inspections during such off hours.

§ 8.2.7 The Contractor understands that in order to meet the requirements of the Project Schedule, including intermittent milestone and critical path dates set forth in the Contract Documents, it may be required to work its personnel and equipment overtime on regular work days and on Saturdays and holidays, the cost of which is included in the Contract Sum. If the Owner specifically approves in writing reimbursement for overtime, the Contractor shall be paid by the Owner on the basis of the premium payment.

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

§ 8.2.8 The Owner shall have the right at any time to modify the Project Schedule; to suspend, delay or accelerate, in whole or in part, the commencement or execution of the Work or any portion thereof or to vary the sequence thereof; and to prescribe the time, order and priority of the various portions of the Work, and all other matters relating to the scheduling of the Work. The Contractor shall not be entitled to additional compensation for any such decisions made by the Owner.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed in the commencement or progress of the Work as a result of: Acts of God (such as tornado, flood, hurricane, pandemics, epidemics, etc. making performance temporarily impossible); the negligent acts or omissions of the Owner, Architect, Construction Manager, other Contractors, or their agents or employees in the performance of their respective obligations for the Work; strikes, lockouts or other labor disturbances (not arising from the labor practices of the Contractor or its Subcontractors, Suppliers, or Sub-subcontractors to comply with their obligations arising under the Contract); unusually adverse weather conditions; freight embargoes (provided that delays by the Contractor, its Subcontractors, Sub-subcontractors or Suppliers do not constitute an excusable cause of delay); changes in the Work to be performed by the Contractor (not caused or resulting from the failure of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors); changes to laws or regulations after the effective date of the Contract; or any other cause beyond the reasonable control of the Contractor and its Subcontractors as determined by the Owner, provided the Contractor has used all reasonable efforts to mitigate the foregoing causes; then the Contractor shall be entitled to a day for day extension of the Contract Time for the established delay to the critical path of the Work subject to the provisions of this Article 8 and Article 15. Notwithstanding anything in the foregoing to the contrary, to the extent a delay is caused by the negligent acts or omissions of the Owner, Architect, Construction Manager, other Contractors, or their agents or employees, the Contractor agree to use its best efforts to provide the Owner with prompt written notice of any such act or omission that could reasonably be expected to cause an excused delay. The extension of time provided under this Section 8.3.1 shall be the Contractor's exclusive remedy.

§ 8.3.1.1 The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused or could not have been anticipated by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (3) is of a duration of more than one (1) day.

§ 8.3.1.2 The Contractor's inability to secure sufficient personnel for the performance of the Work shall not constitute a basis for an extension of time. The Contractor shall not be entitled to an extension of time if the Architect or Construction Manager stops the Work due to the existence of or reasonable suspicion of a deficiency in the Work.

§ 8.3.1.3 An extension of the Contract Time, if requested by the Contractor, shall only be considered after the Contractor has made reasonable effort to recover the lost time. An extension, or extensions, of time may be granted subject to the provisions of this Article 8, but only after written application therefore by the Contractor. An extension of time shall be only for the number of days of delay which the Architect or Construction Manager may determine to be due solely to the causes set forth in the application for extension of time. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; but if at all, only the actual period of delay as determined by the Construction Manager or Architect.

§ 8.3.1.4 All requests for additional time shall be made in writing, delivered to the Construction Manager within five (5) calendar days from the time when the circumstance with potential for delay becomes reasonably known to the Contractor, supported by documentation which demonstrates to the Architect and Construction Manager's satisfaction that the critical path of the Work has been significantly altered by the delays to the activities in question through no fault of the Contractor or anyone for whom the Contractor is responsible, and that the Project schedule cannot be maintained by re-ordering other activities within the Project at no cost. This request shall also contain, at a minimum, the following information: (1) date of start of delay; (2) specific cause of delay; (3) effect of delay on construction progress; and (4) date of termination of delay. Upon receipt of the Contractor's request for an extension of time, the Owner will ascertain the facts and extent of the delay, and may, in its sole discretion, extend the time for completion of the Contractor's Work when in its judgment such an extension is justified. The Owner's determination will be final and binding in any litigation commenced by the Contractor against the Owner which arises out of the Owner's denial of an extension of time to the Contractor. Any approval of an extension of the Contractor's time to complete its Work shall be memorialized by written change order, signed by the Owner, Contractor, Architect and Construction Manager. When the Owner determines that the Contractor will be granted an extension of time, such extension shall be computed in accordance with the following: for each day of delay in the completion of its Work, the Contractor shall be allowed one day of additional time to complete its Contract. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; rather, only the actual period of delay as determined by the Owner or its Architect may be allowed.

§ 8.3.1.5 Failure of the Contractor to give written notice as required by Section 8.3.1.4 or to strictly comply with the requirements of Article 8 shall be deemed conclusively to be a waiver and release of such claim, and such notice shall be a condition precedent to the Contractor's right to make a claim for any claim arising out of, under or in connection with the Contractor or the performance of the Work.

§ 8.3.2 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted and justified under Section 8.3.1, shall be the sole remedy of the Contractor for, and the Contractor waives its right to any claim for damages to the extent arising from, any (1) delay in the commencement, prosecution, or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity or acceleration; or (4) other claims for disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its consultants, and lack of coordination, errors or omissions in the design of the Project, cumulative impact of multiple change orders, unavailability of materials or equipment, delays in payment, and other delays and impacts (collective referred to herein as "Delay(s)"). In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any Delay, including, but not limited to, delay costs, loss of productivity or efficiency, lost profits, extended jobsite general conditions and home office overhead, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, but not limited to, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as interference, hindrance or obstruction with the Contractor's performance of the Work and shall not entitle the Contractor to any additional compensation. The Contractor shall include a no-damages-for-delay clause in all subcontracts for the performance of the Work.

§ 8.3.3 Delays that affect the scheduled completion of the Work and are attributable to interference between Multiple Prime Contractors, Separate Contractors, Subcontractors, suppliers, utility companies or municipalities, shall be compensated solely by the granting of an extension of time to the Contractor by the Owner to complete the Work without charges to the Owner. The parties acknowledge that the Contract Time takes into account the time necessary for review of submittals and shop drawings, correcting design errors or omissions, coordination amongst other Contractors and Separate Contractors, change orders, delays incurred by seasonal limitations, work by utilities, and other administrative processing by all parties involved and are not compensatory. The Contractor agrees that it has included in its Bid prices the additional cost of doing work under this Contract caused by interference of the Architect, Construction Manager, other Contractors, Separate Contractors, Subcontractors, utility companies, etc. and the other non-compensatory Delays described above.

§ 8.3.4 When the Contract Time has been extended, as provided under Section 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs, home office, estimating, extended general conditions or other similar impact costs. The Contractor acknowledges that in agreeing to the Contract Sum it assessed the potential impact of the limitations in Section 8.3.2 on its ability to recover additional compensation in connection with a Work delay, interference, impact or hindrance and agrees that those limitations shall apply regardless of the accuracy of the Contractor's assessment or actual costs incurred by the Contractor.

§ 8.3.5 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.6 The intent of the Contract is for Work to follow a logical sequence. The Contractor, however, may be required by the Owner, Construction Manager or Architect to temporarily omit or leave out any section of Work or perform Work out of sequence. Out of sequence work and come back time to these areas shall be performed at no additional cost to the Owner.

§ 8.3.7 Claims relating to Contract Time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.8 The Contractor understands that the timely prosecution of its obligations under the Contract is essential to the efficient completion of the Project and may have a direct bearing on the costs incurred by all other Contractors and Separate Contractors. The Contractor's obligations in this regard include, but are not limited to: 1) completing the Work in an orderly fashion and in accordance with an agreed upon progress schedule; 2) timely coordination and cooperation with the Owner, the Architect and the other Contractors and Separate Contractors to resolve disruptions, interferences or other problems as they arise; 3) providing sufficient personnel, systems and procedures to ensure

that required materials, supplies and skilled human resources are available so that the Work is timely understood, anticipated, progressed and communicated where required to others involved with the Project; 4) maintaining accurate job progress schedules and systems; 5) timely notifying others working on the site when delays or interferences occur that will affect the Contractor's or other's work pertaining to the Project; 6) providing a skilled, informed and properly supported superintendent at the Project sites and at all required job meetings to provide meaningful information and commitments to efficiently cooperate in coordinating the work of the various contractors; and 7) timely reviewing all job minutes, correspondence and other communications and responding to same when required.

§ 8.3.9 The Contractor agrees that its failure to timely cooperate and proceed can substantially increase the costs of other Contractors and Separate Contractors in attempting to timely prosecute their obligations under related contracts. Accordingly, the Contractor recognizes that other Contractors and Separate Contractors on the site are third-party beneficiaries of the Contractor's obligation to timely coordinate and prosecute its obligations under the Contract Documents. The Contractor hereby waives and shall not raise as a defense the absence of privity of contract between the Contractor and the other Contractors and Separate Contractors in any claim hereafter asserted by other Contractors or Separate Contractors to recover costs or damages for delay or interference and shall be responsible to other Contractors and Separate Contractors on the site for damages caused by the Contractor's failure to timely and properly perform its contractual obligations under the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold or offset any payment to the Contractor if and for so long as the Contractor fails to perform any of its obligations under any of the Contract Documents; provided, however, that any such holdbacks shall be limited to an amount sufficient in the reasonable opinion of the Owner to cure any default or failure of performance by the Contractor.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

§ 9.2.1 Within 15 days of Contract Award, the Contractor shall submit to the Construction Manager a schedule of values allocated to various portions of the Work for each building, prepared in the currently authorized form of AIA Document G703 – Continuation Sheet and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The schedule of values shall state the names of all Subcontractors, Sub-subcontractors and material suppliers and the amounts to become due to each breakdown by specification section. The schedule of values shall contain, along with individual work items, separate line items for (1) mobilization, bonds, insurance, etc., (2) value of administrative close out submittals, (3) Allowance(s) if required elsewhere in the Project Manual, (4) separate subtotals by building, and (5) buildings further separated between "Additions/New Construction" and "Renovations/Reconstruction" as applicable. At the direction of the Architect, it shall include quantities, if applicable. The total for all items shall aggregate the Contract Sum.

§ 9.2.2 Any schedule of values that fails to include sufficient detail, is unbalanced or exhibits "front loading" of the value of the Contractor's Work will be rejected. Furthermore, if the schedule of values has been approved by the Construction Manager and the Architect and is subsequently used, but later is found by the Construction Manager or Architect to be improper for any reason, sufficient funds shall be withheld from the Contractor's future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's Work.

§ 9.2.3 For each item, the value of labor shall be listed separately from the value of materials and other costs. All items within the schedule shall be of the same order of magnitude. The Schedule of Values shall contain line items in equal amounts allocated to initial project requirements (i.e., 1% bonds, 1% insurance, 1% mobilization, 1% general requirements, etc.) and final project requirements (i.e., 1% for demobilization, 1% punch lists, 1% final cleaning, 1% as-built drawings and 1% O&M Manuals). Profit and overhead shall be included in each item. Included with this schedule shall be a cash flow projection upon which the Owner will be entitled to rely for the purpose of making adequate funds available for the Work.

§ 9.3 Applications for Payment

§ 9.3.1 In accordance with Article 5 of the Agreement and the Payment Procedures in the Specifications, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, notarized and reflecting retainage as provided elsewhere in the Contract Documents. Applications for Payment will be in the currently authorized form of AIA Document G732 - 2019, "Application and Certificate for Payment," accompanied by AIA Document G703-1992, "Continuation Sheet," and must include (add and/or deduct) adjustments to the Contract Sum resulting from Work performed under approved Change Orders (specified under Article 7) and shall be shown separately on the application for previous and current periods. Each Application for Payment shall be prepared in such form and supported by such data to substantiate the Contractor's right to payments as the Owner and/or Architect may require such as copies of requisitions from Subcontractor and material suppliers. Each Application for Payment forwarded to the Owner by the Architect shall be subject to audit and approval by the Owner in accordance with the Owner's normal audit procedures. The Application for Payment must be accompanied by: (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; and (e) such other information which the Owner, Construction Manager or Architect request the Contractor furnish in connection with its Application for Payment.

§ 9.3.1.1 The Construction Manager and Architect shall review the application for payment submitted by the Contractor and shall advise the Contractor of any adjustments to be made thereto. The Construction Manager and/or the Architect may make such adjustments under the circumstances set forth in Section 9.5.1. If any such adjustments are made by the Architect or Construction Manager, the Contractor shall submit an original itemized revised application with all documentation required by Section 9.3.1.

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

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

§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments, less an amount necessary to satisfy any claims, liens, or judgments against Contractor, which have not been suitably discharged. In accordance with Section 9.8.5, the Owner shall pay the entire amount retained from previous progress payments less two (2) times the amount required to complete items identified in a list prepared in accordance with Section 9.8.2 and the amount required to satisfy any outstanding claims, liens, or judgments against the Contractor.

§ 9.3.1.5 The Contractor and its Subcontractors are required to submit certified payroll information to the Owner in accordance with New York State Law.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the Project site for subsequent incorporation in the Work. If approved in advance in writing by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest. The costs of applicable insurance, storage, and transportation to the site for such materials and equipment stored off the site shall not increase the Contract Sum.

§ 9.3.2.1 Payment may be made for materials and equipment delivered and suitably stored on-site for future incorporation in the Work, subject to the following conditions:

- .1 Request for payment shall be considered for material or equipment, which is in short or critical supply, which has been specially fabricated for the Project or, at the discretion of the Construction Manager and Architect, for other materials or equipment.
- .2 A request for payment of material stored on-site must be made by the Contractor 10 days prior to actual, monthly cut-off date for Payment Applications.
- .3 Procedures required by the Owner shall include, but not necessarily limited to, submission by the Contractor to the Construction Manager and Architect of bills of sale and bills of lading for such materials and equipment, provisions of opportunity for the Construction Manager's and Architect's visual verification that such materials and equipment are in fact in storage; and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.
- .4 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.2.2 Payment may be made for materials and equipment delivered and suitably stored off-site for future incorporation in the Work, subject to the following conditions:

- .1 The Contractor shall submit: a written validation by the Owner, Construction Manager or Architect that such materials are stored safely off site, in the quantities and condition stated by the Contractor; a copy of an invoice for the material and equipment; a bill of sale or equivalent indication of the quantity and value of the material or equipment; a written statement indicating the location and method of storage; and property insurance certificate or rider covering the specific material or equipment, which shall name the Owner as an additional insured party.
- .2 The Contractor shall submit a verification that such materials and equipment are stored in a bonded warehouse.
- .3 A request for payment of material stored off-site must be made by the Contractor 10 days prior to actual, monthly cut-off date for Payment Applications.
- .4 All such materials and equipment upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

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

§ 9.3.3.1 Notwithstanding such transfer of title, the Contractor shall have the full continuing responsibility to install materials and equipment, protect and maintain the Work, materials and equipment in proper condition and forthwith repair, replace and make good any damage thereto without cost to the Owner until such time as the Work covered by the Contract is fully accepted by the Owner. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract. In the event that after title has passed to the Owner, any such Work, supplies, materials and equipment are rejected as being defective or otherwise unsatisfactory, title to all such items shall be deemed to have been transferred back to the Contractor.

§ 9.3.4 The Contractor further expressly undertakes to defend the Indemnitees (as defined previously in Section 3.18), at the Contractor's sole expense, against any actions, lawsuits or proceedings brought against Indemnitees as a result of liens filed against the Owner, the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor or any portion of the property of any of the Indemnities (referred to collectively as liens in this Section 9.3.4). The Contractor hereby agrees to defend, indemnify, and hold Indemnitees harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

§ 9.3.5 The Owner shall release any payments withheld due to a lien or a claim of lien if the Contractor obtains security acceptable to the Owner or a lien bond which is: (1) issued by a surety acceptable to the Owner, (2) in form and substance satisfactory to the Owner, and (3) in an amount not less than One Hundred Fifty percent (150%) of such lien claim. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3, including, without limitation, the duty to defend and indemnify the Indemnities in an action on the lien, lien discharge bond or underlying debt. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.3.6 Notwithstanding the foregoing, the Owner reserves the right to settle any disputed public improvement lien claim by payments to the lien claimant or by such other means as the Owner, in the Owner's sole discretion, determines is the most economical or advantageous method of settling the dispute. The Contractor shall promptly reimburse the Owner, upon demand, for any payments so made.

§ 9.4 Certificates for Payment

§ 9.4.1 The Construction Manager will, within seven (7) days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven (7) days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven (7) days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and

inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner, another Prime Contractor or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 failure to carry out the Work in accordance with the Contract Documents;
- .8 receipt by the Owner of a notice of withholding from the New York State Department of Labor or other administrative agencies having jurisdiction over the Project;
- .9 failure to comply with applicable federal, state or local statutes, regulations, and/or laws, including, without limitation, laws and regulations applicable to the provision of certified payrolls;
- .10 failure of the Contractor to provide executed performance and payment bonds and a current certificate of insurance and endorsements;
- .11 reasonable evidence that the Work has not progressed as indicated on the Application for Payment;
- .12 damages caused to the Owner, Construction Manager, the Architect or another Contractor as a result of the Contractor's performance of its Work;
- .13 the Architect's and/or the Construction Manager's discovery or observation of work which has been previously paid for by the Owner which is defective and/or incomplete;
- .14 The amount requested exceeds the percent completion of Work on the site; or
- .15 breach of this Agreement.

Notwithstanding the extent to which the Construction Manager and/or Architect certify an Application for Payment, the Owner shall have the right to withhold payment, in whole or in part, should the Owner determine that any of the grounds for withholding certification set forth in this Section 9.5.1 do in fact exist. If the Owner withholds payment, in whole or in part, the Owner shall promptly provide to the Contractor, Architect and Construction Manager a written explanation of the reason(s) for which payment is withheld and shall promptly pay, in accordance with the Contract Documents, all amounts which are not in dispute.

§ 9.5.2 If the Contractor disputes any determination by the Owner, Construction Manager or Architect with regard to any Certificate for Payment or in the event of a bona fide dispute between the Contractor and Owner, the Contractor nevertheless shall expeditiously continue to prosecute the Work and may submit a Claim in accordance with Article 15.

§ 9.5.3 When the above reasons for withholding certification or the Owner's withholding of payment are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, or if the Owner otherwise deems it necessary to protect its interests or the interests of the Project, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 Notwithstanding anything above to the contrary, the Owner has the right to withhold payment to the Contractor to protect itself against damages incurred or which may be incurred as a result of the Contractor's breach or negligence, including, but not limited to, the items set forth in Section 9.5.1. With respect to any liens, claims, or other circumstances for which the Owner is entitled to withhold payments pursuant to decisions by the Architect pursuant to Section 9.5.1, the Owner shall be entitled to withhold a sum equal to twice the stated amounts of such liens or claims, or, where there is no stated amount, twice the amount determined by the Architect to be necessary to protect the interests of the Owner. The Owner will release payments withheld due to liens provided that the Contractor obtains a discharge of record of such lien, by bonding or otherwise. By posting a lien discharge bond, however, the Contractor shall not be relieved of any responsibilities or obligations under the Agreement, including, without limitation, the duty to defend, indemnify, and hold harmless the Indemnitees (as defined previously in Section 3.18). The cost of any premiums or other expenses incurred in connection with such bonds or other means of discharge of record shall be the sole responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.5.6 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract, including but not limited to these General Conditions, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained herein to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.5.7 If the Contractor disputes any determination by the Owner, Construction Manager or Architect with regard to any Certificate for Payment, or in the event of a bona fide dispute between the Contractor and the Owner, the Contractor nevertheless shall expeditiously continue to prosecute the Work.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents unless such requisition is not in accordance with the terms of the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held in trust by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contracts with the Contractor for which payment was made by the Owner. The Contractor shall strictly comply with any common law, statutory, or decisional law trust fund requirements in the State of New York (including, without limitation, the requirements of New York Lien Law Article 3-A), and hereby agrees that the Owner has the same rights as any beneficiary of such trusts to examine the books and records of the Contractor to determine such compliance, from time to time at the Owner's sole discretion. The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

§ 9.6.2.1 Within seven (7) days of receipt of a payment from the Owner, the Contractor shall pay each of its Subcontractors and suppliers for work performed and materials furnished by them as reflected in the payment from the Owner, less an amount necessary to satisfy any outstanding claims, liens, or judgments and less a retained amount of not more than 5%, except that the Contractor may retain not more than 10% provided that prior to

entering into a Subcontract with the Contractor, the Subcontractor is unable or unwilling to provide a performance bond and labor and material payment bond both in the full amount of the subcontract at the request of the Contractor. The Contractor shall not retain portions of the proceeds owed any Subcontractor or supplier from the Owner's payment to the Contractor for the "contract balance." Similar provisions apply to the Subcontractor and/or supplier paying each of its Subcontractors and suppliers. Nothing in this Section shall create in the Owner any obligation to pay, or to ensure that the Contractor pays, any Subcontractor or supplier, or any relationship in contract or otherwise, implied or expressed, between any Subcontractor or supplier and the Owner. The Contractor agrees that it shall comply with the payment requirements of Section 106-b(2) of the New York General Municipal Law, as amended, and that to the extent there is any conflict between that statutory section and the provisions of this Section 9.6.2.1, the provisions of the statute shall prevail.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to its suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If, through no fault of the Contractor, the Construction Manager and Architect do not issue a Certificate for Payment within 30 days of the Construction Manager's receipt of the Contractor's Application for Payment or if, through no fault of the Contractor, the Owner does not pay the Contractor the amount certified by the Construction Manager and Architect, subject to the Owner's right to withhold payment under the terms of the Contract Documents, within 30 days of the date established for such payment in the Contract Documents, then the Contractor may, upon seven (7) additional days' written notice and opportunity to cure to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. To the extent it is determined that payment to the Contractor was improperly held through no fault of the Contractor and the Contractor elected to stop its Work consistent with the procedure set forth in this Section, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up as provided for in the Contract Documents. However, if the Contractor stops its Work and it is determined that the Owner had the right to withhold payment under the terms of the Contract Documents, then the Contractor shall be responsible to the Owner for all costs and damages (including attorneys' fees) arising from such stoppage of Work and the Contractor shall not be entitled to any adjustment in the Contract Sum or the Contract Time. This Section shall not apply: (a) to the extent that the Contractor owes to the Owner any amount pursuant to the provisions of this Contract, or (b) to the extent the Owner is required to expend amounts to purchase additional insurance on behalf of the Contractor to meet the insurance requirements of this Agreement.

§ 9.8 Substantial Completion

§ 9.8.1 The date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for which it is intended. Minor items of completion or correction ("Punch List Work") may be performed after Substantial

Completion, provided that such items can and shall be performed at such times and in such manner that such Work does not unreasonably interfere with the Owner's occupancy and use of the Project. Substantial Completion shall not be deemed to exist until (a) the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner) if such Certificate of Occupancy is required, and any other permits, approvals, licenses and any other documents from governmental authorities having jurisdiction therefore necessary for the beneficial occupancy of the Project and (b) the Contractor, Construction Manager, Architect and Owner have agreed upon a schedule for final completion and to provide the Owner with all as-built drawings, operating manuals, warranties and other required closeout documents. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Contractor, Architect and Construction Manager.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list which shall identify all non-conforming, defective and incomplete Work and establish the date of commencement of warranties in connection with any such Work. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Construction Manager or Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion. If the Architect and the Construction Manager are required to perform additional substantial completion inspections because the Work fails to be substantially complete, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all Punch List Work, which timeframe shall not exceed 30 days. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

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

§ 9.8.5.1 In conformance with New York General Municipal Law Section 106-b(1)(a), upon proper execution of Certificate of Substantial Completion of Work, the Contractor shall submit a requisition for payment of the remaining amount of the Contract Sum. Upon certification of payment by the Architect, the Owner will approve and promptly pay the remaining amount of the Contract Sum less two times value of any remaining items to be completed or corrected and less an amount necessary to satisfy any claims, liens or judgments against Contractor which have not been suitably discharged. Such payment shall be made under terms and conditions governing final payment except that the Owner's making of such payment shall not constitute the Owner's waiver of any objection to all or any portion of the Work performed by the Contractor or any claims the Owner may then have against the Contractor.

§ 9.8.5.2 Neither the requisition for payment stipulated in Section 9.8.5.1 nor any portion of retained percentage shall become due until the Contractor submits to the Construction Manager:

- .1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or the Owner's property might in any way be responsible, have been

- paid or otherwise satisfied, the form of which will be the currently authorized AIA Document G706, “Contractor’s Affidavit of Payment of Debts and Claims”;
- .2 consent of all sureties, if any, to such payment, the form of which will be the currently authorized AIA Document G707A, “Consent of Surety to Reduction in or Partial Release of Retainage,” but which will not be required if the amount withheld under Section 9.8.3.1 exceeds the amount of retainage;
 - .3 if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases, and waivers of liens arising out of contract to such extent and in such form as may be designated by the Owner; and
 - .4 all required closeout documents.

§ 9.8.5.3 As the Punch List Work is satisfactorily completed or corrected, the Contractor may submit a requisition for payment of these items. The Contractor shall submit with each such requisition for payment affidavits, consents of surety, and other data as described in Section 9.8.5.2 covering work for which payment is requested. Upon certification of such requisitions by the Architect and Construction Manager, the Owner will approve and promptly pay the requisition less an amount two times that which is necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

§ 9.8.5.4 Where the Project includes heating, air conditioning, electrical, communication, data or other systems which are not put into operation at the time of occupancy, a sum shall be withheld until these systems have operated to the general satisfaction of the Architect. The Contractor shall provide complete start up and commissioning of the systems with a detailed check list as recommended by the equipment or system manufacturer. The retained amount shall approximate five percent (5%) of the cost of the systems as determined by the cost breakdown submitted. The guaranty/warranty period for such systems will not commence until after such Architect approval.

§ 9.8.5.5 The Contractor shall complete the Punch List Work for the Project no later than 30 days after Substantial Completion of the Project. The Contractor shall be fully liable to the Owner for all damages suffered by the Owner as a result of delay in achieving final completion of the Work, including without limitation, additional architectural and construction management fees related to extended services.

§ 9.8.5.6 No partial payments will be made after the time fixed for the completion of the Work or the time to which completion may be extended under the terms of the Contract, until the full and final completion and acceptance of all Work herein agreed upon.

§ 9.8.6 If the Architect or the Construction Manager is required to inspect the Work more than two (2) times prior to certifying the Work as being substantially complete on account of the discovery of one or more items that are not sufficiently complete, the Contractor shall be liable to the Owner for the amount of any costs, additional fees or compensation due from or paid by the Owner to the Architect and/or the Construction Manager for the additional inspections.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.9.4 The Contractor shall cooperate with the Owner in order to make portions of the Project available as soon as possible.

§ 9.9.4.1 The Project site and buildings, whether work of the Contractor is partially or fully completed or not, are property of the Owner who shall have certain rights and privileges in connection with use of same.

§ 9.9.4.2 Should there be, in the opinion of the Architect or Construction Manager, unwarranted delay on part of any Contractor in completion of incomplete or defective work or other Contract requirements, and the Architect so certifies, the Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, the Contractor whose unfinished work is done subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by the Owner shall in no instance constitute acceptance of any of the Work.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the Work is not accepted by the Owner after final inspection and additional time is required to complete items identified during the final inspection, the date starting the two-year correction period described in Article 12.2 shall be set by the Architect at his discretion, but not later than the date of the final Certificate for Payment.

§ 9.10.1.2 If the Architect and the Construction Manager are required to provide additional services, extend the duration of services to the Owner, and/or perform additional final inspections because the Work fails to comply with the requirements of the Contract Documents, or the Contractor did not complete the Work in accordance with the construction schedule or Project Schedule, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment due to the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) all closeout documents required by the Contract Documents, including, without limitation, as-built drawings, attic stock, maintenance manual, operating instructions and other documents required to be delivered under the Contract in connection with the Work in the form required by the Owner, (2) confirmation that all start-up, testing, balancing and commissioning of systems, equipment and other materials has been successfully completed as required by the Contract Documents, (3) 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, (4) 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, (5) 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, (6) consent of surety, if any, to final payment, (7), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (8) all warranties and guarantees required by the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien

remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In addition to the submittals required in Section 9.10.2 above, the Contractor shall submit separate final release or waivers of lien for each Subcontractor, material supplier, or others with lien rights against the Project, and shall submit a list of such parties.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment by the Owner shall not constitute a waiver of claims, causes of action, damages or complaints by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing in accordance with Article 15 and identified by that payee in writing as unsettled at the time of the final Application for Payment.

§ 9.10.6 At any time a lien is filed against the Project funds, the Owner may demand that the Contractor discharge said lien, through bonding or otherwise, and the Contractor must obtain the discharge of said lien within seven (7) days of such demand at the Contractor's sole cost and expense, and at no cost to the Owner. If any lien or other encumbrance required to be removed at the Contractor's sole cost and expense pursuant to this Section is not discharged of record as aforesaid, the Owner shall have the right to take such action as the Owner shall deem appropriate (which shall include the right to cause such lien or other encumbrance to be canceled and discharged of record), and in such event, all costs and expenses incurred by the Owner in connection therewith (including, without limitation, premiums for any bond furnished in connection therewith, and reasonable attorneys' fees, court costs and disbursements), shall be paid by the Contractor to the Owner on demand or, at the option of the Owner, deducted from any payment then due or thereafter becoming due from the Owner to the Contractor in accordance with the provisions of these General Conditions.

§ 9.10.7 Existing warranties shall not deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The periods referred to above shall not be construed as limitations on the time in which the Owner may pursue any such action, right or remedy.

§ 9.10.8 The Contractor shall achieve final completion of all Work, including, without limitation, correction of punch-list items, preparation and delivery of all manuals, presentation of training and completion of final paper submissions not later than 30 days following the date of Substantial Completion. In the event the Contractor shall fail to achieve final completion of the Work within such a period of time, the Contractor and the Contractor's surety, if any, shall be liable for and shall reimburse the Owner for any and all fees paid to the Architect and Construction Manager and other expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due to the Contractor, and the Contractor shall promptly pay or refund the Owner the excess, if any, upon the Owner's written request.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, implementing, directing, controlling, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager. The Contractor's safety precautions and programs shall include

specific steps designed to minimize the risk of contracting or spread of COVID-19, including provision of all appropriate personal protective equipment, social distancing, avoiding stacking of trades, and other reasonable precautions.

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

§ 10.1.2 The Contractor shall provide its own COVID-19 Safety Plan to the Owner prior to the start of the Work. The Contractor shall designate a person on its staff to be responsible for monitoring the wearing of PPE by each person on site working with or for the Contractor. The Contractor shall strictly follow and ensure that its Subcontractors follow the Contractor's COVID-19 Safety Plan as well as all applicable Center for Disease Control guidelines and federal, state and local orders and directives.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, infection or exposure to COVID-19, or loss to

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

§ 10.2.1.6 Safe access to and egress from any building under construction as part of this Contract, or any existing building in which Work is being done under this Contract, shall be maintained and remain unencumbered by the Contractor in accordance with all applicable codes, rules and regulations of authorities having jurisdiction on the Work. The Contractor and its Subcontractors shall cooperate in maintaining this condition. Roadways, paths, walks, exits, service drives and other areas shall remain unobstructed and shall be maintained in a safe and satisfactory condition, for all persons using the building and premises. Materials shall not be stored promiscuously about the site or in the building, but shall be carefully stored in areas which will not interfere with pedestrian traffic or with access to and egress from adjacent properties and use of the building. The Contractor shall provide and maintain such temporary Work as may be required for the protection of its finished Work where liable to injury. The Contractor will be responsible for all of its Work, materials and equipment that may be damaged or stolen during the duration of the Contract and until the Work is accepted by the Owner. The Contractor shall make good any such damage or loss without expense to the Owner. The Contractor shall not permit unnecessary hazards to be created nor permit them to continue if they are discovered. The Contractor's storage and staging areas shall be only in locations assigned or approved by the Owner and Architect and may be required to be relocated by the Contractor as building occupancy or use changes during the course of the Work. This relocation will be done by the Contractor at no additional cost to the Owner.

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

§ 10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply

therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail or refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fee, in recovering such defense costs from the Contractor.

§ 10.2.2.2 All laborers, workers, and mechanics employed in the performance of the Work of this Project shall be certified as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least 10 hours in duration. The Contractor and its Subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by State Education Department, and the Contractor's safety program.

§ 10.2.2.3 All safety equipment including hard hats, weather protective gear and PPE required for the Contractor to perform its Work are to be supplied by the Contractor or its Subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, or other agents, and its Subcontractors, employees, superintendents, or other agents are required to wear hard hats and other required or essential safety equipment. Each person seen without a hard hat, or otherwise failing to comply with this requirement, will be ordered to leave the Project. No prior warnings will be given by the Owner, Construction Manager or Architect. The Contractor and its Subcontractors shall be solely responsible for making up and paying for any loss of production or required progress resulting from the removal of personnel from the Project as set forth herein including any costs incurred by the Owner in connection with the work of other Contractors.

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

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

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the Owner reasonable advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18, and shall not be limited by such damage or loss being insured under property insurance required by the Contract Documents.

§ 10.2.6 The Contractor shall schedule weekly safety meetings and each of its Subcontractors must be properly represented at such meetings. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. The Contractor shall not load any part of the Work with materials, equipment, shores, bracing, or other items which in any way could cause damage to the Work or to other Work or could endanger persons in or about the Work.

§ 10.2.8 If, during the construction, public or private property is damaged or destroyed as a consequence of its Work, the Contractor shall, at its own expense, restore such property to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding or replacing it, or otherwise making good such damage or destruction in an acceptable manner.

§ 10.2.9 The Contractor shall be responsible for all breakage of glass, which has been furnished and installed as part of Contract and existing glass that is broken due to operations under the Contract for Work. No matter by whom or what cause glass was broken, the Contractor shall replace all broken glass before completion and acceptance of the Contractor's Work.

§ 10.2.10 In addition to all requirements set forth herein, the Contractor and its Subcontractors shall fully comply with the provisions of the federal Occupational Safety and Health Act of 1970, as amended, and with any rules and regulations pursuant to the Act. This requirement shall apply continuously and not be limited to normal working hours.

§ 10.2.11 The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor at its sole expense.

§ 10.2.12 The Contractor shall immediately contact the Construction Manager and, within 24 hours, report, in writing, to the Owner, Architect and Construction Manager, all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner, Construction Manager, and Architect.

§ 10.2.13 The Contractor shall be solely responsible for any conditions that develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements at the sole expense of the Contractor.

§ 10.2.14 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement to the satisfaction of the Owner, Construction Manager and Architect.

§ 10.2.15 From the commencement to the final completion of the Work, the Contractor shall keep the Work and the Owner's building(s) free from accumulation of water no matter the source or cause of water infiltration. This responsibility shall include additions/alterations of existing buildings. The Contractor shall be responsible for temporary roofing, tarps and other protection at roofs, cavity walls, etc. Should the Contractor fail to provide adequate protection causing flooding, damage or other disturbance to the existing building(s), the Contractor shall be responsible for all costs associated with clean up, remediation and repairs. Inasmuch as flooding and water damage have safety implications to the general public, clean up, remediation and repairs may be made by the Owner without prior notice to the Contractor. Administration costs incurred by the Owner, Construction Manager and Architect will also be back charged to the Contractor. The Contractor, by entering into this Contract, agrees to be liable for these costs.

§ 10.2.16 Where solvents, chemicals, etc. are used in the installation or cleaning of materials or equipment under this Contract, which might cause injury or sickness to an employee or occupant of the building, they shall be used in strict conformance with the manufacturer's direction, material safety data sheets (OSHA 20) in the handling, storage and application of such materials shall be obtained by the Contractor and strictly adhered to. Every precaution shall be taken to prevent seepage of toxic fumes into the building. All hazardous waste material shall not be deposited in any dumpster, in any drain, or any part of the site, but shall be collected in a container specifically authorized by the EPA for the collection of said material, transported in accordance with DOT regulations and legally disposed of. Permits shall be obtained for storage, treatment and disposal of all hazardous materials.

§ 10.2.17 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall

be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents and all applicable laws, rules and regulations regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing. The Owner shall arrange for the material to be tested and if the test reveals that the material is a hazardous material or substance which has not been rendered harmless, the Owner shall pay for the test; otherwise, the Contractor shall bear the cost of the test and the Contract Sum shall be reduced by the amount of that cost. The Contractor shall comply with the reasonable instructions of the Owner after the test is conducted. This Section shall not apply in the case of asbestos which is to be removed and disposed of as part of the Work of the Contract.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and the Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, but only to the extent of available insurance proceeds, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that the person seeking indemnification: (1) did not bring such material onto the Project site; (2) timely provided notice of the condition and stopped Work in the affected area as required by Section 10.3.1; and (3) has a claim, damage, loss or expense that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself). The Owner shall have no indemnity obligation to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity or the fault or negligence of a third party for whom the Owner is not responsible.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence or fault on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance (that was not brought to the site by the Contractor or those for whom the Contractor is responsible) solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.3.7 The Contractor shall notify the Owner of any storage, use, or discovery of hazardous material on the Project site which the Contractor knows or reasonably should know could cause bodily injury or death and of any injury or death attributable to any such hazardous material.

§ 10.3.8 The Contractor shall take all reasonable precautions and measures to prevent any contamination by or spread or disturbance of hazardous or potentially hazardous substances or materials stored, used, or discovered on the Project site.

§ 10.3.9 For the avoidance of any doubt, COVID-19 shall not be considered a Hazardous Material for purposes of this Article 10.3.

§ 10.4 Emergencies

§ 10.4.1 The Contractor shall provide at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone at the Work.

§ 10.4.2 The Contractor must promptly report in writing to the Construction Manager all emergencies whatsoever arising out of, or in connection with the performance of the Work, whether on, or adjacent to the site, which caused death, personal injury or property damages, giving full details and statements of witnesses. In addition, if death, injury, or damages are caused, the emergency shall be reported immediately to the Construction Manager, Owner, and Architect.

§ 10.4.3 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.4.4 All fire and emergency access, including roads, rights-of-way, corridors, doors, and stairs, and all existing fire and smoke detection systems shall be maintained at all times in accordance with fire safety laws. If the Work requires the temporary obstruction of any fire and emergency access or existing fire and smoke detection systems, the Construction Manager shall be notified at least 72 hours in advance.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies licensed to do business in State of New York, having an A.M. Best "A-" or better rating, and one to which the Owner has no reasonable objection 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, including private entities performing Work at the site and exempt from the coverage on account of number of employees or occupation, which entitles shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project. As required by the New York State Workers' Compensation Law, all out of state contractors working in New York must provide a Workers' Compensation Insurance Policy that specifically lists New York in Item 3A of the Policy Information page;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees or persons or entities excluded by statute from the requirements of Section 11.1.1.1 but obligated by the Contract Documents to provide the insurance required by that section;
- .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;
- .7 Claims for bodily injury or property damage arising out of completed operations;
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18;
- .9 Where the Contract or Subcontract involves asbestos, the insurance required by Section 11.1 shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time period. If there is a limitation, it will be at the Owner's discretion to accept or reject that limitation;
- .10 Insurance must remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing or replacing defective Work in accordance with Section 12.2.2.2;

- .11** Liability insurance (including Umbrella Excess Liability policy) shall include all major divisions of coverage and be on a comprehensive basis. The required coverage shall be written on an occurrence basis and shall include the following:
- a. Premises Operations (including X, C and U coverage as applicable).
 - b. Independent Contractor's Protective.
 - c. Products and Completed Operations.
 - d. Contractual, including specified provision for Contractor's obligation under Section 3.18 of the General Conditions.
 - e. Owned, non-owned and hired motor vehicles.
 - f. Broad Form Property Damage including Completed Operations.
 - g. Pollution Legal Liability Insurance (as applicable to the Prime Contract or Subcontract including asbestos abatement activities).
 - h. Personal injury liability with Employment Exclusion deleted.
- .12** The insurance policies required to be purchased and maintained by the Contractor under this Agreement shall be: (i) written on an occurrence basis, and (ii) shall be primary on a per project basis for the defense and indemnification of any action or claim asserted against the Owner (and its Board, employees and volunteers), Construction Manager, Architect, and/or the Contractor for Work performed under the Agreement regardless of any other collectible insurance or any language in the insurance policies that may be to the contrary. The policies of the Owner and Architect and their consultants shall be excess and noncontributory.
- .13** A fully completed New York Construction Certificate of Liability Insurance Addendum (Acord 855 2014/15) must be included with the certificates of insurance. For any "yes" answers on Items G through L on this Form – additional details must be provided in writing.

The Contractor shall not commence work under this Contract and shall not be considered "approved" until it has obtained all insurance required in this Article 11 and the Specifications, and such insurance has been approved by the Owner; nor shall the Contractor allow any of its Subcontractors to commence work under its Subcontract until it has obtained all similar insurance for protection of itself, the Contractor and the Owner.

§ 11.1.2 The insurance required by Article 11 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of three years after Final Completion of the Work. All coverages are to be written on an occurrence basis unless approved by the Owner.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner 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 Article 11 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 on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.3.1 The insurance requirements set out herein and elsewhere in the Contract Documents are independent from all other obligations of the Contractor under the Contract Documents and apply whether or not required by any other provision of this Agreement.

§ 11.1.3.2 Neither the Owner or Construction Manager shall have any duty to the Contractor or to any of its insurers or their insurance agents to review any certificates or copies of insurance furnished by the Contractor or to determine whether the terms of each certificate or policy of insurance comply with the insurance-related provisions of the Agreement. A failure to detect that the Contractor has not submitted certificates, or proper certificates, or is otherwise not in compliance with the insurance-related provisions of the Agreement shall not be considered a waiver or other impairment of any of the Owner's rights under such insurance-related provisions.

§ 11.1.4 The Contractor shall cause all liability insurance policies coverage required by the Contract Documents (excluding Workers' Compensation) to include (1) the Owner (and its Board of Education, employees and

volunteers), Construction Manager, Architect, and their consultants as additional insureds on a primary and non-contributory 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 (and its Board of Education, employees and volunteers) as additional insureds on a primary and non-contributory for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations. If the terms of policies expire, or the lives of the insurance companies terminate, before the Contract is completed or during the period of completed operations coverage, and the Contractor fails to maintain continuance of such insurance, the Owner is entitled to provide protection for itself, to pay premiums, and to charge the cost to the Contractor.

§ 11.1.5 It is expressly understood and agreed that:

- .1 The amount of insurance provided in the insurance coverages required by Article 11 and any other provision of the Contract Documents shall not be construed to be a limitation of the liability on the part of the Contractor or any of its Subcontractors.
- .2 Any type of insurance or any increase in limits of liability not described above which the Contractor requires for its own protection or on account of statute shall be its own responsibility and at its own expense and shall not be charged back to the Project.
- .3 The carrying of insurance described shall in no way be interpreted as relieving the Contractor or any Subcontractor of any responsibility or liability under the Contract.
- .4 In the event of a failure of Contractor to furnish and maintain said insurance and to furnish satisfactory evidence thereof, the Owner shall have the right (but not the obligation) to take out and maintain the same for all parties on behalf of the Contractor who agrees to furnish all necessary information thereof and to pay the cost thereof to the Owner immediately upon presentation of an invoice.
- .5 Any work performed without having the insurance coverage is at Contractor's own risk.
- .6 The Contractor agrees to indemnify the Owner for any applicable deductibles and self-insured retentions.

§ 11.1.6 Schedule of Insurance

The Contractor and its Subcontractors, at their own expense, shall procure and maintain the following insurance coverages with limits of liability not less than the limits specified, or greater if required by law.

§ 11.1.6.1 Workers' Compensation and Employers' Liability

Workers' compensation and employers' liability insurance coverage complying with the laws of the Project location and elsewhere as may be required and shall include a minimum of:

Workers' Compensation	Statutory
Bodily Injury by Accident:	\$1,000,000 Each Accident
Bodily Injury by Disease:	\$1,000,000 Each Employee
Bodily Injury by Disease:	\$1,000,000 Policy Limit

The workers' compensation and employers' liability policies shall be endorsed to waive the right of subrogation against the Owner and its Board of Education, employees and volunteers, Construction Manager and Architect.

§ 11.1.6.2 Commercial General Liability

Commercial general liability written on ISO occurrence form providing coverage for Premises and Operations, Products-Completed Operations, Independent Contractors, Personal and Advertising Injury (Employment Exclusion deleted), Blanket Contractual Liability, and Broad Form Property Damage (including coverage for Explosion, Collapse, and Underground Hazards).

Occurrence Form:	
General Aggregate:	\$2,000,000 (per project)
Products/Completed Operations	
Aggregate:	\$2,000,000 (per project)
Each Occurrence:	\$1,000,000
Personal and Advertising Injury:	\$1,000,000
Property Damage (Aggregate)	\$2,000,000 (per project)
Property Damage (Each Occurrence)	\$1,000,000
Fire Damage (any one fire):	\$300,000
Medical Expense (any one person):	\$10,000

The Contractor shall cause the commercial liability coverage required herein to include Bodily Injury and Property Damage, Damage for Premises/Operations, Products and Completed Operations provided by the General Liability coverage form CG 00 01 in connection with work to be completed by the Contractor and all subcontractors and consultants, with the Owner and its Board of Education, employees and volunteers, Architect and Construction Manager named as additional insureds, on a primary and non-contributory basis, including ongoing and completed operations using ISO form CG 20 10 04/13 or the CG 20 38 04/13 combined with the CG 20 37 04/13. Products and Completed Operations Coverage must be maintained for a period of at least three (3) years after final payment and must provide that the Owner and its Board of Education, employees and volunteers are additional insureds on a primary, non-contributory basis for the same period (using ISO form CG 20 10 04/13 or CG 20 38 04/13 combined with the CG 20 37 04/13). These limits must apply on a per project basis. Coverage must be written on CG 00 01 form or its equivalent. The commercial general liability policy shall be endorsed to waive the right of subrogation against the Owner and its Board of Education, employees and volunteers, Construction Manager and Architect.

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§ 11.1.6.3 Automobile Liability

Business automobile liability, including liability arising out of any owned, leased, non-owned or hired automobile with per accident limits of liability of not less than \$1,000,000. The Contractor shall cause the automobile liability coverage required herein to include the Owner and its Board of Education, employees and volunteers, Construction Manager, Architect, and their consultants as additional insureds on a primary and non-contributory basis. The automobile liability policy shall be endorsed to waive the right of subrogation against the Owner and its Board of Fire Education, employees and volunteers , Construction Manager and Architect.

§ 11.1.6.4 Owners and Contractors Protective Liability Insurance

The Contractor shall procure and maintain at the Contractor’s own expense until final completion of the Work covered by the Contract, and any extension thereof, Owners and Contractors Protective Liability Coverage issued in the name of the Owner and covering the liability for damages imposed by law upon the Owner with respect to all operations under the agreement by the Contractor or its Subcontractors, including omissions and supervisory acts of the Owner. Such policy shall be delivered to the Owner no later than fifteen (15) days of awarding the Contract. Unless otherwise specifically required by special specifications, each policy shall be issued with limits not less than \$1,000,000 per occurrence and \$2,000,000 aggregate.

§ 11.1.6.5 Pollution Legal Liability Insurance

If the Work includes the removal, mitigation or other handling of pollutants or hazardous materials of any type, the Contractor will be required to carry and maintain pollution legal liability insurance coverage with the minimum limits set forth below, in a form acceptable to the Owner and written by an insurance company acceptable to the Owner. Proof of such coverage shall be provided prior to the commencement of the Work. With coverage for the services rendered for the Owner, including, but not limited to removal, replacement enclosure, encapsulation and 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. The limits shall be as follows:

Each Occurrence:	\$1,000,000
Products and Completed Operations Aggregate:	\$2,000,000
General Aggregate:	\$2,000,000 (specific to the project)

These limits shall include products and completed operations. The Contractor’s pollution legal liability policy shall also include coverage for non-owned disposal site liability, mold remediation and related expenses. If retroactive date is used, it must pre-date the inception of the Contract. If the Contractor is using motor vehicles to be used for transporting hazardous materials, the Contractor shall provide pollution legal liability broadened coverage (ISO endorsement CA 9948 or equivalent) as well as proof of MCS 90. The coverage shall include a three-year reporting period following substantial completion of the Work. The Contractor shall cause the pollution liability coverage required herein to include the Owner and its Board of Education, employees and volunteers, Construction Manager, Architect, and their consultants as additional insureds on a primary and non-contributory basis. The pollution legal liability policy shall be endorsed to waive the right of subrogation against the Owner and its Board of Education, employees and volunteers , Construction Manager and Architect.

§ 11.1.6.6 Umbrella Liability

Provide follow form excess coverage over the commercial general liability, employers’ liability, automobile liability

and pollution legal liability (if required by contract) policies with limits not less than \$5,000,000 each occurrence and \$5,000,000 aggregate specific to the Contract. The Contractor shall cause the excess coverage required herein to include the Owner and its Board of Education, employees and volunteers, Construction Manager, Architect, and their consultants as additional insureds on a primary and non-contributory basis. The umbrella liability policy shall be endorsed to waive the right of subrogation against the Owner and its Board of Fire Education, employees and volunteers, Construction Manager and Architect.

§ 11.2 Owner's Liability Insurance

The Owner shall purchase and maintain the Owner's usual liability insurance. Neither the Owner's usual liability insurance nor any other insurance obtained by the Owner reduces or otherwise affects the Contractor's insurance requirements under Section 11.1.

§ 11.3 Property Insurance

§ 11.3.1 The Contractor shall purchase and maintain, in a company lawfully authorized to do business in New York, 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. Losses up to the deductible amount shall be the responsibility of the Contractor unless caused solely by the Owner.

§ 11.3.1.1 The Contractor's 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. This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.2 The said insurance policy shall contain a provision that the loss, if any, is to be made adjustable with and payable to the Owner as trustee for the insureds, and a provision that it shall not be changed or cancelled and that it will be automatically renewed upon expiration and continued in force unless the Owner is given thirty (30) days written notice to the contrary.

§ 11.3.1.3 The Contractor shall have the sole responsibility to promptly report any loss to the insurer and to furnish the latter with all necessary details relating to the occurrence of the loss and the amount thereof. The Owner, Construction Manager, Architect, Contractor and all subcontractors of the Contractor waive all rights, each against the others, for damages caused by fire or other perils covered by insurance provided under the terms of this Section, except such rights as they may have to the proceeds of insurance received; provided, however, this waiver shall not apply to any manufacturer, supplier or similar agent under any guarantee or warranty.

§ 11.3.1.4 The Contractor shall not violate or permit to be violated any condition of such policy and shall at all times satisfy the fire safety requirements of the Owner and the insurance company issuing the same.

§ 11.3.1.5 The procurement and maintenance of said policy shall in no way be construed or be deemed to relieve the Contractor from any of the obligations and risks imposed upon it by this Contract or to be a limitation on the nature or extent of such obligations and risks.

§ 11.3.1.6 Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the Owner with an updated replacement certificate of insurance and endorsements. The Contractor shall advise the Owner of any letter or notification that cancels, materially changes, or non-renews the policy and Contractor shall require the insurance carrier(s) to copy the Owner on any letter or notification that cancels, materially changes, or non-renews the policy. Before the Contractor shall be entitled to have any progress payment rendered on account of the work which is to be insured pursuant to this Section, it shall furnish to the Owner a certificate in duplicate of the insurance herein required. Such insurance must be procured from an insurance carrier approved by the Owner, licensed to do business in the State of New York ("admitted" carrier), and rated at least "A-" by A.M. Best Company.

§ 11.3.2 Boiler and Machinery Insurance. The Owner, if applicable to the Work and at its sole option, may purchase and maintain boiler and machinery insurance or shall do so if required by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner. This insurance will include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 11.3.3 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.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described in this Section 11.3 or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost for it will be charged to the Contractor by appropriate Change Order.

§ 11.3.5 Upon the Contractor's request, the Owner will provide copies of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ 11.3.6 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their respective subcontractors, sub-subcontractors, agents and employees, and (2) the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire or other causes of loss to the extent of proceeds under property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, by appropriate written agreements, similar waivers each in favor of other parties enumerated in this Section 11.3.6. The policies must provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation is effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity has an insurable interest in the property damaged.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Contractor shall furnish performance and labor and material payment bonds, each in an amount equal to one hundred percent (100%) of the Contract Sum, meeting all statutory requirements of the State of New York, in form and substance satisfactory to the Owner in its sole discretion and, without limitation, complying with the following specific requirements:

- .1 The prescribed form of the performance and payment bonds shall conform to AIA A312-2010, and other shall be satisfactory to the Owner in the Owner's sole judgment;
- .2 The cost of the required bonds shall be included in the Contract Sum;
- .3 Bonds shall be executed by a responsible surety licensed in New York State, listed in the latest issue of the U.S. Treasury Circular 570 and having an A.M. Best's rating of no less than A-/IX and shall remain in effect for a period not less than two years following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer;
- .4 The Contractor shall require the attorney in fact who executes the required bond on behalf of the surety to affix thereof a certified and current copy of his power of attorney indicating the monetary limit of such power. The signatures of the Contractor and Surety shall be acknowledged by a notary public;
- .5 Every bond under this Section 11.4.1 must display the surety bond number.

§ 11.4.2 A rider including the following provisions shall be attached to each bond:

1. This bond includes performance by the Contractor of any correction and warranty obligations in the Contract Documents, including such performance after the dates of Substantial Completion and final completion.
2. Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Such addition, alteration, change,

extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.

3. Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to the Owner.

§ 11.4.3 All bonds shall be maintained in full force during the duration of the Project and for a period of two (2) years after the date of the Contractor's acceptance of final payment as guarantee that the Contractor will make good any faults or defects in the work arising from improper or defective workmanship or materials which may appear during the comeback warranty period.

§ 11.4.4 The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the Project site, but no later than seven (7) days after execution of the Contract.

§ 11.4.5 The Owner may, in the Owner's sole discretion and without prior notice to the Contractor, inform surety of Contractor's Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Contractor's Work.

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

§ 11.4.7 The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of: (1) notice of changes in the Work; (2) request for reduction or release of retention; (3) request for final payment; and (4) any other material required by the surety. The Owner shall be notified by the Contractor, in writing, of all communications with the surety. The Owner may, in the Owner's sole discretion, inform the surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under any pursuant to any bond issued in connection with the Work.

§ 11.4.8 Notwithstanding any other provisions in any performance or payment bond, it shall not be a condition precedent to termination of a Contract or Contractor that notice be sent to or meeting be arranged or held with the Contractor (principal) and surety, prior to such termination. Any such requirement(s) shall be void and unenforceable and the Owner shall have the right to reject any such bond(s) or ignore such condition. The exclusive method of termination of a Contract or the Contractor is contained in the Contract Documents, and the Contractor and surety expressly agree to be bound thereby.

§ 11.4.9 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.10 The Contractor shall provide for the continuation of the performance bond as a maintenance bond for two (2) full years after the date of final payment request at the full final Contract Sum.

§ 11.5 Neither the procurement nor the maintenance of any type of insurance by the Owner or the Contractor shall in any way be construed or be deemed to limit, discharge, waive or release the Contractor from any of the obligations and risks imposed upon him by the Contract or to be a limitation on the nature or extent of such obligations or risks.

§ 11.6 Nothing in the Contract shall create or give to third parties any claim or right of action against the Contractor, Architect, Construction Manager or Owner beyond such as may legally exist irrespective of the Contract.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Final Payment

The Owner, through its Architect or Construction Manager, shall have the authority to reject Work performed by the Contractor that does not conform to the requirements of the Drawings, Specifications, or both. The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Final Payment

§ 12.2.2.1 If, within two (2) years after the date of Final Payment for the Work or a designated portion thereof, or after the date for commencement of warranties established otherwise in the Contract Documents, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The obligation set forth hereunder shall survive acceptance by the Owner of the Work or termination of the Contract. The Owner shall give such notice promptly after discovery of the condition. The Contractor's Performance Bond shall remain in full force and effect through this two-year comeback correction period.

§ 12.2.2.2 The two-year period for correction of the Work shall be extended with respect to portions of Work first performed after Final Payment by the period of time between Final Payment and the actual completion of that portion of the Work.

§ 12.2.2.3 Upon completion of any Work under or pursuant to this Section 12.2, the two-year period for correction of Work in connection with the Work requiring correction shall be renewed and recommence.

§ 12.2.2.4 The obligations shall cover any repair and replacement to any part of the Work or other property caused by the defective or nonconforming Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.3.1 If the Contractor fails to commence to correct, repair and make good any defects in its Work within a reasonable time, not to exceed ten (10) days from the date the Contractor received written notice from the Owner per Section 12.2.2.1, the Owner may correct it in accordance with Section 2.5 and the Contractor shall, upon demand, pay to the Owner all amounts which it expends for such corrective work.

§ 12.2.3.2 In emergencies occurring during the two-year correction period, the Owner may correct any defect immediately and charge the cost to the Contractor. The Owner shall at once notify the Contractor, who may take over the Work and make any corrections remaining after its forces arrive at the Work. Repair work not started within ten (10) days following notice to the Contractor of any defect may be considered an emergency.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Multiple Prime Contractors or Separate Contractors, whether completed or partially completed, caused by the Contractor's

correction or removal of Work that is not in accordance with the requirements of the Contract Documents. The Contractor shall also replace or repair to satisfaction of Owner any and all damage done to the building or its contents in consequence of work performed in fulfilling any applicable warranty. This clause is general in nature and will not operate to waive stipulations of other clauses that specify warranty periods in excess of two (2) years.

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as determined by the Owner, with the advice of the Construction Manager and Architect. Such adjustment shall be effected whether or not final payment has been made. For this Section to apply, the Owner must accept non-conforming Work in writing specifying the non-conforming Work being accepted. Notwithstanding any acceptance by the Owner, if the Owner discovers non-conforming Work that the Owner has not expressly accepted in writing, the Owner may demand that the Contractor correct such Work as per the provisions of Article 12 hereof.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the State of New York, and the parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the Contract or performance of the Work shall be commenced and maintained in New York State Supreme Court, Westchester County.

§ 13.1.2 The Contractor shall at all times observe and comply with all federal, state and local laws and all laws, ordinances and regulations of the Owner, in any manner affecting the Work and all such orders decreed as exist at present and those which may be enacted later, by bodies or tribunals having jurisdiction or authority over the Work, and the Contractor shall defend, indemnify and save harmless the Owner and its Board of Education, officers, agents, or servants against any claim or liability arising from, or based on, a violation of any such law, ordinances, regulation, order or decree, whether by himself or by his employee or agents. Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with the Agreement unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the agency responsible for the enforcement of such law.

§ 13.1.3 Except as other specified, the Contractor shall comply with the current editions of applicable specifications of the following agencies, herein referenced. In the case of conflicting requirements, the most stringent shall apply: New York State Department of Education (NYSED); American Society for Testing and Materials (ASTM); New York State Department of Health (NYSDH); applicable NYS Building Code; U.S. Department of Commerce, Commercial Standards (C.S.); New York State Department of Public Work (NYSDPW); American National Standards Institute (ANSI); National Electric Code (NEC); American Insurance Association; National Fire Protection Association (NFPA); Americans with Disabilities Act (ADA); SMACNA - Technical Manuals and Standards; IAQ (Indoor Air Quality) Guidelines of Occupied Buildings Under Construction - 1995.

§ 13.1.4 Building codes, regulations, and other applicable governmental requirements shall govern the Work of this Project. The Contractor shall comply with all requirements of the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor, and all regulations of the New York State Labor Law pertaining to hazardous conditions that may develop in connection with the Work of this Contract. All Work and materials of the Contract shall comply with all federal, state, county and local building, health, plumbing, HVAC, and electrical codes, laws, ordinances and regulations that apply to the Work. All Work of this Project shall be subjected to the provisions of all applicable requirements of local utility company regulations. Any covered product or material used shall comply with combustion/toxicity tests as found in the New York State Building Code and shall be listed by the Department of State Building Materials and Finishes Data File.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided

in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

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

§ 13.3 Rights and Remedies

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

§ 13.3.2 Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the Owner, Architect, Construction Manager, or any board member, officer, agent or employee of the Owner; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the Owner of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the Owner in its performance of such duties or obligations; nor any delay or omission by the Owner to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the Owner, its commissioners, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the performance bond or a waiver of any provision of the Contract or of any rights or remedies to which the Owner may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the Owner may be entitled because of such breach. No waiver by the Owner of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

§ 13.3.3 The rights stated in these General Conditions and the Contract Documents are cumulative and not in limitation of any rights of the Owner at law or in equity.

§ 13.3.4 The Owner shall not be responsible for damages or for loss of anticipated profits on Work not performed on account of any termination of the Contractor by the Owner or by virtue of the Owner's exercise of its right to take over the Contractor's Work.

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

§ 13.3.6 The Contractor hereby expressly waives any rights it may have in law or in equity to lost bonding capacity as a result of any of the actions of the Owner, the Architect or the Construction Manager taken in connection with the Contractor's Work on the Project.

§ 13.3.7 The Contractor agrees that it waives the defense of privity of contract as between itself and each other Multiple Prime Contractor. In the event that an act or omission by a Multiple Prime Contractor or its Subcontractors of any tier causes impact, damage or loss in any form to the Contractor, then the Multiple Prime Contractor responsible in whole or in part for such impact, damage or loss agrees it is directly responsible and liable to the Contractor. The Contractor acknowledges and agrees that this waiver of the defense or privity of contract permits and requires it to commence an action or suit directly against the responsible Multiple Prime Contractor. The Owner, Architect and the Construction Manager shall not be parties to such suit. The Contractor waives and relinquishes any right and claim as against the Owner, to the extent such claim is caused, or contributed to, by a Multiple Prime Contractor or its subcontractors of any tier.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Tests, inspections and approvals of portions of the Contractor's Work required by the Drawings or Specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall arrange for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

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

§ 13.4.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.4.1, the Construction Manager or Architect shall, upon written authorization from the Owner, instruct the Contractor to arrange for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If such procedures for testing, inspection or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense, including the cost of retesting for verification of compliance if necessary until the Architect certifies that the Work in question does comply with the requirements of the Contract Documents, and none of such costs shall be included in computing the Contract Sum.

§ 13.4.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 Any material to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and/or workmanship do not conform to the Specification requirements.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the legal rate as required in General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims

§ 13.6.1 No action or proceeding shall lie or be maintained by the Contractor, nor anyone claiming under or through the Contractor, against the Owner upon any claim arising out of or based on the Agreement or the Contract Documents or by reason of any act or omission or requirements relating to the giving of notices and information, unless such action or proceeding shall be commenced within one (1) year after submission to the Owner of the final Application for Payment. As to a claim based upon money required to be retained for any period after the date of the final Application for Payment, such action must be commenced within six (6) months after such money becomes due and payable under the terms of the Contract. Notwithstanding, if the Contract is terminated by the Owner, any action or proceeding by the Contractor must be commenced within six (6) months after the date of such termination. The Contractor's acceptance of final payment shall constitute a release of all claims against the Owner. This provision shall not relieve the Contractor of the obligation to comply with the provisions of the law relating to notices of claim.

§ 13.6.2 Acts or failures to act occurring during the construction of the Project or following the issuance of the final certificate for payment, which give rise to a cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor, whichever occurs last.

§ 13.7 No Oral Waiver or Constructive Changes

The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by the Owner. No person is authorized on behalf of the Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve the Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

§ 13.8 Notices Regarding Liens

The Contractor shall provide to the Owner copies of all notices of any type regarding liens received from Subcontractors, Sub-subcontractors, or suppliers to the Contractor.

§ 13.9 Wages Rates

The Contractor shall, and cause its Subcontractors to, comply with prevailing wage rate determinations as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this Project are included in the Project Manual.

§ 13.10 General Provisions

Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.11 Manufacturer's and Trade Standards

§ 13.11.1 Whenever any manufacturer of material utilized in the Project issues recommended fabrication, installation, erection, and/or application standards or instructions, such standards or instructions shall be strictly followed in the performance of the Work, except as specified otherwise.

§ 13.11.2 Whenever any trade, organization, institution, utility company, code group, society, association and governing board standard, or requirement of specification is adopted by reference in the Contract Documents, all Work related thereto shall be performed in strict accord with the referenced edition thereof and amendments thereto, except where a higher standard is specifically required by the Contract Documents.

§ 13.11.3 The Contractor shall take full responsibility for failure of materials, devices, equipment, systems, and finishes not fabricated, installed, erected, or applied in accord with the requirements of this Section and shall remove, replace, repair or correct any such failures or deficiencies promptly upon notification by the Owner or Architect.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or
- .3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4 and 9.5, or because the Owner has not made payment after 14 days written notice of such failure to make payment provided that such failure is not due to a disputed amount, and except to the extent the Owner is excused from timely making all or part of any payment on a Certificate for Payment as per any other provisions of the Contract Documents.

Notwithstanding the preceding or anything else in the Contract Documents, the Contractor shall not cease or delay the progress of the Work for any reason other than one set forth in Section 9.7.1, it being agreed that monetary damages shall be an adequate remedy for the Contractor for any breach of this Agreement or the Contract Documents by the Owner.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon 30 days' written notice and opportunity to cure to the Owner, terminate the Contract and recover from the Owner payment for such Work properly performed for which it has not otherwise been compensated, but in no event shall the Owner be liable to the Contractor for any prospective loss, including, but not limited to, termination expenses, loss of anticipated profits, impact damages, unabsorbed overhead, or the like. Notwithstanding the foregoing, any such payments to the Contractor shall be less any setoffs to which the Owner may be entitled as per any other provision of the Contract Documents.

§ 14.1.4 If the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon 30 additional days' written notice to the Owner, Construction Manager and Architect (during which the Owner shall have the right and opportunity to cure), terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
- .2 fails to make payment to Subcontractors or Suppliers for materials or labor in accordance with the respective agreements between the Contractor and its Subcontractors or Suppliers;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority, or its health and safety plan;
- .4 otherwise is guilty of substantial breach of or default under a provision of the Contract Documents;
- .5 cannot complete the Work within the Contract Time or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the Owner's opinion, attributable to conditions within the Contractor's control;
- .6 breaches any warranty made by the Contractor under or pursuant to the Contract Documents;
- .7 is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the Work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders;

- .8 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;
- .9 refuses to proceed with the Work or extra work when and as directed by the Owner, Construction Manager or Architect;
- .10 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than 10 days, except as permitted under the Contract Documents;
- .11 fails or neglects to complete the Work within the Contract Time or in accordance with the Construction Schedule;
- .12 refuses or fails to correct deficient Work performed by it;
- .13 the Contractor's progress of the Work is such that the Owner reasonably believes that the Contractor shall not be able to achieve Substantial Completion by the Substantial Completion Date and the Contractor has not delivered and implemented a recovery plan required under the Contract or has not recovered the schedule sufficient to meet the respective Contract Time requirements as required by written notice to the Contractor by the Owner; or
- .14 disregards the instructions of the Construction Manager, Architect or Owner (when such instructions are based on the requirements of the Contract Documents).

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§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' written notice, terminate employment of the Contractor at the expiration of such seven (7) day period, and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and take possession of materials stored off-site by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site, and also such subcontractors as it may deem advisable, or if may call upon the Contractor's surety at its own expense to do so. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work. Such accounting shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 In the event that the Owner declared the Contractor in default of the Work or any part of the Work, the Contractor, in addition to any other liability to the Owner hereunder or otherwise provided for or allowed by law, shall be liable to the Owner for any costs it incurs for additional architectural, engineering and construction administration services necessary, in its opinion, because of the default and the total amount of other damages incurred by the Owner from the date when the Work should have been completed by the Contractor in accordance with the terms hereof to the date of actual completion of the Work, both of which items shall be considered as costs incurred by the Owner in completing the Work and the amount of which may be charged against and deducted out of such monies as would have been payable to the Contractor or its surety if the Work had been completed without a default. If the costs of finishing the Work exceed the unpaid Contract 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, and this obligation for payment shall survive termination of the Contract.

§ 14.2.4.1 The costs of finishing the Work also include, without limitation, all reasonable attorneys' fees incurred in responding to the default and enforcing the Owner's rights under the Contract Documents, additional title costs, insurance, additional interest because of any delay in completing the Work, loss of State Building Aid, and all other direct and indirect and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein. In addition, the Owner shall have the right to recover all costs, including attorneys' fees, incurred by the Owner in enforcing its rights and remedies under this Section 14.2, including costs and attorneys' fees incurred in any dispute resolution proceeding.

§14.2.4.2 It is recognized that: (1) if an order for relief is entered on behalf of Contractor pursuant to Title 11 of the United States Code, (2) if any other similar order is entered under any other debtor relief laws, (3) if Contractor

makes a general assignment for the benefit of its creditors, (4) if a receiver is appointed for the benefit of its creditors, or (5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract. Accordingly, it is agreed that upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract. Failure to comply with such request within ten (10) days of delivery of the request, or Owner's determination that the assurances are not adequate, shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.4 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be back charged against the Contract Sum.

§ 14.2.5 If the Owner wrongfully terminates the Contract for cause, the rights, remedies and obligations of the parties will be the same as if the Owner had terminated the Contract for convenience under Section 14.4.

§ 14.2.6 In the event that the Contractor, or the Contractor's surety, challenges the Owner's termination of the Contract for cause, and the Owner prevails in litigation in connection with such challenge, whether initiated by the Owner or by the Contractor or the Contractor's surety, the Owner shall be entitled to its costs, including reasonable attorney's fees, incurred as a result of such litigation, as part of any judgment against the Contractor or the Contractor's surety. Such costs, including reasonable attorney's fees, shall be deemed a cost of finishing the Work.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine. The Owner shall incur no liability by reason of such suspension, delay, or interruption except that the Contractor may request an extension of its time to complete its Work in accordance with Article 8 hereof.

§ 14.3.2 The Contract Time shall be adjusted for increases in time caused by suspension, delay or interruption as described in Section 14.3.1. No adjustment shall be made to the extent:

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

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the whole or any portion of the Contract for the Owner's convenience and without cause upon not less than seven (7) days' written notice to the Contractor. Notwithstanding any other provision to the contrary in the Contract, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor or the Work by giving written notice to the Contractor. This termination for convenience of the Owner provision allows and authorizes the Owner to terminate this Contract at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion. Termination by the Owner under this Section shall be by Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall immediately and in accordance with instructions from the Owner:

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
- .4 proceed to complete the performance of the Work required under portions of the Contract not terminated, if any.

§ 14.4.3 Upon receipt of written notice of the Owner's exercise of such termination, the Contractor shall, as the Contractor's sole and exclusive remedy, be paid for the Work properly executed in accordance with the Contract Documents prior to the effective date of termination and for items properly fabricated off-site, delivered and stored in accordance with the Owner's instructions or the Contract Documents before such effective date. The Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. The Contractor shall be entitled to no other payment and waives any claim for damages including, but not limited to, lost profits, any prospective loss,

underutilization of personnel or equipment, unabsorbed overhead, and any and all items of consequential loss or damage. The Owner shall be entitled to credit against any payment to be made to the Contractor pursuant to this Section 14.4 the following: (1) payments previously made to the Contractor for the terminated portion of the Work; (2) claims which the Owner has against the Contractor under the Contract Documents; and (3) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor, the cost of which is included in the Contract Sum. Notwithstanding the foregoing, in the event of a termination under Section 14.4.1 prior to the issuance of a Notice to Proceed, the Contractor shall not be entitled to any compensation whatsoever.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by 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. Neither a Request for Information, nor a Construction Change Directive, nor a Change Order, nor a reservation of rights, nor minutes of a meeting, nor a daily report, nor any log entry, nor an Owner’s request for or the Contractor’s response to a Change Order proposal, nor notice of a potential or future claim shall constitute a Claim.

§ 15.1.2 Time Limits on Claims

§ 15.1.2.1 Claims by the Contractor must be initiated by written notice to the Owner and the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier.

§ 15.1.2.2 Written notice shall contain a heading stating “Notice of Claim” to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following: (1) a clear statement of claim matter, including background and chronology; (2) documentation in support of claim matter; (3) documentation in support of claimed damages; and (4) certification by responsible officer of claimant.

§ 15.1.2.3 The Owner shall not be liable to any Contractor or Subcontractor for damages caused by any breach of Contract, delay in performance or other act of neglect by other Contractors or Subcontractors having Contracts for performance of any portion of work.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor must be initiated by written notice to the Owner and to the Architect with a copy sent to the Construction Manager within the time limits set forth in Section 15.1.2.1 above. The purpose of the written notice is to give the Owner prompt opportunity: (a) to cancel or revise orders or directions, change plans, mitigate or remedy circumstances giving rise to the Claim or to take other action that may be desirable; (b) to monitor and verify the facts and circumstances as they occur; and (c) to verify any costs and expenses claimed by the Contractor contemporaneously as they are incurred. Written notice is required whether or not the Owner, Construction Manager or Architect is aware of the facts or circumstances that constitute the basis for the Contractor’s Claim, and no action or conduct of the Owner, Construction Manager, Architect or any other person will be regarded as a waiver of such notice requirement except only a written statement to such effect signed by the Owner. Failure of the Contractor to give written notice as required by this Section shall be deemed conclusively to be a waiver and release of any Claim, and such written notice shall be a condition precedent to the Contractor’s right to make any Claim arising out of, under or in connection with the Contract or its performance of the Work.

§ 15.1.3.2 Written notice shall contain a heading stating “Notice of Claim” to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following: (1) a clear statement of the claim, including background and chronology; (2) documentation in support of the claim; (3) documentation in support of claimed damages; and (4) certification by responsible officer of the Contractor. The responsibility to substantiate Claims shall rest with the Contractor. An additional Claim arising from the same occurrence or condition made after the Initial Claim has been implemented by Change Order shall not be considered.

§ 15.1.3.3 The Contractor agrees that it has and will make no claim for damages against the Owner by reason of any act or failure to act by any other Contractor, Separate Contractor or Subcontractors having contracts for performance of any portion of work of the Project or in connection with the Owner’s, Architect’s or Construction Manager’s acts or omissions to act in connection with such other Contractors, Separate Contractors or Subcontractors.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim by the Contractor, except as otherwise agreed in writing or as provided in Section 9.7, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents; provided, however, that the Contractor shall use its best efforts to furnish the Architect and Owner, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Architect and the Owner in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3. The Contractor agrees that an express condition precedent to the Contractor's entitlement to any increase in the Contract Sum shall be full and complete compliance to the satisfaction of the Owner with the requirements of Article 15. The Contractor acknowledges the no damages for delay provisions set forth in Sections 8.3.2 and 15.1.6.1.4 hereof.

§ 15.1.5.1 The Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time if:

- .1 The Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Sum and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or
- .2 The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for the Contractor prior to Contractor's making such final commitment;
- .3 The Contractor failed to give the written notice within the time and as required by Section 15.1.2; or
- .4 If the Owner and the Contractor are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Sum or Contract Times, a claim may be made therefore as provided in Article 15. However, the Owner, Construction Manager, and Architect shall not be liable to the Contractor for any claims, costs, losses or damages sustained by the Contractor on or in connection with any other project or anticipated project.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Sections 15.1.2 and 15.1.3 shall be given. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.1.1 An application for extension of time must set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner, Construction Manager or Architect may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim for an increase in the Contract Time.

§ 15.1.6.1.2 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6.1.3 The Contractor agrees that an express condition precedent to the Contractor's entitlement to any extension of the Contract Time shall be full and complete compliance to the satisfaction of the Owner with the requirements of Articles 8 and 15.

§ 15.1.6.1.4 The Owner shall not be liable to the Contractor or any of its Subcontractor for claims, impact costs, extended general conditions, unabsorbed overhead or delay damages of any nature caused by or arising out of delay, disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its Architect or Construction Manager, and lack of coordination or scheduling, cumulative impact of multiple change orders, errors or omissions in the design of the Project, delay and other

performance impacts. The sole remedy against the Owner for such delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except only in the case of the Owner's failure to provide access to the site of the Work such that the Contractor is wholly unable to perform the Work, which shall be the sole and exclusive exception to the no-damages-for-delay provision contained herein, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs, extended general conditions, directions given or not given by the Owner, Construction Manager, or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or the Construction Manager's or Architect's review of shop drawings and requests for instructions; errors or omissions in the design of the Project; or, on account of any delay, disruption, interference, impedance, inefficiency, lack of productivity, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect or any other Contractor or Separate Contractor on the Project, whether or not the delays or their causes or their length were foreseeable or contemplated by the parties when they entered into the Contract. The Contractor agrees that its sole right and remedy therefore shall be an extension of the Contract Time, if appropriate. It is emphasized that no monetary recovery may be obtained by the Contractor for delay against the Owner, Construction Manager, Architect, other Contractor or Separate Contractor based on any reason and that the Contractor's sole remedy, if appropriate, is additional time.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction. In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor waives any and all claims for consequential damages of any kind and nature arising out of or relating to this Contract. This waiver includes, without limitation, damages incurred by the Contractor for principal office expenses including compensation for personnel stationed there, unabsorbed overhead, for losses of financing, business and reputation, and loss of profit and anticipated profit. This waiver of consequential damages shall survive termination of the Contract.

§ 15.2 Initial Decision

§ 15.2.1 Claims by the Contractor, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims by the Contractor excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to binding dispute resolution of any Claim. If an initial decision has not been rendered within 30 days after the Contractor's Claim has been referred to the Initial Decision Maker, the Contractor may proceed with binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims by the Contractor and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims by the Contractor, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim by the Contractor or to furnish additional supporting data, such party shall respond, within 10 days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be

furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim by the Contractor in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim by the Contractor, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to binding dispute resolution.

§ 15.2.6 Intentionally omitted.

§ 15.2.6.1 Intentionally omitted.

§ 15.2.7 Intentionally omitted.

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§ 15.2.8 If a Claim by the Contractor relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Dispute Resolution

§ 15.3.1 At the election of the Owner, the Owner and Contractor will attempt in good faith to resolve any controversy or claim arising out of or relating to the Contract, its breach, termination or validity through non-binding mediation and otherwise as set forth in this Section. Unless otherwise agreed, any mediation shall take place at the location of the Project.

§ 15.3.2 Should the Contractor seek to pursue any claim subject to this Section 15.3, the Contractor shall make a written demand to the Owner requesting that the Owner elect whether or not mediation is required. The written demand shall expressly reference this Section 15.3 and be addressed via Certified Mail, Return Receipt Requested, to the Superintendent of Schools for the Owner. The Owner shall respond in writing. If a writing is not post marked to, or otherwise received by, the Contractor within 15 business days of receipt by the Owner of such demand relating to mediation, the Owner shall be deemed to have elected to forgo mediation.

§ 15.3.3 If the controversy or claim has not been resolved pursuant to the mediation procedure within 60 days of the commencement of such procedure, or if the Owner elects not to participate in mediation, any further proceedings shall be via litigation, which litigation shall be venued exclusively in New York Supreme Court, County of Westchester.

§ 15.3.4 Wherever reference is made to arbitration in the Contract Documents, such reference shall be changed to refer to litigation.

§ 15.3.5 The Contractor shall carry on the Work and maintain its schedule during any proceeding under this article 15.

§ 15.3.6 The laws of the State of New York without reference to its conflicts of the law principles shall govern the Contract.

§ 15.3.7 In no event may a demand for mediation be made, or litigation filed, after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statutes of limitations.

ARTICLE 16 SPECIAL CONDITIONS

§ 16.1 Equal Opportunity

§ 16.1.1 The Contractor shall maintain policies for equal employment opportunity for construction employment. During performance of the Agreement, the Contractor agrees as follows:

§ 16.1.2 The Contractor and its Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that all applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following:

employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship and on-the-job training.

§ 16.1.3 The Contractor will post and keep posted in conspicuous places, for employees and applicants for employment, notices obtained by the Contractor from the New York State Division of Human Rights as set forth in the General Regulations of that Division at 9 NYCRR 466.1(a), such conspicuous places to be as defined in 9 NYCRR 466.1(b), and such other postings as that Division may require with respect to New York State's laws, codes, rules, and regulations governing discrimination in employment.

§ 16.1.4 The Contractor will state in all solicitations or advertisements for employees placed by, or on behalf, of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.

§ 16.1.5 The Contractor will comply with provisions of Sections 290-299 of the Executive Law and with the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commissioner of Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to the Contractor's books, records and accounts by the Owner, the State Commissioner of Human Rights, the Attorney General and the Industrial Commissioner for the purposes of investigation to ascertain compliance with these nondiscrimination clauses and such sections of the Executive Law and Civil Rights Law.

§ 16.1.6 The Contractor will send to each labor union, or representatives of workers, with which it has, or is bound by a collective bargaining or other Agreement or understanding notices obtained from the State Commissioner of Human Rights, advising such Labor Union or representative of the Contractor's Agreement under requirements of this Article. If the Contractor was directed to do so by Owner as part of the Bid, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the Owner and State Commissioner of Human Rights of such failure or refusal.

§ 16.1.7 The Agreement may be forthwith canceled, terminated or suspended in whole, or in part, by Owner upon the basis of a finding made by the State Division of Human Rights, that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future Contracts made by, or in behalf of, the State, or Authority or Agency of the State, or Housing Authority or an Urban Renewal Agency, or Contracts requiring the approval of the Commissioner of Housing and Community Renewal, until it has satisfied the State Division of Human Rights, that it has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such findings shall be made by the State Division of Human Rights after conciliation efforts by the Division have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Division, notice thereof has been given to the Contractor, and an opportunity has been afforded by the Contractor to be heard publicly in accordance with the Executive Law. Such sanctions may be imposed and remedies invoked immediately of, or in addition to sanction in remedies otherwise provided by law. If the Agreement is canceled or terminated under provisions of this Article, in addition to other rights of Owner provided in the Agreement upon its breach by the Contractor, the Contractor will hold Owner harmless against any additional expenses or costs incurred by Owner in completing the work or in purchasing the services, materials, equipment or supplies contemplated by Agreement and Owner may withhold payments from the Contractor in an amount sufficient for this purpose and recourse may be had against authority on the Performance Bond if necessary.

§ 16.1.8 The Contractor will include the provisions of this Article in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontractor or purchase order as the State Division of Human Rights or the Owner may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or a vendor, as a result of such direction by the State Division of Human Rights, the Contractor shall promptly so notify the Owner and the Attorney General, requesting the Attorney General to intervene and protect the interests of the State of New York.

§ 16.2 Waiver of Immunity

§ 16.2.1 The Contractor hereby agrees to the provisions of Paragraph 139-a and 139-b of the New York State Finance Law and Section 103-a of the New York General Municipal Law, which require that upon the refusal of a person, when called before a grand jury, head of a State department, temporary State commission or other State agency, or the organized crime task force in the Department of Law, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the State, any political subdivision thereof, a public authority or with any public department, agency or official of the State or of any political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

§ 16.2.1.1 Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with New York State or any public department, agency or official thereof for goods, work or services, for a period of five years after such refusal.

§ 16.2.1.2 Any and all contracts made with the State of New York, or any public department, agency or official thereof since the effective date of this law, by such person, and by an firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the State of New York without incurring any penalty or damages on account of such cancellation or termination, but any moneys owing by the State of New York for goods delivered or work done prior to the cancellation or termination shall be paid.

§ 16.3 Non-Collusive Clause as Required by NYS General Municipal Law Section 103-d

§ 16.3.1 Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

§ 16.3.2 By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief, the following:

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

§ 16.3.2.2 Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor.

§ 16.3.2.3 No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

§ 16.3.3 A bid shall not be considered for award nor shall any award be made where requirements of this Article have not been complied with; provided however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which set forth in detail the reasons therefor. Where requirements of this Article 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 agent of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

§ 16.3.4 The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed, or pending, publication of new or revised price list for such items, or (c) has sold the same items to other customers at the same prices being bids, does not constitute a disclosure within the meaning of this Article.

§ 16.3.5 Any bid hereafter made to any political subdivision of the state or any public department, agency official thereof by a corporate bidder for work or services performed or to be performed or good sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of this section, shall be deemed to have been authorized shall be deemed to in-

clude 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.

§ 16.4 Assignment of Public Contracts

As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the same, or of his right title, or interest therein, or his power to execute such contract or any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract. If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified in subdivision one of this section, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged from any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

§ 16.5 Fingerprinting

Pursuant to the Safe Schools Against Violence in Education Act (“SAVE” legislation) and Part 87 of the Regulations of the Commissioner of Education, any individual who, as a result of their work on this capital project, will move (or migrate) in and out of student occupied areas for more than five (5) days a year, must be fingerprinted. The Contractor shall be responsible to ensure that it (and its employees) are in full compliance with the fingerprinting provisions New York’s SAVE Legislation and Part 87 of the Regulations of the Commissioner of Education at the Contractor’s sole cost and expense.

ARTICLE 17 NEW YORK STATE LABOR LAW REQUIREMENTS

§ 17.1 Working Hours

§ 17.1.1 The Contractor specifically agrees as required by the New York State Labor Law (“Labor Law”), Sections 220 and 220-d, as amended, that:

- .1 No laborer, worker, or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the work included in the Contract Documents shall be permitted or required to work more than eight hours in any one calendar day or more than five (5) days in any one week, except to the extent permitted in the case of extraordinary emergencies described in the Labor Law.
- .2 The wages to be paid to each laborer, worker, or mechanic in the employ of the Contractor, Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents for a legal day’s work shall be not less than the prevailing rate of wages as defined by the Labor Law.
- .3 Each laborer, workman or mechanic employed by the Contractor, a Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents shall be provided the supplements required by Article 8 of the Labor Law.
- .4 The minimum hourly rate of wage to be paid shall be not less than that stated in the General Conditions, and shall be as designated by the industrial Commissioner.
- .5 The Contractor’s and any Subcontractor’s or other person’s filing of payrolls in a manner prescribed by subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to the to the Owner’s payment of any sums due and owing to the Contractor, Subcontractor or other party for work done on or with respect to the Project.

§ 17.2 Wage Rates

§ 17.2.1 The Contractor specifically agrees, as required by the Labor Law, that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

- .1 the prevailing wage rates as provided in Labor Law Section 220(3) as amended, or,
- .2 the minimum wage rates as provided in Labor Law Section 220-d, as amended.

§ 17.2.2 The Contractor shall comply with Prevailing Wage Rates as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this project are included in the Project

Manual as part of the Contract Documents. The Contractor is responsible to regularly review “Prevailing Wage Schedules/Updates” available on the “Prevailing Wage/Public Work” link on State of New York Department of Labor “Business in New York” web page (www.labor.state.ny.gov) to identify and implement any applicable changes to Prevailing Wage Rates during the Project.

§ 17.2.3 The Contractor shall comply with all the requirements of the Labor Law Section 220-a, as amended, regarding mandatory submission of certified payroll records, which shall be included with each application for payment.

§ 17.3 Anti-Discrimination

§ 17.3.1 The Contractor specifically agrees, as required by the provisions of Section 220-e of the Labor Law, as amended, that:

- 1 In the hiring of employees for the performance of work under the Contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall be reason of race, creed, color, sexual orientation, or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;
- 2 No contractor, subcontractor, nor any person on its behalf, shall in any manner, discriminate or intimidate any employee hired for the performance of work under the contact on account of race, creed, color, sexual orientation, or national origin.
- 3 There may be deducted from the amount payable to the Contractor by the Owner under the contract a penalty at fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; and
- 4 The Contract may be canceled or terminated by the Owner, and all monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

ARTICLE 18 GENERAL MUNICIPAL LAW REQUIREMENTS OF THE STATE OF NEW YORK

§ 18.1 Payment of Contractors and Subcontractors

§ 18.1.1 The Contractor specifically agrees it is bound by Section 106-b of the New York General Municipal Law.

ARTICLE 19 SPECIFIC CONFORMANCE TO THE LAWS OF THE STATE OF NEW YORK

§ 19.1 Statutory Requirements

§ 19.1.1 The parties agree that each is bound to the provisions of the laws of the State of New York governing bidding and contracting for public improvement projects, including but not limited to applicable provisions of the General Obligations Law, Labor Law, and General Municipal Law. To the extent any provisions in the Contract Documents conflict with any provisions of New York Law, the statutory provisions shall prevail and the conflicting provisions in the Contract Documents shall be deemed to conform to the statutory provisions.

§ 19.1.2 To the extent the laws of the State of New York governing bidding and contracting for public improvement projects mandate inclusion of specific terms in contracts for such improvements, but which are not already included in these General Conditions, such terms shall be deemed and hereby are incorporated into these General Conditions.



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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

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____ *(Corporate Seal)*

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ *(Corporate Seal)*

Signature: _____
Name and Title: _____
Address: _____



AIA[®] Document A312[™] – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

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.

§ 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.

Init.

§ 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.

Init.

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

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

Init.

/

Application and Certificate for Payment Instructions

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.

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

FROM: VIA CONSTRUCTION PERIOD TO:
CONTRACTOR: MANAGER: CONTRACT DATE:
CONTRACT FOR: General Construction VIA ARCHITECT: PROJECT NOS: / /

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 \$ 0.00
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 \$ 0.00
(Line 4 minus Line 5 Total)
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: _____ Date: _____
By: _____
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.



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

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.

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

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

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 on the 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. 08-06-24

SECTION 00 63 10 – INSURANCE CERTIFICATION FORM

Your insurance representative must complete the form below in order to be considered for the award of this bid or project, and it is important that you complete the Bidder's Acknowledgement section of this form. **Please note that this Insurance Certification form must accompany your bid submission in order for your bid to be considered.**

Insurance Representative's Acknowledgement:

We have reviewed the insurance requirements set forth in AIA A232-2019 Article 11 of the General Conditions of the Contract for Construction and are capable of providing such insurance to our insured in accordance with such requirements in the event the contract is awarded to our insured and provided our insured pays the appropriate premium.

Insurance Representative:

Address:

Are you an agent for the companies providing the coverage? Yes_____No_____

Date: _____

Insurance Representative Signature

Bidder's Acknowledgement:

I acknowledge that I have received the insurance requirements of this bid and have considered the costs, if any, of procuring the required insurance and will be able to supply the insurance required in accordance with the bid, if it is awarded. I understand that this Insurance Certification form must be submitted with my bid and my inability to provide the required insurances may result in the rejection of my bid, and the Bedford Central School District may award the contract to the next lowest/responsive bidder.

Firm name: _____

Address: _____

Date: _____

Bidder's Signature



AIA[®] Document G705[™] – 2001

List of Subcontractors

PROJECT: *(Name and address)*

DATE:

TO ARCHITECT: *(Name and address)*

BBS Architects, Landscape Architects & Engineers, PC
244 E Main St
Patchogue, NY 11772

ARCHITECT'S PROJECT NUMBER:

FROM CONTRACTOR: *(Name and address)*

CONTRACTOR'S PROJECT NUMBER:

(List Subcontractors and others proposed to be employed on the above Project as required by the bidding documents.)

Work/Firm Name

Address/Phone

Superintendent



AIA[®] Document G706[™] – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER:

ARCHITECT:

CONTRACTOR:

SURETY:

OTHER:

TO OWNER: *(Name and address)*

CONTRACT FOR:

CONTRACT DATED:

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

CONTRACTOR: *(Name and address)*

BY: _____

(Signature of authorized representative)

(Printed name and title)

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).

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA[®] Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT
NUMBER:

OWNER:

ARCHITECT:

CONTRACTOR:

TO OWNER: *(Name and address)*

CONTRACT FOR:
CONTRACT DATED:

SURETY:

OTHER:

STATE OF:
COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



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)

on bond of
(Insert name and address of Contractor)

, SURETY,

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

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

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)

(Printed name and title)

Attest:
(Seal):



AIA[®] Document G707A[™] – 1994

Consent of Surety to Reduction in or Partial Release of Retainage

PROJECT: <i>(Name and address)</i>	ARCHITECT'S PROJECT NUMBER:	OWNER: <input type="checkbox"/>
	CONTRACT FOR:	ARCHITECT: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT DATED:	CONTRACTOR: <input type="checkbox"/>
		SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

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

on bond of
(Insert name and address of Contractor)

, SURETY,

hereby approves the reduction in or partial release of retainage to the Contractor as follows:

, CONTRACTOR,

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)

as set forth in said Surety's bond.

, OWNER,

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)

(Printed name and title)

Attest:
(Seal):



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Bedford CSD
John Prentice
244 E. Main Street
Patchogue NY 11776

Schedule Year 2025 through 2026
Date Requested 01/08/2026
PRC# 2026000248

Location Bedford CSD - Fox Lane Campus
Project ID# 23-131k
Project Type Bond Improvements - Maintenance Bldg.

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 Rate Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2025 through June 2026. 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.

Contractor Registry

Effective December 30, 2024 all contractors and subcontractors submitting bids or performing construction work on public work projects, or private projects covered by Article 8 of the Labor Law, are required to register with the New York State Department of Labor (NYSDOL) under Labor Law Section 220-i. To register, contractors and subcontractors must submit an application through NYSDOL's Contractor Registry portal which is available through the agency's Management System for Protecting Worker Rights (MPWR) <https://mpwr-public.labor.ny.gov/en/login>.

For additional information, please visit [online](#).

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.

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 12226; 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

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, contemporaneous, 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 NYS DOL 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 12226 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

Bedford CSD
John Prentice
244 E. Main Street
Patchogue NY 11776

Schedule Year 2025 through 2026
Date Requested 01/08/2026
PRC# 2026000248

Location Bedford CSD - Fox Lane Campus
Project ID# 23-131k
Project Type Bond Improvements - Maintenance Bldg.

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: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

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

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 12226

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.

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)



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.

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

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/bureau-public-work>



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) 568-5287		

* 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 or 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 requirements 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.

*Contractor Registry (LL 220-I): Effective December 30th, 2024

Labor Law Section 220-i(6) prohibits contractors from bidding on public work and prohibits both contractors and subcontractors from commencing work on private and public projects subject to prevailing wage requirements. This section requires contractors to submit their Certificate of Registration with their bid materials. Each Certificate of Registration will have a unique registration number. Failure to provide proof of registration, as required by Labor Law Section 220-i, as a minimum qualification will result in the bidder being deemed non-responsive. There is a public database of registered contractors and subcontractors available online at data.ny.gov to confirm registration validity. For additional information on how to register and the requirements, visit <https://dol.ny.gov/public-work-contractor-and-subcontractor-registry-landing>

*Electronic Certified Payroll (LL 220-J): Effective December 31st, 2025

Effective December 31, 2025, all contractors and subcontractors who perform public work, or covered private work subject to the prevailing wage, will be required to submit certified payrolls electronically to the Bureau of Public Work and Prevailing Wage Enforcement. Additional information about the electronic certified payroll submission system will be made available on the Department's Website at <https://dol.ny.gov/Electronic-Payroll>

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least three (3) years from the projects date of completion. Additionally, 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, contemporaneous, 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.

Payroll records and transcripts are required to be kept on site during all the time that work under that contract is being performed.

NOTE: For more detailed information regarding Article 9 prevailing wage contracts, please refer to "General Provisions of Laws Covering Workers on Article 9 Public Work Building Service Contracts".

If you have any questions concerning the attached schedule or would like additional information, please write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

OR

Contact the nearest BUREAU of PUBLIC WORK District Office

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

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.

Shift Work

If the timeline of the contract requires shift work be performed to meet deadlines, the BPWE will enforce the shift work rate as the required rate on the project whether or not shift work is specifically addressed in the contract.

Paid Prenatal Leave

Every employer shall be required to provide to its employees twenty hours of paid prenatal personal leave during any fifty-two week calendar period. Paid prenatal personal leave shall mean leave taken for the health care services received by an employee during their pregnancy or related to such pregnancy, including physical examinations, medical procedures, monitoring and testing, and discussions with a healthcare provider related to the pregnancy. Paid prenatal personal leave may be taken in hourly increments. Benefits for paid prenatal personal leave shall be paid in hourly installments. Employees shall receive compensation at the employee's regular rate of pay, or the applicable minimum wage established by the labor law, whichever is greater, for the use of Paid Prenatal leave.

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 12226

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 **01/01/2026**

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:	07/01/2025	01/01/2026
Boilermaker	\$ 68.88	\$ 70.38
Repairs & Renovations	68.88	70.38

Repairs & Renovation: Includes Repairing, Renovating and Replacement of parts to an existing unit(s).

SUPPLEMENTAL BENEFITS

Per Hour:

Boilermaker	33.5% of Hourly
Repair & Renovations	Wage Paid + \$26.85

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

OVERTIME PAY
 See (*B, O, **U) on OVERTIME PAGE
 Note:* Includes 9th & 10th hours, double for 11th or more.
 ** Labor Day ONLY, if worked.

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY
 Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

REGISTERED APPRENTICES
 (1/2) Year Terms at the following percentage of Boilermaker's wage per hour:

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

SUPPLEMENTAL BENEFITS:

33.5% of Hourly Wage Paid Plus Amount Below:

1st	2nd	3rd	4th	5th	6th	7th
\$20.36	21.28	22.22	23.12	24.07	25.00	25.93

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Broadband **01/01/2026**

JOB DESCRIPTION Broadband **DISTRICT 4**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

PARTIAL COUNTIES
 Orange: Entire County except Village of Greenwood Lake, Village of Highland Falls, Town of Tuxedo, and Town of Patterson

WAGES

Per Hour:	07/01/2025	07/01/2026
Field Tech Install/Repair	\$ 53.97	\$ 55.59

"Broadband", "Broadband Service", or "Broadband Internet" means mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up internet access service.

For outside work (excluding installation on building construction/alteration/renovation projects), stopping at first point of attachment (demarcation), installing/maintaining/repairing broadband internet service.

Applies to projects receiving ConnectAll funding that are subject to New York State Labor Law §224-E.

SUPPLEMENTAL BENEFITS

Per Hour: \$ 23.54

OVERTIME PAY

See (B, K, *R) on OVERTIME PAGE
 Note: *Two and one half times the hourly rate after the 8th hour

HOLIDAY

Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
 Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

4-CWA-Dist1

Carpenter

01/01/2026

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2025

Piledriver \$ 61.59
 + 10.16*

Dockbuilder \$ 61.59
 + 10.16*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 46.48

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
\$ 27.98	\$ 33.58	\$ 41.96	\$ 50.35
+ 5.66*	+ 5.66*	+ 5.66*	+ 5.66*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental benefits per hour:

All Terms: \$ 33.03

8-1556 Db

Carpenter

01/01/2026

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2025

Carpet/Resilient
Floor Coverer \$ 59.05
+ 8.39*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS

Per hour: \$ 40.49

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
\$ 26.54	\$ 29.60	\$ 34.05	\$ 42.40
+ 2.00*	+ 2.54*	+ 3.00*	+ 3.94*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$ 15.84	\$ 16.95	\$ 20.29	\$ 21.35

8-2287

Carpenter

01/01/2026

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour: 07/01/2025

Marine Construction:

Marine Diver \$ 76.46
+ 10.16*

Marine Tender \$ 56.00
+ 10.16*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 46.48

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 13, 16, 18, 19, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year \$ 27.98
+ 5.66*

2nd year	33.58
	+ 5.66*
3rd year	41.96
	+ 5.66*
4th year	50.35
	+ 5.66*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits
 Per Hour:

All terms \$ 33.03

8-1456MC

Carpenter **01/01/2026**

JOB DESCRIPTION Carpenter **DISTRICT 8**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
 Per hour: 07/01/2025

Building	
Millwright	\$ 60.83
	+ 13.12*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS
 Per hour:

Millwright \$ 45.91

OVERTIME PAY
 See (B, E, Q) on OVERTIME PAGE

HOLIDAY
 Paid: See (18, 19) on HOLIDAY PAGE
 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.
\$ 32.74	\$ 38.39	\$ 44.04	\$ 55.34
+ 7.08*	+ 8.25*	+ 9.42*	+ 11.76*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental benefits per hour:
 One (1) year terms:

1st.	2nd.	3rd.	4th.
\$ 31.16	\$ 33.69	\$ 36.87	\$ 41.29

8-740.1

Carpenter **01/01/2026**

JOB DESCRIPTION Carpenter **DISTRICT 8**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
 Per Hour:
 07/01/2025

Timberman \$ 56.59

+ 10.42*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2025

\$ 45.79

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Overtime: See (5, 6, 11, 13, 25) on HOLIDAY PAGE

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
\$ 25.96	\$ 31.07	\$ 38.72	\$ 46.38
+ 5.71*	+ 5.71*	+ 5.71*	+ 5.71*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental benefits per hour:

All terms \$ 32.78

8-1556 Tm

Carpenter

01/01/2026

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: 07/01/2025

Core Drilling:

Driller \$ 47.88
+ 3.45*

Driller Helper

\$ 37.58
+ 3.45*

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 of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS

Per hour:

Driller and Helper \$ 31.04

OVERTIME PAY

See (B, G, P) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 13, 25) on HOLIDAY PAGE
 Overtime: See (5, 6, 13, 25) on HOLIDAY PAGE

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway **01/01/2026**

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT 11**

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

WAGES

WAGES:(per hour)
 Applies to CARPENTER BUILDING/HEAVY & HIGHWAY/TUNNEL:

	07/01/2025	07/01/2026
Base Wage	\$ 43.46 +\$6.66*	Additional \$ 1.25**

*For all hours paid straight or premium.
 **To be allocated at a later date.

SHIFT WORK

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 \$ 32.11

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
\$ 21.73	\$ 26.08	\$ 30.42	\$ 34.77
+3.84*	+3.84*	+3.84*	+3.84*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.76

11-279.1B/HH

Electrician **01/01/2026**

JOB DESCRIPTION Electrician **DISTRICT 9**

ENTIRE COUNTIES
 Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour: 07/01/2025 03/12/2026

Service Technician	\$ 38.40	\$ 39.45
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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:	\$ 22.76	\$ 23.33

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 **01/01/2026**

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour:	07/01/2025	01/01/2026
Electrician/A-Technician	\$ 58.75	\$ 58.75
Teledata	58.75	58.75

"M" rate for all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls.

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	\$ 61.09	\$ 61.09

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:

	07/01/2025	01/01/2026
1st term	\$ 16.50	\$ 17.00
2nd term	17.00	17.00
3rd term	19.00	19.00
4th term	21.00	21.00
MIJ 1-12 months	26.50	26.50
MIJ 13-18 months	30.00	30.00

Supplemental Benefits per hour:

	07/01/2025	01/01/2026
1st term	\$ 13.05	\$ 13.05
2nd term	15.89	15.89

3rd term	17.23	17.23
4th term	18.57	18.57
MIJ 1-12 months	15.83	15.83
MIJ 13-18 months	16.29	16.29

8-3/W

Electrician

01/01/2026

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour

	07/01/2025
Electrician -M	\$ 32.50
H - Telephone	32.50

"M" rate for all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls.

SUPPLEMENTAL BENEFITS

	07/01/2025
Electrician & H - Telephone	\$ 16.62

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

01/01/2026

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:

	07/01/2025	03/17/2026
Elevator Constructor	\$ 83.27	\$ 86.43
Modernization & Service/Repair	65.54	68.06

SUPPLEMENTAL BENEFITS

Per Hour:

Elevator Constructor	\$ 47.65	\$ 48.96
Modernization & Service/Repairs	46.47	47.73

OVERTIME PAY

Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, E5, P) 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:

6 MONTH TERMS:

1st Term*	2nd & 3rd Term*	4th & 5th Term	6th & 7th Term	8th & 9th Term
50%	50%	55%	65%	75%

* Note: 1st, 2nd, 3rd Terms are based on average of the Constructor, the Modernization and the Service/Repair wage.
 Terms 4 thru 9 Based on the Journeyman's wage of classification they are working in.

SUPPLEMENTAL BENEFITS:

	07/01/2025	03/17/2026
Elevator Constructor		
1st Term	\$ 0.00	\$ 0.00
2nd & 3rd Term	36.90	37.66
4th & 5th Term	37.99	38.80
6th & 7th Term	39.70	40.60
8th & 9th Term	41.40	42.39
Modernization & Service/Repair		
1st Term	\$ 0.00	0.00
2nd & 3rd Term	36.88	37.63
4th & 5th Term	37.58	38.37
6th & 7th Term	39.20	40.09
8th & 9th Term	40.83	41.81

4-1

Elevator Constructor **01/01/2026**

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

	07/01/2025	01/01/2026
Per Hour		
Mechanic	\$ 73.07	\$ 76.12
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

SUPPLEMENTAL BENEFITS

	07/01/2025	01/01/2026
Per hour		
Journeyworker/Helper	\$ 38.435*	\$ 38.985*

(*)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 **01/01/2026**

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:

	07/01/2025	11/01/2025
Glazier, Glass Tinting and Window Film	\$ 64.23	\$ 65.23
Scaffolding, including swing scaffold	69.23	70.23
*Mechanical Equipment	65.23	66.23
**Repair & Maintenance	31.71	32.44

*Mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under \$193,000.

SUPPLEMENTAL BENEFITS

Per hour:

Glazier, Glass Tinting Window Film, Scaffolding and Mechanical Equipment	\$ 43.03	\$ 43.88
Repair & Maintenance	25.12	25.37

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (5, 6, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

For 'Repair & Maintenance'

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:

	07/01/2025	11/01/2025
1st term	\$ 22.79	\$ 23.29
2nd term	31.15	31.71
3rd term	41.53	42.23
4th term	50.90	51.70

Supplemental Benefits:

(Per hour)

1st term	\$ 19.56	\$ 19.80
2nd term	27.85	28.31
3rd term	33.49	34.09
4th term	36.73	37.41

8-1087 (DC9 NYC)

Insulator - Heat & Frost **01/01/2026**

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2025
Insulator/Fire Stop Work*	\$ 62.42
Discomfort & Additional Training**	65.48

* 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 \$10 a day for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:	
Insulator/Fire Stop Journeyworker:	\$ 38.90
Discomfort & Additional Training:	\$ 40.94

OVERTIME PAY

See (B, E, E2, Q) 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	
\$ 33.91	\$ 39.61	\$ 45.31	\$ 51.02	
Discomfort & Additional Training Apprentices:				
1st	2nd	3rd	4th	
\$ 35.44	\$ 41.44	\$ 47.45	\$ 53.47	

Supplemental Benefits paid per hour:

Insulator Apprentices:	
1st term	\$ 19.81
2nd term	23.62
3rd term	27.44
4th term	31.26
Discomfort & Additional Training Apprentices:	
1st term	\$ 20.82
2nd term	24.85
3rd term	28.88
4th term	32.91

Ironworker **01/01/2026**

JOB DESCRIPTION Ironworker

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2025	01/01/2026
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Stone Derrickmen Rigger	\$ 76.86	\$ 77.82
Stone Handset Derrickman	74.38	75.67

SUPPLEMENTAL BENEFITS

Per hour:

Stone Derrickmen Rigger	\$ 47.34	\$ 48.02
Stone Handset Derrickman	46.51	47.01

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
07/01/2025	\$ 38.28	\$ 54.28	\$ 60.39	\$ 66.50
01/01/2026	\$ 38.91	\$ 55.02	\$ 61.21	\$ 67.39

Supplemental Benefits:

Per hour:

07/01/2025	23.84	35.82	35.82	35.82
01/01/2026	24.02	36.27	36.27	36.27

Stone Handset:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th
07/01/2025	\$ 36.69	\$ 52.22	\$ 58.10	\$ 63.99
01/01/2026	\$ 37.34	\$ 53.27	\$ 59.24	\$ 65.20

Supplemental Benefits:

Per hour:

07/01/2025	23.75	35.52	35.52	35.52
01/01/2026	24.00	35.77	35.77	35.77

9-197D/R

Ironworker

01/01/2026

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2025	01/01/2026
Ornamental	\$ 48.15	\$ 48.40
Chain Link Fence	48.15	48.40
Guide Rail	48.15	48.40

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:	\$ 68.17	\$ 69.04
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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

1 year terms at the following wages per hour:

	1st	2nd	3rd	4th
07/01/2025	\$ 25.98	\$ 28.45	\$ 30.80	\$ 34.39
01/01/2026	\$ 26.40	\$ 28.92	\$ 31.80	\$ 34.95

Supplemental Benefits per hour:

1st	2nd	3rd	4th
\$ 16.29	18.29	19.29	21.29

4-580-Or

Ironworker

01/01/2026

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

PER HOUR:

07/01/2025	01/01/2026
------------	------------

Ironworker:

Structural	\$ 58.95	\$ 59.20
Bridges		
Machinery		

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyman	\$ 92.60	\$ 94.11
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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

6 month terms at the following wages per hour:

	1st	2nd	3rd-6th
07/01/2025	\$ 30.61	\$ 31.21	\$ 31.82
01/01/2026	\$ 30.74	\$ 31.34	\$ 31.95

Supplemental Benefits

PER HOUR PAID: \$ 64.38

4-40/361-Str

Ironworker

01/01/2026

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: 07/01/2025

Reinforcing & Metal Lathing	\$ 57.00
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"Base Wage" 55.20**

** For OVERTIME/PREMIUM CALCULATION purposes only.

SUPPLEMENTAL BENEFITS

Per hour:
 Reinforcing & Metal Lathing \$ 46.27

OVERTIME PAY

See (B, E, Q, *X) on OVERTIME PAGE
 *Only \$23.50 per Hour for non worked hours

** OVERTIME/PREMIUMS are calculated on Reinforcing & Metal Lathing "Base Wage" then adding: \$ 1.80 per hour.

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half \$ 52.77
 Double Time 59.27

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

1st	2nd	3rd	4th
\$ 22.55	\$ 25.00	\$ 28.00	\$ 30.00
Base Wage:			
\$21.00*	\$23.20*	\$26.20*	\$28.20*

* "Base Wage" are utilized for PREMIUM/OVERTIME Calculations ONLY then adding:
 \$ 1.55 per hour for 1st Term
 \$ 1.80 per hour for all other terms.

SUPPLEMENTAL BENEFITS Per Hour:

1st	2nd	3rd	4th
\$ 18.17	\$ 18.22	\$ 17.22	\$ 17.22

4-46Reinf

Labourer - Building

01/01/2026

JOB DESCRIPTION Labourer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour 07/01/2025

Labourer \$ 44.05
 "Base Wage" \$ 43.95**

Labourer/Asbestos & Hazardous
 Materials Removal \$ 45.70*
 "Base Wage" \$ 45.60**

* 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.

** Overtime premiums are calculated using Labourer "Base Wage"

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: 07/01/2025

Journeyworker \$ 33.30

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
\$ 29.50	\$ 34.05	\$ 38.60	\$ 40.00

Supplemental Benefits per hour:

Apprentices

All terms \$ 24.60

8-235/B

Laborer - Heavy&Highway

01/01/2026

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) 07/01/2025

GROUP I	\$ 52.11*
GROUP II	50.71*
GROUP III	50.29*
GROUP IV	49.93*
GROUP V	49.56*
GROUP VIA	51.64*
Operator Qualified	
Gas Mechanic(A Mech)	62.51*
Operator Qualified	
Gas Mechanic(1st yr.)	56.11*
Flagperson	42.96*

*NOTE: To calculate overtime premiums, deduct \$0.12 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 off-shift and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

Per Hour \$ 29.13

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	2nd term	3rd term	4th term
1-1000hrs	1001-2000hrs	2001-3000hrs	3001-4000hrs
\$ 32.21	\$ 37.17	\$ 42.13	\$ 47.08

Supplemental Benefits per hour:

\$25.10

8-60H/H

Laborer - Tunnel

01/01/2026

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)

	07/01/2025	06/01/2026
		Additional
Class 1	\$ 58.55	\$ 2.75*
Class 2	60.70	2.75*
Class 4	67.10	2.75*
Class 5	51.40	2.75*

*To be allocated at a later date

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional \$ 3.00 an hour.

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 37.88
Benefit 2	54.01
Benefit 3	70.12

Benefit 1 applies to straight time hours, paid holidays not worked.

Benefit 2 applies to over 8 hours in a day (M-F) 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 01/01/2026

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.

Crane Operators: Operation of any type of crane on line projects.

Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on line projects.

Digging Machine Operator: All other digging equipment and augering on line projects.

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.

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.

-----Below rates applicable on all 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. Includes access matting for line work.

Per hour:	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A:				
Lineman, Tech, Welder	\$ 64.70	\$ 67.64	\$ 70.24	\$ 73.01
Crane, Crawler Backhoe	64.70	67.64	70.24	73.01
Cable Splicer-Pipe Type	71.17	74.40	77.26	80.31
Cert. Welder-Pipe Type	67.94	71.02	73.75	76.66
Group B:				
Digging Mach Operator	\$ 58.23	\$ 60.88	\$ 63.22	\$ 65.71
Group C:				
Tractor Trailer Driver	\$ 55.00	\$ 57.49	\$ 59.70	\$ 62.06
Groundman, Truck Driver	51.76	54.11	56.19	58.41
Equipment Mechanic	51.76	54.11	56.19	58.41
Group D:				
Flagger	\$ 35.59	\$ 37.20	\$ 38.63	\$ 40.16

Additional 3% per hour above regular rate for entire crew when a helicopter is used. This will increase to 5% on May 3, 2027.

SHIFT WORK

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%

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A	\$ 31.90*	\$ 32.90*	\$ 34.40*	\$ 35.90*
Group B	\$ 27.90*	\$ 28.90*	\$ 30.40*	\$ 31.90*
Group C	\$ 27.70*	\$ 28.50*	\$ 29.70*	\$ 30.90*
Group D	\$ 27.65*	\$ 28.40*	\$ 29.53*	\$ 30.66*

*Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE. NOTE: Double time for emergency work designated by the Dept. of Jurisdiction.

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, 15, 25) on HOLIDAY PAGE

Overtime See (5, 6, 8, 15, 25) on HOLIDAY PAGE

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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
All terms:	\$ 27.65*	\$ 28.40*	\$ 29.53*	\$ 30.66*

*Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata

01/01/2026

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

NOTE: Applies to all public work and covered private projects, including those receiving ConnectAll funding subject to LL 224-E, solicited prior to July 1, 2025. For all projects, excluding dial-up internet access service, solicited on or after July 1, 2025, please see BROADBAND

Per hour: 07/01/2025

Cable Splicer	\$ 40.81
Installer, Repairman	\$ 38.73
Teledata Lineman	\$ 38.73
Tech., Equip. Operator	\$ 38.73
Groundman/Flagger	\$ 20.53

For outside work, stopping at first point of attachment (demarcation).

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work, please see LINEMAN.

SHIFT WORK

THE FOLLOWING RATES APPLY WHEN THE CONTRACTING AGENCY MANDATES MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION ARE WORKED. WHEN TWO (2) OR THREE (3) SHIFTS ARE WORKED THE FOLLOWING RATES APPLY:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 5.77
	*plus 3% of the hour 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

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 **01/01/2026**

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.

Crane Operators: Operation of any type of crane on Traffic Signal/Lighting projects.
 Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on Traffic Signal/Lighting projects.
 Digging Machine Operator: All other digging equipment and augering on Traffic Signal/Lighting projects.

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.

Per hour:	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A:				
Lineman, Technician	\$ 58.49	\$ 61.18	\$ 63.52	\$ 66.01
Crane, Crawler Backhoe	58.49	61.18	63.52	66.01
Certified Welder	61.41	64.24	66.70	69.31
Group B:				
Digging Machine	\$ 52.64	\$ 55.06	\$ 57.17	\$ 59.41
Group C:				
Tractor Trailer Driver	\$ 49.72	\$ 52.00	\$ 53.99	\$ 56.11
Groundman, Truck Driver	46.79	48.94	50.82	52.81
Equipment Mechanic	46.79	48.94	50.82	52.81
Group D:				
Flagger	\$ 35.09	\$ 36.71	\$ 38.11	\$ 39.61

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.

SHIFT WORK

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%

SUPPLEMENTAL BENEFITS

Per hour worked:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
Group A	\$ 31.90*	\$ 32.90*	\$ 34.40*	\$ 35.90*
Group B	\$ 27.90*	\$ 28.90*	\$ 30.40*	\$ 31.90*
Group C	\$ 27.70*	\$ 28.50*	\$ 29.70*	\$ 30.90*
Group D	\$ 27.65*	\$ 28.40*	\$ 29.53*	\$ 30.66*

* Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction. 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, 15, 25) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 25) on HOLIDAY PAGE
 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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2025	05/04/2026	05/03/2027	05/01/2028
All terms:	\$ 27.65*	\$ 28.40*	\$ 29.53*	\$ 30.66*

* Plus 7% of the hourly wage paid. The 7% is based on straight time or premium time.

6-1249aWestLT

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES
 Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2025	12/01/2025	6/1/2026 Additional
Tile Setters	\$ 65.03	\$ 65.64	\$ 1.28

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 29.61*	\$ 30.11*
	+8.53	+8.54

* 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	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	6001-6750	6501-7000
07/01/2025	\$22.34	\$27.46	\$34.56	\$39.66	\$43.35	\$46.96	\$50.69	\$55.79	\$58.36	\$65.03
12/01/2025	\$22.70	\$27.86	\$35.07	\$40.22	\$43.96	\$47.61	\$51.39	\$56.55	\$59.16	\$65.54

Supplemental Benefits per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2025	\$13.00* +\$0.76	\$13.00* +\$0.81	\$16.11* +\$0.92	\$16.11* +\$0.97	\$17.11* +\$1.44	\$18.61* +\$1.49	\$19.61* +\$1.92	\$19.61* +\$1.97	\$19.61* +\$4.57	\$29.61* +\$8.53
12/01/2025	\$13.00* +\$0.76	\$13.00* +\$0.82	\$16.11* +\$0.92	\$16.11* +\$0.97	\$17.11* +\$1.44	\$18.61* +\$1.50	\$19.61* +\$1.93	\$19.61* +\$1.98	\$19.61* +\$4.58	\$30.11* +\$8.54

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

PARTIAL COUNTIES
 Orange: Only the Township of Tuxedo.

WAGES

Per hour: 07/01/2025

Bricklayer	\$ 48.89
Cement Mason	48.89
Plasterer/Stone Mason	48.89
Pointer/Caulker	48.89

Additional \$1.00 per hour for power saw work
 Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK

SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

- Irregular workday 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 \$ 39.20

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%

11-5wp-b

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Building

07/01/2025 01/01/2026

Wages per hour:

Mosaic & Terrazzo Mechanic	\$ 61.77	\$ 62.27
Mosaic & Terrazzo Finisher	60.17	60.67

SUPPLEMENTAL BENEFITS

Per hour:

Mosaic & Terrazzo Mechanic	\$ 31.56* + \$10.91	\$ 31.66* + \$11.37
Mosaic & Terrazzo Finisher	\$ 31.56* + 10.89	\$ 31.66* + 11.35

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (A, E, Q) on OVERTIME PAGE

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	2nd	3rd	4th	5th	6th
	0- 1500	1501- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000
07/01/2025	\$25.50	\$32.80	\$40.21	\$41.37	\$49.69	\$56.54
01/01/2026	\$25.72	\$33.06	\$40.57	\$41.80	\$50.18	\$56.58

Supplemental Benefits per hour:

07/01/2025	\$7.16*	\$9.20*	\$15.78*	\$23.96*	\$24.96*	\$27.46*
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	+ 3.83	+ 4.91	+ 6.55	+ 7.63	+ 8.74	+ 9.81
01/01/2026	\$7.16*	\$9.20*	\$15.78*	\$24.96*	\$24.96*	\$27.96*
	+ 3.98	+ 5.12	+ 7.95	+ 7.95	+ 9.10	+ 11.37

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2025 07/07/2025 01/05/2026

Building-Marble Restoration: Marble, Stone & Terrazzo Polisher	\$ 47.93	\$ 48.20	\$ 48.36
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SUPPLEMENTAL BENEFITS

Per Hour:
 Journeyworker:

Building-Marble Restoration: Marble, Stone & Polisher	\$ 31.86	\$ 32.16	\$ 32.57
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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

REGISTERED APPRENTICES

WAGES per hour:

900 hour term at the following wage:

	1st 1- 900	2nd 901- 1800	3rd 1801- 2700	4th 2701
07/01/2025	33.54	38.34	43.13	47.93
07/07/2025	33.73	38.56	43.37	48.20
01/05/2026	33.84	38.68	43.51	48.36

Supplemental Benefits Per Hour:

07/01/2025	29.59	30.34	31.11	31.86
07/07/2025	30.19	30.84	31.51	32.16
01/05/2026	31.14	31.61	32.10	32.57

9-7/24-MP

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour: 07/01/2025 07/07/2025 01/05/2026

Marble Cutters & Setters	\$ 64.21	\$ 64.66	\$ 65.21
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SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 40.51 \$ 40.82 \$ 41.02

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
	0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
07/01/2025	\$27.24	\$40.84	\$44.25	\$47.63	\$51.05	\$54.58	\$60.99	\$64.21
07/07/2025	\$27.60	\$41.50	\$44.98	\$48.45	\$51.94	\$54.81	\$64.66	\$64.66
01/05/2026	\$27.39	\$41.07	\$44.49	\$47.91	\$51.33	\$53.73	\$65.21	\$65.21

Supplemental Benefits per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th
07/01/2025	\$26.88	\$30.14	\$30.95	\$31.78	\$32.59	\$38.07	\$39.71	\$40.51
07/07/2025	\$26.95	\$30.02	\$30.78	\$31.55	\$32.32	\$38.53	\$40.82	\$40.82
01/05/2026	\$28.60	\$31.67	\$32.43	\$33.20	\$33.97	\$40.73	\$41.02	\$41.02

9-7/4

Mason - Building **01/01/2026**

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2025	12/01/2025	06/01/2026
Tile Finisher	\$ 50.11	\$ 50.44	Additional 1.05*

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2025	12/01/2025
	\$ 26.11* + 8.35	\$ 26.61* + 8.36

*This portion of benefits is subjected 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 **01/01/2026**

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2025	07/07/2025	01/05/2026
Marble, Stone, Maintenance Finishers:	\$ 27.99	\$ 28.15	\$ 28.30

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 Maintenance Finishers:	\$ 15.88	\$ 16.13	\$ 16.39
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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:

	07/01/2025	07/07/2025	01/05/2025
0-750	\$ 22.91	\$ 23.39	\$ 23.56
751-1500	23.59	24.02	24.20
1501-2250	24.26	24.67	24.83
2251-3000	24.95	25.29	25.46
3001-3750	25.96	26.25	26.41
3751-4500	27.32	27.52	27.68
4501+	27.99	28.15	28.30

Supplemental Benefits:

Per hour:

0-750	\$ 12.43	\$ 12.31	\$ 12.50
751-1500	12.89	12.82	13.01
1501-2250	13.35	13.32	13.51
2251-3000	13.80	13.84	14.05
3001-3750	14.50	14.60	14.83
3751-4500	15.41	15.62	15.86
4501+	15.88	16.13	16.39

9-7/24M-MF

Mason - Building / Heavy&Highway

01/01/2026

JOB DESCRIPTION Mason - Building / Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2025	07/07/2025	01/05/2026
Marble-Finisher	\$ 50.22	\$ 50.44	Additional \$ 0.53

SUPPLEMENTAL BENEFITS

Journeyworker:

Per hour

Marble- Finisher	\$ 37.69	\$ 38.00
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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

01/01/2026

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

07/01/2025

Bricklayer	\$ 49.39
Cement Mason	49.39
Marble/Stone Mason	49.39
Plasterer	49.39
Pointer/Caulker	49.39

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 workday is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

- Irregular workday 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	\$ 39.20
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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%

11-5WP-H/H

Operating Engineer - Building

01/01/2026

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) 07/01/2025

Building Construction:

Party Chief	\$ 81.94
Instrument Man	60.49
Rodman	40.63

Steel Erection:

Party Chief	\$ 84.04
Instrument Man	63.19
Rodman	43.31

Heavy Construction-NYC counties only:
(Foundation, Excavation.)

Party Chief	\$ 88.97
Instrument man	66.04
Rodman	55.85

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2025

Building Construction	\$ 29.45* + 7.65
Steel Erection	31.25* + 7.65
Heavy Construction	32.06* + 7.64

* This portion subject to SAME premium as wages

Non-Worked Holiday Supplemental Benefit:
\$ 22.48

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 has 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

01/01/2026

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)

	07/01/2025	03/02/2026
GROUP I		
Cranes- up to 49 tons	\$ 69.25	\$ 71.19
Cranes- 50 tons to 99 tons	71.67	73.69
Cranes- 100 tons and over	81.89	84.27
GROUP I-A	60.56	62.20
GROUP I-B	55.77	57.24
GROUP II	58.42	59.98
GROUP III-A	56.26	57.75
GROUP III-B	53.54	54.93
GROUP IV-A	55.69	57.16
GROUP IV-B	47.01	48.17
GROUP V	50.72	52.01
Group VI-A	59.54	61.05
GROUP VI-B		
Utility Man	48.10	49.30
Warehouse Man	50.44	51.72

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 \$ 32.92 34.52

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, 28) on HOLIDAY PAGE

8-137B

Operating Engineer - Heavy&Highway

01/01/2026

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:	07/01/2025	03/02/2026
Group I	\$ 70.57	\$ 72.77
Group I-A	62.07	63.97

Group I-B	65.47	67.49
Group II-A	59.40	61.21
Group II-B	61.30	63.17
Group III	58.34	60.12
Group IV	52.91	54.49
Group IV-B	45.28	46.59
Group V		
Engineer All Tower, Climbing and Cranes of 100 Tons	80.08	82.61
Hoist Engineer(Steel)	72.41	74.67
Engineer(Pile Driver)	77.30	79.73
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	60.80	62.66

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.

SHIFT WORK

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:	\$ 36.48 up to 40 Hours	\$ 38.08 up to 40 hours
	After 40 hours \$ 26.58* PLUS \$ 1.40 on all hours worked	After 40 hours \$ 27.63* PLUS \$ 1.45 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, 28) 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	\$ 37.24	\$ 38.38
2nd term	43.45	44.78
3rd term	49.66	51.18
4th term	55.86	57.57

Supplemental Benefits per hour:

\$ 27.98	\$ 29.08
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8-137HH

Operating Engineer - Heavy&Highway

01/01/2026

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: 07/01/2025

Party Chief \$ 85.77
Instrument Man 63.48
Rodman 53.53

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2025

All Categories
Straight Time: \$ 32.06* + \$7.64

Premium:
Time & 1/2 \$ 48.09* + \$7.64

Double Time \$ 64.12* + \$7.64

*This portion is subject to the SAME premium as wages.

Non-Worked Holiday Supplemental Benefits:
\$ 22.47

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

01/01/2026

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)

	07/01/2025	03/02/2026
GROUP I	\$ 70.57	\$ 72.77
GROUP I-A	62.07	63.97
GROUP I-B	65.47	67.49
GROUP II-A	59.40	61.21
GROUP II-B	61.30	63.17
GROUP III	58.34	60.12
GROUP IV-A	52.91	54.49
GROUP IV-B	45.28	46.59
GROUP V-A Engineer-Cranes	80.08	82.61
Engineer-Pile Driver	77.30	79.73
Hoist Engineer	72.41	74.67
Jersey Spreader/Post Hole Digger	60.80	62.66

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.

SHIFT WORK

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

\$ 36.48 up to 40 hours	\$ 38.08 up to 40 hours
After 40 hours \$26.58 plus \$1.40 on all hours worked	After 40 hours \$27.63 plus \$1.45 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	\$ 37.24	\$ 38.38
2nd term	43.45	44.78
3rd term	49.66	51.18
4th term	55.86	57.57

Supplemental Benefits per hour:

All terms	\$ 27.98	\$ 29.08
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8-137Tun

Operating Engineer - Marine Dredging

01/01/2026

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 wage rates do not apply to Operating Engineers on land-based construction projects. For those projects, refer to the Operating Engineers Heavy/Highway rates. The wage rates listed below apply specifically to all equipment and operators involved in marine dredging work within navigable waters located in the counties listed above.

Per Hour:	07/01/2025	10/01/2025
CLASS A1 Deck Captain, Leverman, Mechanical Dredge Operator, Licensed Tug Operator with MOTV	\$ 47.07	\$ 48.48
CLASS A2 Crane Operator (360 swing)	41.94	43.20
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 I/II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer, Licensed Boat, Crew Boat Operator	40.71	41.93
CLASS B2 Certified Welder	38.31	39.46
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	37.26	38.38
CLASS C2 Boat Operator	36.07	37.15
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	29.96	30.86

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes: 7% of Hourly Straight time wage + \$12.00.

Additional \$0.63 per hour for Overtime hours

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

01/01/2026

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 Dutchess 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: 07/01/2025
 Survey Classifications

Party Chief	\$ 51.16
Instrument Man	42.44
Rodman	36.92

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members: \$ 24.53

OVERTIME PAY

OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.

*Double-time 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

01/01/2026

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2025 05/01/2026

Brush	\$ 54.56	Additional
		\$2.69*

Abatement/Removal of lead based or lead containing paint on materials to be repainted.	54.56
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Spray & Scaffold	\$ 57.56
Fire Escape	57.56
Decorator	57.56
Paperhanger/Wall Coverer	55.62

*To be allocated at a later date.

SHIFT WORK

Counties of Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, and Westchester; Agency/Government mandated off-shift work to be paid at time and one-half the hourly wage.

SUPPLEMENTAL BENEFITS

Per hour:

Paperhanger	\$ 38.82
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All others	35.23
Premium	39.36**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY

See (A, E, R) 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:	07/01/2025
Appr 1st term...	\$ 20.76
Appr 2nd term...	26.72
Appr 3rd term...	32.51
Appr 4th term...	43.64

Supplemental benefits:

Per Hour:	
Appr 1st term...	\$ 17.40
Appr 2nd term...	21.47
Appr 3rd term...	24.77
Appr 4th term...	31.43

8-NYDC9-B/S

Painter

01/01/2026

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:	07/01/2025	05/01/2026
Drywall Taper:	\$ 54.56	Additional
Scaffold:	\$ 57.56	\$ 2.69*

* To be allocated a later date.

SHIFT WORK

Agency/Government mandated off-shift work to be paid at time and one-half hourly wage

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	\$ 35.23

OVERTIME PAY

See (A, E, R) 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	\$ 20.76
2nd term	26.72
3rd term	32.51
4th term	43.64

Supplemental Benefits - Per hour:

One year term (1500 hours) at the following dollar amount.

1st year	\$ 17.40
2nd year	21.47
3rd year	24.77
4th year	31.43

8-NYDCT9-DWT

Painter - Bridge & Structural Steel

01/01/2026

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:	07/01/2025	10/01/2025
	\$ 56.25	\$ 57.00
	+ 11.10*	+ 12.10*

ADDITIONAL \$7.00 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 (50 hour cap).

** To be allocated a later date

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:	\$ 13.33	\$ 13.49
	+ 30.76*	+ 31.27*

* 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 (50 hour 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.	07/01/2025	10/01/2025
1st year	\$ 22.50	\$ 22.80
	+ 4.44	+ 4.54*
2nd year	\$ 33.75	\$ 34.20
	+ 6.63	+ 7.26*
3rd year	\$ 45.00	\$ 45.60

	+ 8.88	+ 10.60*
Supplemental Benefits - Per hour:		
1st year	\$ 1.52 + 12.51	\$ 18.63*
2nd year	\$ 8.00 + 18.47	\$ 8.09 + 19.04*
3rd year	\$ 10.66 + 24.62	\$ 10.79 + 25.39*

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping

01/01/2026

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):	07/01/2025	04/01/2026
Striping-Machine Operator*	\$ 35.49	\$ 36.93
Linerman Thermoplastic	42.74	44.44

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.

SHIFT WORK

When directly specified in public agency or authority contract documents there shall be a 30% night shift premium pay differential for all work performed after 9:00pm and before 5:00am.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyworker:

Striping Machine Operator:	\$24.30	\$ 24.95
Linerman Thermoplastic:	24.30	24.95

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:

	07/01/2025	01/01/2026	04/01/2026
1st Term:	\$ 16.50	\$ 17.00	\$ 17.00
2nd Term:	21.29	20.47	22.16
3rd Term:	28.39	27.30	29.54

Supplemental Benefits per hour:

All terms:	\$ 24.30	\$ 24.30	\$ 24.95
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8-1456-LS

Painter - Metal Polisher

01/01/2026

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

	07/01/2025
Metal Polisher	\$ 40.33
Metal Polisher*	41.43
Metal Polisher**	44.33

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2025

Journeyworker:
All classification \$ 13.44

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, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

	07/01/2025
1st year	\$ 20.17
2nd year	22.18
3rd year	24.20
1st year*	\$ 20.56
2nd year*	22.62
3rd year*	24.74
1st year**	\$ 22.67
2nd year**	24.68
3rd year**	26.70

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:

1st year	\$ 8.94
2nd year	8.94
3rd year	8.94

8-8A/28A-MP

Plumber

01/01/2026

JOB DESCRIPTION Plumber

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour:

07/01/2025

Plumber and
Steamfitter \$ 65.07

SHIFT WORK

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 \$ 45.35

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	\$ 24.26
2nd Term	27.81
3rd Term	32.15
4th Term	45.73
5th Term	49.05

Supplemental Benefits per hour:

1st term	\$ 18.63
2nd term	20.81
3rd term	24.72
4th term	32.75
5th term	34.77

8-21.1-ST

Plumber - HVAC / Service

01/01/2026

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 Walkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2025

HVAC Service \$ 44.43
+ \$ 4.52*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker HVAC Service
\$ 31.84

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.
\$ 20.11	\$ 23.87	\$ 29.70	\$ 36.53	\$ 39.73

+\$2.45* +\$2.79* +\$3.34* +\$4.00* +\$4.26*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits per hour:

Apprentices	07/01/2025
1st term	\$ 22.13
2nd term	23.85
3rd term	25.71
4th term	28.29
5th term	30.11

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations **01/01/2026**

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:	07/01/2025
Journeyworker:	\$ 50.68

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	\$ 37.83

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	\$ 21.76
2nd year	24.20
3rd year	26.41
4th year	37.03
5th year	39.14

Supplemental Benefits per hour:

1st year	\$ 12.65
2nd year	14.82
3rd year	19.10
4th year	25.85
5th year	28.01

8-21.3-J&A

Roofer **01/01/2026**

JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2025	05/01/2026
		Additional
Roofer/Waterproofer	\$ 50.25	+ \$ 2.75
	+ \$7.00*	

* 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:	\$ 32.62
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OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term apprentices indentured prior to 01/01/2023

	1st	2nd	3rd	4th
	\$ 17.59	\$ 25.13	\$ 30.15	\$ 37.69
		+ 3.50*	+ 4.20*	+ 5.26*
Supplements:				
	1st	2nd	3rd	4th
	\$ 4.22	\$ 16.69	\$ 19.87	\$ 24.65

* This portion is not subjected to overtime premiums.

(1) year term apprentices indentured after 01/01/2023

	1st	2nd	3rd	4th	5th
	\$ 19.10	\$ 22.61	\$ 25.13	\$ 30.15	\$ 37.69
		+ 3.16*	+ 3.50*	+ 4.20*	+ 5.26*
Supplements:					
	1st	2nd	3rd	4th	5th
	\$ 7.95	\$ 15.09	\$ 16.69	\$ 19.87	\$ 24.65

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker **01/01/2026**

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2025
SheetMetal Worker	\$ 51.48
	+ 3.81*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
 12% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker	\$ 47.43
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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
-----	-----	-----	-----	-----	-----	-----	-----

\$ 21.00	\$ 21.71	\$ 24.12	\$ 26.51	\$ 28.93	\$ 31.37	\$ 34.25	\$ 37.11
+ 1.52*	+ 1.71*	+ 1.91*	+ 2.10*	+ 2.29*	+ 2.48*	+ 2.67*	+ 2.86*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 18.57
2nd term	22.80
3rd term	25.34
4th term	27.88
5th term	30.40
6th term	32.92
7th term	34.99
8th term	37.08

8-38

Sheetmetal Worker

01/01/2026

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour:

07/01/2025

Sign Erector

\$ 60.00

NOTE: For Structurally Supported Overhead Highway Signs (See STRUCTURAL IRON WORKER CLASSIFICATION)

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2025

Sign Erector

\$ 58.31

OVERTIME PAY

See (B, 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:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 18.65	\$ 21.16	\$ 23.69	\$ 26.22	\$ 35.39	\$ 38.52	\$ 42.55	\$ 45.75	\$ 48.96	\$ 52.15

4-137-SE

Sprinkler Fitter

01/01/2026

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour

07/01/2025

Sprinkler
Fitter

\$ 57.20

SUPPLEMENTAL BENEFITS

Per hour

Journeyworker \$ 31.36

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
\$ 29.33	\$ 32.75	\$ 35.47	\$ 38.20	\$ 40.25	\$ 43.66	\$ 46.39	\$ 49.12	\$ 51.85	\$ 54.58

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 9.57	\$ 9.57	\$ 21.49	\$ 21.49	\$ 21.74	\$ 21.74	\$ 21.74	\$ 21.74	\$ 21.74	\$ 21.74
									1-669.2

Teamster - Building / Heavy&Highway 01/01/2026

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, Tracker/Crawler Dump Truck.

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)

07/01/2025

GROUP A	\$ 48.61*
GROUP AA	51.61*
GROUP B	49.23*
GROUP BB	48.73*
GROUP C	51.36*
GROUP D	49.06*
GROUP E	49.61*
GROUP F	50.61*
GROUP G	49.36*
GROUP H	49.98*
GROUP HH	50.36*
GROUP I	50.11*
GROUP II	50.48*

* To calculate premium wage, subtract \$.10 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 WORK

When mandated by the contracting agency, DOT, or any governmental agency contracts shall receive a shift differential of fifteen (15%) above the wage rate for all work performed during the irregular shift.

SUPPLEMENTAL BENEFITS

Per hour:
Journeyworker

First 40 hours \$ 38.08
Over 40 hours 29.64

OVERTIME PAY

See (B, E, P, R) 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

8-456

Teamster - Delivery of Concrete **01/01/2026**

JOB DESCRIPTION Teamster - Delivery of Concrete

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

WAGES

Per Hour:

Effective 01/01/2026

01/01/2026

Asphalt & Concrete Delivery \$ 43.29
+ 2.66

SUPPLEMENTAL BENEFITS

Per Hour:

Asphalt & Concrete Delivery Driver \$ 46.85

OVERTIME PAY

See (B, E, P, *R, **U, ***V) on OVERTIME PAGE

Note: R* for Holidays 2, 11, & 15 ONLY

U** for Holidays 5 & 6 ONLY

V*** paid at \$13.25 per hour worked ONLY

HOLIDAY

Paid: See (5, 6, 11, 25) on HOLIDAY PAGE
Overtime: See (2, 5, 6, 11, 15) on HOLIDAY PAGE

9-282nyc

Welder **01/01/2026**

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 07/01/2025

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
- (B3) Time and one half of the hourly rate after 40 straight 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) 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 12226**

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

10 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
- Fuel Delivery
- Guards, Watchmen
- Janitors, Porters, Cleaners,
Elevator Operators
- Moving furniture and
equipment
- Trash and refuse removal
- Window cleaners
- Other (Describe)

9. Does this project comply with the Wicks Law involving separate bidding? YES NO

10. Name and Title of Requester

Signature



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://apps.labor.ny.gov/EDList/searchPage.do>

For inquiries please call 518-457-5589.

NYS DOL Bureau of Public Work Debarment List 01/02/2026

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	****5784	A.J.M. TRUCKING, INC.		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	DOL		AKHLAQ OULAKH		4307 28TH AVE ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	DOL		ALEXANDER DELISA		411 THEODORE FREMND SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL	****8387	AMERICAN PAVING & MASONRY, CORP.		8 FOREST AVE GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL	****8654	AMERICAN PAVING, INC.		8 FORREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO STANCO		8 FOREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL		ANTHONY CASALE		20 HEATHER RIDGE ROAD TROY NY 12180	05/20/2025	05/20/2030
DOL	DOL		ANTHONY MONGELLI		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	DOL	****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC	****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DA	****2404	BJA RENOVATION, CORP		33 DOLLARD DR NORTH BABYLON NY 11703	03/19/2025	03/19/2030
DOL	DOL	****5078	BLACK RIVER TREE REMOVAL, LLC		29807 ANDREWS ROAD BLACK RIVER NY 13032	10/17/2023	10/17/2028
DOL	DOL		C.M.C CONTRACTORS, INC.		500 WEST PUTNAM AVE SUITE 400GREENWICH CT 06830	09/03/2025	09/03/2030
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	DOL		CARLOS F. ESCOBAR		411 THEODORE FREMND AVE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL		CARLOS FIGUEROA		411 THEODORE FREMND AVE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL	****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTI ON	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	AG	****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL		CESAREO TULA		120 SEARS AVE ELMSFORD NY 10523	09/26/2025	09/26/2030
DOL	DOL	****2292	CHAMPION MAINTENANCE CONTRACTORS, INC.		211 SOUTH RIDGE STREET RYE BROOK NY 10573	09/03/2025	09/03/2030
DOL	NYC	****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DOL		CHARLES CASALE		55 MAIN AVENUE WYNANTSKILL NY 12198	05/20/2025	05/20/2030
DOL	DOL		CHARLES CASALE		55 MAIN AVENUE WYNANTSKILL NY 12198	05/20/2025	05/20/2030
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER PEROSI		5507 NESCONSET HIGHWAY MT. SINAI NY 11766	07/17/2025	07/17/2030
DOL	DOL	****2281	CORRAO TRUCKING, INC.		PO BOX 393 NANUET NY 10954	09/17/2024	09/17/2029
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027

NYS DOL Bureau of Public Work Debarment List 01/02/2026

Article 8

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	****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL DELISA		211 SOUTH RIDGE STREET RYE BROOK NY 10573	09/03/2025	09/03/2030
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARWIN PEGUESE		6400 BALTIMORE NATIONAL SUITE 602CANTONSVILLE NY 21228	10/24/2024	10/24/2029
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL		DENISE NAGLE		36 OAKWOOD TRAIL S AL MONROE NY 10950	10/29/2025	10/29/2030
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
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	****2337	EGL DRAINAGE SOLUTION & REPAIRS LLC		5507 NESCONSET HIGHWAY MT. SINAI NY 11766	07/17/2025	07/17/2030
DOL	DOL	****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	DOL		EMIL KISZKO		84 DIAMOND ST BROOKLYN NY 11222	07/18/2024	07/18/2029
DOL	DOL	****3298	EMJACK CONSTRUCTION CORP.		84 DIAMOND ST BROOKLYN NY 11222	07/18/2024	07/18/2029
DOL	DOL	****3298	EMJACK CONSTRUCTION LLC		4192 SIR ANDREW CIRCLE DOYLESTOWN PA 18902	07/18/2024	07/18/2029
DOL	DOL		EUGENIUSZ "GINO" KUCHAR		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	****2998	G.E.M. AMERICAN CONSTRUCTION CORP.		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA		GIOVANNI NAPOLITANO		2501 BAYVIEW AVENUE WANTAGH NY 11793	02/21/2024	02/21/2029
DOL	DA	****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DA	****4760	GTX CONSTRUCTION ASSOCIATES, CORP		2501 BAYVIEW AVE WANTAGH NY 11793	02/21/2024	02/21/2029
DOL	DOL		HENRY WICKE A/K/A HENRY WICKE, JR.		36 OAKWOOD TRAIL S AL MONROE NY 10950	10/29/2025	10/29/2030
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	****6961	HUNTER ELEVATOR COMPANY, INC.		36 OAKWOOD TRAIL S AL MONROE NY 10950	10/29/2025	10/29/2030
DOL	DOL	****2397	ISLAND BREEZE MARINE, INC.		6400 BALTIMORE NATIONAL CANTONSVILLE MD 21228	10/24/2024	10/24/2029
DOL	DOL	****5010	J. LINDSLEY ENTERPRISE, LLC		1002 STATE ROUTE 176 FULTON NY 13069	07/30/2025	07/30/2030
DOL	DOL	****0241	J. LINDSLEY ROOFING, LLC		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
DOL	DOL	****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.M.J CONSTRUCTION		151 OSTRANDER AVENUE SYRACUSE NY 13205	11/21/2022	11/21/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027

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DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JAMES LINDSLEY		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
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	11/15/2022	11/15/2027
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	*****2435	JEFFEL D. JOHNSON	JMJ7 AND SON	5553 CAIRNSTRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JEFFEL JOHNSON ELITE CARPENTER REMODEL AND CONSTRUCTION		C2 EVERGREEN CIRCLE LIVERPOOL NY 13090	11/21/2022	11/21/2027
DOL	DOL	*****2435	JEFFREY M. JOHNSON	JMJ7 AND SON	5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JENNIFER LINDSLEY		211 NORTH 2ND STREET FULTON NY 13069	07/30/2025	07/30/2030
DOL	DOL		JERRY DASTON		36 OAKWOOD TRAIL S AL MONROE NY 10950	10/29/2025	10/29/2030
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		JMJ7 & SON CONSTRUCTION, LLC		5553 CAIRNS TRAIL LIVERPOOL NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 AND SONS CONTRACTORS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS		7014 13TH AVENUE BROOKLYN NY 11228	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS AND SONS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS, LLC		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN NAGLE A/K/A JOHN NAGLE, JR.		36 OAKWOOD TRAIL S AL MONROE NY 10950	10/29/2025	10/29/2030
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		JONATHAN DELISA		411 THEODORE FREMND AVE SUITE 206 RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL		JORGE FIGUEROA		411 THEODORE FRMND AVE SUITE 206 RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DA		JOSEPH DEMASCO		33 DOLLARD DRIVE NORTH BABYLON NY 11703	03/19/2025	03/19/2030
DOL	DOL		JOSEPH HALL		937 US ROUTE 11 CENTRAL SQUARE NY 13036	10/21/2024	10/21/2029
DOL	DOL	*****2271	JOSEPH HALL COMPANIES LLC		937 US ROUTE 11 CENTRAL SQUARE NY 13036	10/21/2024	10/21/2029
DOL	DOL		JOSEPH K. SALERNO		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL		JOSEPH K. SALERNO II		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028

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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	11/15/2022	11/15/2027
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		JRN CONSTRUCTION CO, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DOL	****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KEAN INDUSTRIES, LLC		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL	****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KEVIN FUNEZ URBINA A/K/A KEVIN FUNEZ		1009 LYNDALE AVE TRENTON NJ 08629	12/16/2024	12/16/2029
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	****8760	KJ&J CONSTRUCTION, LLC		1009 LYNDALE AVE TRENTON NJ 08629	12/16/2024	12/16/2029
DOL	DOL		KMA GROUP II, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	****1833	KMA GROUP INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KRIN HEINEMANN		2345 ROUTE 52, SUITE 2N HOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	NYC		KULWANT S. DEOL		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	****3716	LIGHTNIN ELECTRIC INC.		3418 NORTHERN BLVD SUITE 5-27LONG ISLAND CITY NY 11101	12/13/2024	12/13/2029
DOL	AG	****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DOL		LIZETTE PONCE		411 THEODORE FREMND AVE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
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

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DOL	DOL	****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		MOHAMMAD MIAN		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	NYC		NASEER CHAUDHRY		2349 BRAGG STREET BROOKLYN NY 11229	04/22/2025	04/22/2030
DOL	DOL	****7790	NATIONAL BUILDING & RESTORATION CORP		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	****1797	NATIONAL CONSTRUCTION SERVICES, INC		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NELCO CONTRACTING, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DA		NICHOLAS BARNETT		33 DOLLARD DR BABYLON NY 11703	03/04/2025	03/04/2030
DOL	DOL		NICHOLAS RAO		411 THEODORE FREMND AVE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
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	11/15/2022	11/15/2027
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		NIKOLA NTONI		3418 NORTHERN BLVD SUITE 5-27LONG ISLAND CITY NY 11101	12/13/2024	12/13/2029
DOL	NYC	****6971	NN CONSTRUCTION, INC.		2349 BRAGG STREET BROOKLYN NY 11229	04/22/2025	04/22/2030
DOL	NYC	****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
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	****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
DOL	DOL	****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL	****4772	R.W. LOBDELL CONSTRUCTION LLC		635 WEST DRYDEN ROAD FREEVILLE NY 13068	01/31/2025	01/31/2030
DOL	DOL	****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	DOL		ROBBYE BISSEsar		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		ROSA GARCIA		411 THEODORE FRMND AVE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL	****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
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

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DOL	DA	****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA		SILVANO TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DOL	****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
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	****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEVEN DELISA		411 THEODORE FREMND AVE SUITE 206RYE NY 11426	09/03/2025	09/03/2030
DOL	DOL	****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED MUHAMMAD S. JAFRI A/K/A SHARRUKH JAFRI		4307 28TH AVE ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
DOL	DOL	****4855	TECH INDUSTRIES LLC		20 HEATHER RIDGE ROAD TROY NY 12180	05/20/2025	05/20/2030
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	****2426	THE MATRUKH GROUP, INC.		4307 28TH AVE PO BOX 9082ASTORIA NY 11103	10/11/2024	10/11/2029
DOL	DOL		THOMAS LOBDELL		635 WEST DRYDEN ROAD FREEVILLE NY 13068	01/31/2025	01/31/2030
DOL	DOL		TIMOTHY PERCY		29807 ANDREWS ROAD BLACK RIVER NY 13612	10/17/2023	10/17/2028
DOL	DA	****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	****8485	TULA PLUMBING AND HEATING LLC		120 SEARS AVE ELMSFORD NY 10523	09/26/2025	09/26/2030
DOL	DOL	****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBASHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL		VINCENT CORRAO		PO BOX 393 NANUET NY 10954	09/17/2024	09/17/2029
DOL	DOL	****8266	WILLIAM CHRIS MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
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		WILLIAM SCRIVENS		4192 SIR ANDREW CIRCLE DOYELSTOWN PA 18902	07/18/2024	07/18/2029
DOL	DOL	****9494	WND CONSTRUCTION LLC		411 THEODORE FREMD AVENUE SUITE 206RYE NY 10580	09/03/2025	09/03/2030
DOL	DOL		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 010000 – GENERAL REQUIREMENTS

PART 1 – SCHEDULES AND REPORTS

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8. Job Meetings
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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-e)

- 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.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 010100 – 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 017000. 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 always kept clear 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. In accordance with the applicable provisions of AHERA (40 CFR §763.84.d) all contractor's are notified that district's buildings do contain asbestos containing building materials (ACBM) and asbestos regulated areas. In addition to the work specified in these project documents, contractors are to review the district's Asbestos Management Plan (AMP) and applicable AHERA Reinspection/Surveillance report for the applicable buildings/work areas prior to performing any work in the school buildings. If your proposed work requires the handling or disturbance of any ACBM, assumed ACBM, any unlisted suspect ACBM, or requires entrance into any asbestos labeled/regulated areas you are required to contact the district's asbestos designated person at the facilities office prior to any work being performed. Any disturbance/handling of ACBM must be performed in accordance with the Asbestos section of these specifications.

Please advise your staff of this requirement and ensure that they sign the short-term worker notification sheet located in the custodian's office prior to the start of any work. If you need any assistance in reviewing the information in this report, please contact the owner or owner's representative.

- BB. 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. The contractor is responsible for all compliance with applicable OSHA regulations pertaining to any occupational exposures to asbestos fibers.

Specifically, certain crawlspaces and pipe tunnels have been identified and placarded by the district as Regulated Areas in accordance with 29 CFR 1910 (OSHA). The contractor must perform the following entry/exit procedures for all Regulated Areas identified by the school district.

1. All persons entering the regulated area (i.e. crawlspace) shall don protective coveralls including shoe coverings, prior to entry.
 2. Each person exiting the crawlspace shall, while still inside the crawlspace, remove the protective coveralls, immediately before stepping out of the crawlspace onto a walk-off pan/pad. All protective coveralls shall remain in the crawlspace for future disposal as asbestos contaminated waste.
 3. All personnel shall ensure that the areas outside the crawlspace are visibly free of sand, dust, etc. subsequent to their exit.
 4. 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.
- CC. If the contractor encounters damaged or inadvertently disturbs any ACBM, work should stop immediately, and the contractor notify the owner/owners representations. Any abatement/disturbance of these materials must be performed in accordance with the Asbestos section of these specifications.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 010300 – GOVERNING LAWS

GOVERNING LAWS

This project is governed by, but not limited to, the following laws:

- General Municipal Law, § 101, regarding separate contracts when total project exceeds \$1,500,000
- General Municipal Law, § 103-d, regarding non-collusive bidding clause.
- General Municipal Law, § 106-b, regarding payment of contractors and subcontractors.
- General Municipal Law, § 108, regarding Worker's Compensation Insurance.
- General Municipal Law, § 109, regarding non-assignment of public contract.
- Labor Law, § 220, subdivision 2, regarding 40-hour week, 8-hour day.
- Labor Law, § 220-d, regarding wage rates and supplements.
- Labor Law, § 220-e, regarding anti-discrimination.
- Labor Law, § 222-a, regarding elimination of dust hazard.

SECTION 011000 - SUMMARY OF WORK - SINGLE PRIME CONTRACT**1.1 PROJECT INFORMATION**

- A. Project: Bedford Central School District Phase 2 – Maintenance Building
- B. Project Location: Bedford, NY
- C. Owner: Bedford Central School District
- D. Architect: BBS Architects & Design
- E. Construction Manager: Arris Contracting Company, Inc.
- F. The overall scope of work includes:

Fox Lane Maintenance Building (FLMB) – Construct a metal building system as per plans and specifications inclusive of domestic water main and 400 Amp service. Interior fit out inclusive of ADA toilet room as designed shall be ADD / ALTERNATE #1. HVAC system as designed shall be ADD / ALTERNATE #2. Item #4 in lieu of asphalt as designed shall be DEDUCT / ALTERNATE #3.

The contractor shall provide all labor, materials, equipment and services to furnish deliver and install all materials and related work as shown on the drawings, as required by these specifications and/or as directed by the Architect/Construction Manager.

- G. Contracts:

The Project will be constructed under a single prime contract arrangement.

1.2 DIVISION OF WORK

The contract shall include all labor materials, plans, tools, equipment and supervision which are required for or incidental to the proper completion of the work as indicated on the drawings and described in the following specification sections:

1.3 GENERAL REQUIREMENTS

- 1. All DIVISION 00 Sections
- 2. All DIVISION 01 Sections

Special Notes:

- 1. Work hours M-F 7:00AM – 4:30PM. Contractor will appropriately man the project to avoid Saturday and Overtime hours which result in Owner, Construction Manager and Architect additional costs. (2nd shift where indicated by Milestone schedule 3:00 pm – 11:00 pm)
- 2. Delivery black out times- No Contractor trucks/deliveries are allowed during school bus times as indicated by owner approx. **7:00 am-8:30 am or 2:00 pm -3:30 pm.**
- 3. Contractor to include all required insurance coverages as outlined by the General Conditions and front-end sections in their base bid. Provide renewals ahead of expiration. No contractors will be allowed onsite if their insurance has expired.
- 4. Contractor is specifically reminded of their responsibilities for clean up as per Section 017423. Maintaining a clean jobsite is considered a safety issue and will be strictly enforced. In addition to daily cleaning, the contractor is required to hire a professional cleaning company to final clean all areas impacted by the construction. This includes completely cleaning any surfaces/equipment/furniture which has been dusted by the construction work.

If the contractor does not properly perform this function when directed by the Owner/CM, within 4 hours of being notified the owner will perform the work with others and deduct the cost from the contractor.

5. Contractor shall provide suitable rubbish containers device(s) for their own use (both demolition and construction debris), properly maintained and serviced, replaced as required and protected from access by the public fencing as may be specified herein or approved by the Architect or Construction Manager.
6. Existing building space may not be used for storage unless approved by Owner.
7. Contractor is required to submit their corporate safety policy within 10 days of receipt of the Notice to Proceed. Said Policy must minimally meet OSHA Standards and define details concerning the maintenance of a safe work environment and shall also define practices for the maintenance of hygiene and minimizing of the spread of infectious / contagious diseases.

1.4 GENERAL CONTRACT

In addition to the General Requirements, Division 1, included in this bid package contractor shall provide for proper completion of work as indicated on all drawings and in accordance with the terms and conditions described in the following sections:

DIVISION 03 – CONCRETE

Section 033000 – Cast-in-Place Concrete Work

DIVISION 05 – METALS

Section 050530 – Cold Galvanizing

Section 053000 – Metal Deck

Section 054000 – Cold Formed Metal Framing

DIVISION 06 – WOODS, PLASTICS & COMPOSITES

Section 061000 – Rough Carpentry

Section 062000 – Finish Carpentry

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

Section 072100 – Building Insulation

Section 072713 – Self-Adhered Non-Permeable Air Barrier Membrane

Section 079200 – Joint Sealants

DIVISION 08 – OPENINGS

Section 081113 – Hollow Metal Doors and Frames

Section 083600 – Sectional Overhead Doors

Section 085113 – Aluminum Windows

Section 087100 – Door Hardware

Section 088000 – Glazing

DIVISION 09 – FINISHES

Section 092900 – Gypsum Wall Board
Section 096519 – Resilient Tile Flooring
Section 099000 – Painting

DIVISION 10 – SPECIALTIES

Section 102813 – Toilet Accessories
Section 104400 – Fire Extinguishers, Cabinets and Accessories

DIVISION 13 – SPECIAL CONSTRUCTION

Section 133419 – Metal Building Systems

DIVISION 22 – PLUMBING

Section 220000 – Plumbing General Provisions
Section 220010 – Codes, Standards & Permits
Section 220020 – Cutting and Patching
Section 220030 – Schedule of Equivalency
Section 220100 – Maintenance Instructions
Section 220300 – Plumbing Basic Materials & Methods
Section 220553 – Plumbing Identification Systems
Section 220555 – Access to Plumbing Work
Section 220719 – Plumbing Insulation
Section 220801 – Plumbing Testing, Adjusting & Balancing
Section 221000 – Plumbing Piping Systems
Section 221316 – Sanitary Waste and Vent Piping
Section 224000 – Plumbing Fixtures and Trim

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

Section 230000 – General Provisions
Section 230010 – Codes, Standards and Permits
Section 230300 – Basic Mechanical Materials and Methods
Section 230400 – Painting of Mechanical Work
Section 230513 – Common Motor Requirements for HVAC Equipment
Section 230516 – Expansion Compensation
Section 230519 – Meters and Gauges for HVAC Piping
Section 230523 – General Duty Valves for HVAC Piping
Section 230548 – Vibration Controls for HVAC
Section 230580 – Mechanical Testing Requirements
Section 230593 – HVAC Testing, Adjusting and Balancing
Section 230800 – Commissioning of HVAC
Section 233000 – Air Distribution
Section 233113 – Ductwork

Section 233300 – Duct Accessories
Section 233400 – Fans
Section 233713 – Diffusers, Registers and Grilles

DIVISION 26 – ELECTRICAL

Section 260500 – Common Work Results for Electrical
Section 260519 – Low Voltage Electrical Power Conductors and Cables
Section 260526 – Grounding and Bonding
Section 260529 – Fasteners, Attachments and Supporting Devices
Section 260532 – Raceways, Fittings and Accessories
Section 260534 – Outlet Junction and Pull Boxes
Section 260553 – Identification of Electrical Systems
Section 260810 – Mandatory UL Participation
Section 262416 – Panelboards
Section 262726 – Wiring Devices
Section 265100 – Interior Lighting
Section 265600 – Exterior Lighting

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Section 284613.10 – Fire Alarm System (Modify Existing)

DIVISION 31 – EARTHWORK

Section 310000 – Earthwork
Section 310001 – Site Work General Provisions
Section 310002 – Stake Out
Section 311000 – Site Clearing
Section 312317 – Trenching
Section 312318 – Rock Removal
Section 312500 – Erosion and Sediment Controls
Section 312510 – Temporary Tree and Plant Protection

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 320116 – Cold Milling
Section 320117 – Pavement Repair and Resurfacing
Section 321216 – Asphalt Paving
Section 321216.11 – Asphalt Overlay
Section 321236 – Pavement Sealing
Section 321723 – Pavement Markings
Section 322700 – Site Furnishings
Section 323113 – Vinyl Coated Chain Link Fences and Gates

1.5 PRIME CONTRACTOR'S USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the work is indicated.
- B. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner 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.
- C. Owner's representative(s) will cover the project for the standard Monday – Friday shift. If a contractor requests additional hours to make up schedule time or weekends, he will need to reimburse Owner for additional coverage or costs (e.g. – Architect, Construction Manager, etc.) at their contractual rate.
- D. General: Limitations on site usage as well as specific requirements that impact utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements, the Contractor shall administer allocation of available space equitably among the separate sub-contractors and other entities needing access and space, so as to produce the best overall efficiency in performance of the total work of the project. The Contractor shall schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
- E. After the equipment is no longer required for the work, it shall be promptly removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractors.
- F. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off-site.
- G. Contractor and any entity for which the Contractor is responsible shall not erect any sign of the Project site without the prior written consent from the Owner, which may be withheld in the sole discretion of the Owner.
- H. Contractor shall ensure that the work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the work and all adjacent areas. The work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of: Any areas and building adjacent to the site of the work or the building in the event of partial occupancy.
- I. Maintain the building in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building during the construction period.
- J. Contractor is responsible for maintaining a safe jobsite. This includes actively reviewing their work areas to ensure that they are in compliance with all required OSHA regulations. It is a contract requirement that each contractor conducts weekly tool-box safety meetings to ensure that their employees are properly educated and utilizing safe work practices. (Copies of these weekly meetings and a list of the attendees will be forwarded to the CM Site Superintendent on a weekly basis). Contractors will comply with all requirements outlined in the General Conditions including providing their employees with PPE (personal protective equipment) such as masks, hand sanitizer, hard hats, proper work boots, safety harness, safety glasses, etc.
- K. Smoking, drinking alcoholic beverages or open fires will not be permitted on the project site.
- L. Utility Outages and Shutdown:
 - 1. Limit the disruption of utility services to hours the building is unoccupied, weekends or holidays at no additional cost.

2. Do not disrupt or shut down line safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days' notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.
4. All costs for manning of temporary shutdowns and utility crossovers, including 24-hour fire watch if necessary, are included in the contractor's bid regardless of weekend, holiday, etc.

1.9 OCCUPANCY REQUIREMENTS

- A. Partial owner Occupancy: The Owner reserves the right to occupy the place and install equipment in completed areas of the work prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work, such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
- B. The Architect will prepare a Certificate of Substantial Completion for each specific portion of the work to be occupied prior to Owner occupancy.
- C. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
- D. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.
- E. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building.

1.10 DEFINITIONS

- A. Definitions as applied to "Contractors" involved with the work of this Project:
 1. "The Contractor" or "Contractor" meaning the Prime Contractor responsible for the work;
 2. Further, wherein said Division 0 and 1 and respective Sections therein, any reference is made to "General Contractor", same shall be construed to mean "Contractor for the General Construction, or General Work Contractor".
- B. The Owner cannot guarantee the correctness of the existing conditions shown and assumes no responsibility therefore, it shall be the responsibility of the Contractor to visit the site and verify all existing conditions prior to bid.
- C. The Owner may purchase certain items required for the overall operation of this facility through outside vendors.
- D. Contractor will cooperate with said vendors as may be necessary to permit the work to be accomplished.
 1. The cooperation may extend to the receiving, unloading and placement of said equipment if directed by the Owner.
 2. Contractor is advised that the Owner may enter into separate contracts as may be in their best interest.
 3. Contractor is further advised that there will be a full on-site Project

Representative/Construction Manager, whose duties will be defined at the pre-construction meeting.

1.11 ADDITIONAL SECURITY PROVISIONS

- A. All Contractors' employees shall use a single means of access and egress, except in the case of emergency, to be designated by the Construction Manager.
- B. Each Contractor and each Subcontractor shall require his employees, while on the job site, to wear, in a conspicuous location, a photo I.D. button bearing the name of the employee and the Contractor. The buttons of each Contractor shall be numbered consecutively. An up-to-date list of all I.D. buttons, indicating the name and number for each employee, shall be furnished to the Construction Manager.

1.12 ASBESTOS AND LEAD PAINT AWARENESS REQUIREMENTS

- A. Contractor agrees not to use or permit the use of any asbestos containing material in or on any property belonging to the Owner.
- B. For purposes of this requirement, asbestos free shall mean free from all forms of asbestos, including - actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite, both in friable and non-friable states and without regard to the purposes for which such material is used.

1.13 CONSTRUCTION TIME AND PHASING REQUIREMENTS

- A. Contractor is advised the "time is of the essence" of the Contract as defined in the "General Conditions" for the completion of the construction of the facility. It is understood that the work is to be carried through to completion with the utmost speed consistent with good workmanship.
- B. Time of Completion shall be as established in the Milestone Schedules (Section 011100).
- C. Contractor shall maintain fences and barricades at all times and shall repair/ restore and/ or pay for any temporary fencing damaged by their work.
- D. Maintain at all times, all exits and walkways.
- E. Where the barricade is removed for work, the Contractor performing such work shall provide adequate safety personnel to prevent unauthorized persons from approaching the work area.
- F. Construction Phasing: The phasing and/ or milestone schedule contained in Section 011100 has been established for the overall construction of the project.
- G. Electrical and mechanical services to the functioning spaces shall be maintained at all times.
- H. Swing-overs to new facilities shall be made so as to cause the least interruption to the facilities' operations.
- I. Contractor shall provide and maintain all required separations between old and new construction to prevent:

1. Unauthorized entrance to construction areas by others than Architect, Construction Manager, or Owner.
 2. Heat loss from existing building, water (rain or ground) infiltration into existing building.
- J. Exterior alteration and restoration, as required, may proceed outside of phasing schedule at the Contractor's option with concurrence from the Architect, Construction Manager and Owner.
- K. Site development work shall proceed in such a manner to cause the least amount of disruption to the ongoing operations as possible.

1.14 PROOF OF ORDERS, DELIVERY DATES AND SUPPLY CHAIN TRACKING

- A. Within 2 weeks after the approval of shop drawings, samples, product data and the like, the Contractor shall provide copies of purchase orders for all equipment and materials which are not available in local stock. The Contractor shall submit written statements from suppliers confirming the orders and stating promised delivery dates. Failure to provide this critical information will result in Owner holding monthly requisition payments until received.
- B. To mitigate potential disruptions in material supply chains, the Contractor(s) must procure all necessary project materials in advance and store them onsite in their own Conex boxes. This requirement applies to commonly available materials such as piping, conduits, wire, and metal studs. The owner will compensate for these stored materials upon delivery to the jobsite, as outlined in Section 012900.
- C. This information shall be incorporated within the progress schedules so required as part of Section 013216 and 013300 and shall be monitored so as to ensure compliance with promised dates.

1.15 FIELD MEASUREMENTS

Each Respective Contractor shall take all necessary field measurements prior to fabrication and installation of work and shall assume complete responsibility for accuracy of same.

1.16 INITIAL SUBMITTAL REQUIREMENTS

As outlined in Division 01, each Contractor shall provide items noted including - bonds, insurance, emergency telephone numbers, progress scheduling, schedules of submittals, subcontractor listings and the like prior to the start of any work. The owner will not issue contracts until all bonds and insurance information is received by the contractor and verified correct.

1.17 SCHEDULES

The milestone schedule presented in the documents is for bidding and general purposes. Due to the nature of the work, it is the intention of the Construction Manager to negotiate actual work periods for the project among the various Prime Contractors involved with this bidding process, as well as separate contractors involved with other phases of the work solicited under separate proposals. Each Contractor shall, under terms of the General Conditions, mutually cooperate in the rescheduling of work to permit an uninterrupted use of the facilities by the Owner, without additional cost to the Owner.

1.18 ADDITIONAL REQUIREMENTS

The following are additional general and special requirements which will govern the work of the projects covered by these Documents.

- A. If it appears that some of the work cannot be completed by the scheduled date, the Contractor shall increase the work force or increase the hours of work, including evenings and weekends as necessary, and cover any additional costs to the Owner, Architect and Construction Manager.
- B. If the work is complete but the area has not been cleaned or debris and equipment remain, the Owner and/or Construction Manager will notify the Contractor of the deficiencies. The Contractor will have up to four hours to clean the specified area(s) to the satisfaction of the Owner and/or Construction Manager. If the Contractor fails to do so, the Owner reserves the right to prepare the area for occupancy using their own resources and deduct the associated costs from the Contract amount.
- C. Contractor must plan, provide and maintain his own access, ramping and egress as required into and out of the site, staging of trailer(s), materials, machinery, and equipment in agreement with the Construction Manager's Superintendent. Maintain free and safe access on the jobsite for other related project personnel. Maintain safe pedestrian or vehicular traffic must be regulated by a flagman. Trucking and delivery operation should be coordinated with Construction Manager's Superintendent and all other trades.
- D. Contractor is responsible to maintain existing site fencing in its existing condition. Modifications of the fence to better accommodate the contract work can be discussed with the Construction Manager. These changes shall than be handled by this Contractor at his expense and in accordance with the Construction Manager's Superintendent's direction. Any cost incurred as a result of damages shall be charged to this Contractor.
- E. Contractor's personnel will not be permitted to use Owners facilities (including toilet, telephone, food services, etc.) for their own benefit. Contractor's Superintendent must explain this to all their field forces.
- F. Contractor shall limit his operations including storage of materials and prefabrication to areas within the Contract Limit Lines.
- G. Contractor shall coordinate the use of premises with the Owner and Construction Manager and shall move at his own expense any stored products under Contractor's control, including excavated material, which interfere with operations of the Owner or separate Contractors.
- H. Contractor shall obtain and pay for off-site storage as needed to maintain the Owner's use of their premises. The costs of any required storage shall not be an additional expense to the Owner.
- I. Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract stored on the site and shall cooperate with the Construction Manager to ensure security for the Owner's Property.
- J. The intention of the work is to follow a logical sequence; however, the Contractor may be required by Construction Manger to temporarily omit or leave out any section of his work or perform his work out of sequence. All such out of sequence work and come back time to these areas shall be performed at no additional cost.
- K. Contractor shall submit a three-week (man-loaded work activity and area) to Construction Manager each week. Contractor's representative shall attend a weekly meeting with all contractors, chaired by Construction Manager, for the purpose of job coordination and sequencing.
- L. Contractor is responsible to coordinate the job with other trades and Construction Manager, and to cooperate with other trades in pursuit of the overall project's coordination drawings and actively participate in resolving discrepancies, conflicts, interferences, etc.

- M. The Contractor shall take special care in verifying that his equipment matches the characteristics of the power being supplied.
- N. Any Contractor personnel including Project Managers, Supervisors, etc. who engage in any personal attacks, belligerent or threatening speech/texts, etc., to the Owner, or any of its agents, will be removed from working on the project.
- O. Unsafe practices, horseplay, abusive behavior or language, wanton destruction of property, use of drugs or alcohol, possession of firearms, and solicitation shall not be tolerated. There will be no warnings, and Contractor shall designate a responsible on-site Supervisor to handle any situations that may arise, including termination.
- P. Each Contractor is responsible to supply and install all blocking/bracing necessary to properly secure their work. This responsibility includes coordinating the installation in concealed areas without delaying other trades.
- Q. Union business shall not be conducted on site. Any Union representative that visits the site must declare what Contractor's personnel they represent and must be escorted by that Contractor's Union steward at all times. No visitors, sales representatives or non-working personnel shall be permitted on site without prior consent of the Construction Manager. No photographs shall be taken without the Construction Manager's prior approval.
- R. Contractor shall provide protection from damage to adjacent and adjoining work and/or structures. Contractor shall clean, repair and/or replace any damage for which this Contractor is responsible.
- S. Contractor shall submit hourly rate sheets that would apply to time and material work for all pertinent trades upon Award of Contract.
- T. Contractor shall examine surfaces and conditions prior to start of work. Report unacceptable conditions to the Construction Manager. Do not proceed until unacceptable conditions are corrected and acceptable. Starting work implies acceptance of existing conditions.
- U. Each Prime Contractor shall include general housekeeping of light debris. All debris from each Prime Contractor will be collected daily and disposed of into their dumpsters. In addition to daily general housekeeping, the General Work Contractor shall provide a weekly broom sweep and damp mop of all areas for the entire duration of the project. The broom sweep shall include debris from all trades working on site.
- V. Sleeves and Sleeve Layout – It is the responsibility of the Prime Contractor requiring a sleeve to provide the sleeve and a layout sketch to the Prime Contractor performing the construction activity that the sleeve goes in.
- W. Limited site space is available in areas as designated by the Construction Manager. Construction trade parking is not permitted in Owner's employee parking lot.
- X. Prior to commencing the work, each Contractor shall provide written acceptance of grades, structures, substrates, and/or systems installed by other Contractors as suitable for installation of his work. Failure to provide this verification prior to commencing work shall constitute acceptance of the existing conditions.
- Y. Each Contractor shall coordinate with the Construction Manager for lay down areas, staging areas, and overall use of project site.
- Z. All Contractors and their employees, subcontractors and supplier are expressly prohibited from entering the occupied areas of the school building during school hours without prior written permission of the Construction Manager and for using any of its facilities (i.e. restrooms, cafeteria, etc.).
- AA. No recycled import fill materials are permitted.

END OF SECTION 011000

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 012100 – ALLOWANCES

1.01 WORK INCLUDED

- A. The Contractor shall provide all labor, materials, equipment and services so as to perform all work of this section and related work indicated on the Construction Drawings and as specified herein, including, but not limited to, the following:
- B. Inclusion of the Allowances herein.
- C. In addition to the work indicated on the Construction Drawings and elsewhere in this Project Manual and specification, the Contractor shall perform additional work as may be ordered by the Owner's Representative, Owner, or Architect.
- D. The following amounts are for any additional work as may be required or ordered by the Owner, Owner's Representative, or Architect or required due to field related conditions. Any additional work relative to these allowances will be authorized and instituted through the Change Order process. Any unused portion in whole or in part of the allowance shall be refunded to the Owner, also through the Change Order process.
- E. The Contractor's costs for unloading and handling at the site, overhead, profit and other expenses contemplated for the stated allowance amounts shall be included in its contract sum and not in the allowances.

1.02 RELATED WORK

- A. Refer to the related and associated divisions of the Project Manual and Specification for related additional or supplementary details and information.

1.03 CONTRACT DOCUMENTS

- A. Applicable provision of the Conditions of the Contract shall govern all work under this section.

1.04 ALLOWANCES

- A. The General Contractor shall include in Base Bid GC-1 the sum of:
 - 1. Allowance GC-1: Contingency Allowance - Contractor shall include a contingency allowance of **\$ 75,000.00** for use according to the Owner's Instructions

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 012300 – ALTERNATES

1. GENERAL REQUIREMENTS

- A. Each Contractor shall state in its 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 the Base Bid.
- 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. 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.
- D. 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.
- E. Submit shop drawings and samples of the work under each accepted Alternate as per "General Conditions" requirements.

END OF SECTION

SECTION 012600 – CONTRACT MODIFICATION**PART 1 – PROCEDURES - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
 - 1. The provisions of this Section apply to the work of each prime contractor.
- B. Related Sections: the following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section “Submittals” for requirements for the Contractor’s Construction Schedule.
 - 2. Division 1 Section “Applications for Payment” for administrative procedures governing Applications for Payment.
 - 3. Division 1 Section “Substitutions” for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 MINOR CHANGES IN THE WORK

- A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect’s Supplemental Instructions.

1.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or reviewed Drawings and Specifications. The Architect will Use AIA Document G709 for Change Order Proposal Requests.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them as instruction to stop work in progress or to execute the proposed change.
 - 2. Within 5 days of receipt of a proposal request, submit an estimate of the cost necessary to execute the change to the Architect for the Owner’s review.
 - a. Include an itemized list of quantities of products required and unit costs, with the total amount of purchases to be made. Furnish survey data and backup invoices, quotes paperwork to substantiate.
 - b. Separate labor hours by trade and indicate labor rate. (Submit attached labor rate worksheet notarized for each trade / classification.)
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Include an updated Contractors Construction Schedule that indicates the effect of the change, including but not limited to; changes in activity duration, start and

finish times, and activity relationship. Use available float before requesting an extension of contract time.

- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect with copy to the Construction Manager.
1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 2. Include an itemized list of quantities of products required and unit costs, with the total amount if purchases to be made. Furnish survey data to substantiate quantities. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts. Include labor rate breakdown sheets for each trade.
 3. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
 4. Include detailed substantiation that indicates the effect of the change, including but not limited to; changes in activity duration, start and finish times, and activity relationship. Use available float before requesting an extension of contract time.

1.5 ALLOWANCES

- A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
1. Include installation costs in the purchase amount only where indicated as part of the allowance.
 2. When requested, prepare explanations and documentation to substantiate the margins claimed.
 3. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
Separate labor hours by trade and indicate labor rate. (Submit attached labor rate worksheet notarized for each trade / classification.)
 4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
 5. **The contractor's overhead and profit, along with all costs related to bonds and insurance, must be incorporated into the general requirements of the contract sum and cannot be charged against any allowance disbursements. Supervision costs will only be reimbursed if the work takes place outside the superintendent's regular on-site supervision hours.**
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 15 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 15 days.

1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714/CMa. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Proposal Request, the Architect or Construction Manager will issue a Change Order for signatures of the Owner, Architect, Construction Manager, and the Contractor on AIA Form G701.
- B. No Change Order or Allowance requisitions can be made or listed on the requisition, unless the formal Change Order or Allowance Disbursement paperwork has been fully executed by Contractor, Construction Manager, Architect, and Owner.
- C. Requests for changes in bond fees, if any, will be analyzed at the conclusion of the project. Contractor's bonding company to submit substantiation letter. (Bond amount based on total adjusted contract value)

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

SECTION 012900 – PAYMENT PROCEDURES**PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section "Submittals."

1.3 SCHEDULE OF VALUES

- A. Coordination: Contractor shall coordinate preparation of its Schedule of Values for the Work with preparation of the Contractors' Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule
 - b. Application for Payment forms, including Continuation Sheets
 - c. List of subcontractors
 - d. Schedule of allowances
 - e. Schedule of alternates
 - f. Schedule of submittals
 - 2. Submit the Schedule of Values (SOV) to the Construction Manager within 10 days of receipt of the Letter of Intent but no later than 10 days before the date scheduled for submittal of the initial Applications for Payment. (SOV's received after the 15th of the month, will not be allowed to requisition until the following month, due to input time for CM & Owner into their computer systems).
- B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project SED number.
 - d. Contractor's name and address.
 - e. Date of Submittal
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of Work.

- c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items as requested by the Construction Manager. Multiple line items will be provided for amounts in excess of five percent of the contract sum, broken out into subcomponents equaling not greater than five percent each. Separate all line items by material & labor.
- a. Breakdown shall be separated between additions, renovations and sitework with subtotals for each.
 - b. Breakdown will be separated by school (and SED number) each with its own stand-alone front-end sections as outlined in item 4 below. Each will have their own subtotal, so that the owner can easily see the value to date with needing to add columns.
4. In addition to the breakdown of specification sections, separate line items will be required for the following front-end line items:
- a. Bonds & OCP insurances shall be listed as separate line items. (Substantiation letters required from bonding & insurance company for any amount higher than industry standard of 2.0% of contract sum). Only OCP insurance is allowed for insurance line item. All other insurance costs must be distributed by contractor evenly throughout the various sections.
 - b. Supervision – include a minimum of 1% of contract sum.
 - c. Project Administration – include a minimum of 1% of contract sum.
 - d. Project meetings (appropriate value for weekly attendance for entire duration of project – see Section 01 31 19 Project Meetings for amount)
 - e. Punchlist – include a minimum of 2.5% of contract sum
 - f. Closeout: separate lines for demobilization, Operation & maintenance manuals, closeout paperwork, demonstration & training (total for closeout minimum 2% percent of contract value)
 - g. Continuous Clean-up and Final Clean-up values each at minimum of 2% of contract sum.
 - h. General Contractor to add line item for Broom sweep/damp mopping at minimum of .5% of contract sum.
5. Round amounts to the nearest whole dollar; the total shall equal the Contract Sum.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
- a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing.

7. Provide separate line items on the Schedule of Values for the initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents. Allowances to be listed at the end of the Schedule of Values.
9. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.
10. Schedule of Values Updating: Update and resubmit the Schedule of Values with the next Applications for Payment when Approved Change Orders or Executed Construction Change Directives and Approved Allowance Disbursements.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: Each progress-payment date is indicated in the Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment-Application Times:
 1. Submit the initial Payment Application to the Construction Manager and the Architect by the twenty fifth of the month for that month. The Construction Manager and the Architect will provide final comments within three business days of receipt on the twenty fifth of the month. If submitted later than the twenty fifth of the month, review times may be as long as five days from receipt.
 2. All required documents, including the final version of the Application for Payment, based on the comments provided by the Construction Manager and the Architect, must be received by the Construction Manager no later than the first business day of the month following the twenty fifth due date. This will allow for final review by the Construction Manager for accuracy and completeness of submitted documents. If comments are provided to the contractor, the contractor must submit a new complete package including all required corrections/updates.
 3. All final, complete, Payment Applications will be transmitted to the Owner on the 5th day of the month. Payment will be in accordance with the terms of the General Conditions of the Contract for Construction.
 4. If a complete package is not submitted to the Construction Manager by the fifth of the month, they will be paid as per the terms of the Standard Form of Agreement Between Owner and Contractor.

- D. Payment-Application Forms: Use AIA Document G732/CMA (provide a line for the Construction Manager's signature) and Continuation Sheets G703 as the form for Applications for Payment.
1. Separate Continuation Sheets shall be provided for work which takes place on each building and per NYSED project number indicated on drawings and specifications, which will detail that portion of the contract which is attributable to the specific building and NYSED project number indicated on drawings and specifications.
- E. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Construction Manager will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions are made.
 2. Include amounts of Change Orders and Allowances issued prior to the last day of the construction period covered by the application. (No Change Order or Allowance requisitions can be made or listed on the requisition, unless the formal CO/AD paperwork has been fully executed by Contractor, Construction Manager, Architect, and Owner).
 3. Provide digital copies of payrolls which are signed and notarized (Blue Ink) documenting compliance with prevailing wage laws. Payroll for contractors is required from the 25th of the previous month to the 24th of the current month. Payroll for subcontractors is required from the 15th of the previous month to the 14th of the current month.
 4. Provide copies of lien waivers for the previous payment (or anticipated payment.) Include certificate of monthly payment for subcontractors for the previous month.
 5. Provide OSHA 10 certificates for all workers on site.
 6. Payment for stored materials (whether onsite but not installed, or offsite in a secure warehouse) will require a bill of lading showing the exact value and photographs. In no case shall more than 90% be approved for uninstalled stored materials. An insurance certificate must be provided, specifically to the materials stored with the appropriate dollar value (for onsite or offsite materials).
- F. Transmittal: Submit 1 signed and notarized digital copy (blue ink signature) of each Application for Payment to the Construction Manager by a method ensuring receipt within 24 hours. The digital copy shall be complete and attached as a single file to include all waivers of lien, certified payrolls and similar attachments.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect and Construction Manager.
- G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.
1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. The owner reserves the right to designate which entities involved in the Work must submit waivers.

- a. Submit final Applications for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
4. Waivers Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following. The initial payment application will not be processed until all of these actions and submittals have been received by the Construction Manager. When preliminary submissions are received with the initial application (items 4 and 7), the final submission for these items must be received and approved by the Construction Manager prior to submission of the second application for payment.
 1. List of subcontractors.
 2. List of principal suppliers and fabricators
 3. Schedule of Values.
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Schedule of principal products.
 6. Schedule of unit prices.
 7. Submittal Schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. Certificates of insurance and insurance policies.
 10. Performance and payment bonds.
 11. Data needed to acquire the Owner's insurance.
 12. Initial settlement survey and damage report, if required.
- I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
 1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Meter readings.
 - f. Startup performance reports.
 - g. Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - h. Final cleaning.
 - i. Application for reduction of retainage and consent of surety.
 - j. Advice on shifting insurance coverages.
 - k. Final progress photographs.
 - l. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

- J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Transmittal of required Project construction records to the Owner.
 4. Removal of temporary facilities and services.
 5. Removal of surplus materials, rubbish, and similar elements.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

- 3.1 No retainage release will be approved by owner until all closeout documents (Closeout paperwork, as-builts, O&M manuals, AIA release forms, warranties, material turnover receipts, etc.) are received and verified complete.

END OF SECTION 012900

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013000 – 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 017000. 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 discrepancies are found, the Contractor shall report all discrepancies in writing. If no corrections are brought to the attention of the Owner and the Architect/ Engineer before starting installation, the Contractor will be totally responsible for the installation providing complete coverage of the area designed as intended by the Architect.
- 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 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 2 Items C1 through C5.
- 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 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Item E.
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 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item H.
- V. Construction Fume Control: Refer to Specification Section 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item I.
- W. Off-Gassing Control: Refer to Specification Section 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item I.
- X. Asbestos Code Rule 56: Refer to Specification Section 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item K.
- Y. Asbestos TEM: Refer to Specification Section 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item J.
- Z. Lead Abatement Projects: Refer to Specification Section 013500 - Commissioner Regulations (Part 155.5) and Safety Standards – Part 1 - Item K.

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.
 1. 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 Owner 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

Section 013100 - PROJECT MANAGEMENT AND COORDINATION**PART 1 – GENERAL****1.1. Related Documents**

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

1.2. Summary

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections: the following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section “Project Meetings” for progress meetings, coordination meetings, and pre-installation conferences.
 - 2. Division 1 Section “Construction Progress Schedule” for preparing and submitting the Contractor’s Construction Schedule.
 - 3. Division 1 Section “Material and Equipment” for coordinating general installation.
 - 4. Division 1 Section “Closeout Procedures” for coordinating contract closeout.

1.3. Coordination

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
 - 4. Contractor is required to coordinate with their subcontractors, other Prime Contractors and the Construction Manager, sufficiently ahead of the work progressing.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as require notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Processing of submittals and photocopying/delivery to affected contractors.
 4. Progress meetings
 5. Project closeout activities.
- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work.

1.4. Submittals

- A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components. (e.g. - sub slab piping, ceiling spaces, etc.)
 1. Show the relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals."
 4. HVAC Contractor will begin coordination drawing process within 15 calendar days of award of Contract by providing ¼" scale drawings indicating locations of all ductwork layout, piping layout, Bottom of duct etc. Electronic documents will then be submitted to Electrical Contractor for lighting fixtures, main feeders and clearances. Electronic documents will then be provided to the Plumbing Contractor for inclusion of their work. Finally, to the General Contractor for ceiling information (Each contractor shall complete their review and mark-ups within 5 days)
 5. A coordination meeting with all Contractors and subcontractors to review completed coordination drawings will be held within 45 days of Contract award.
- B. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 1. Electronic CAD Files of Project Base Plan Drawings; May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
 2. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
 - a. Use of files is solely at receiver's risk. Architect/Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Document. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect/Engineer of discrepancy and use information in hard-copy Contract Drawings and Specifications. CAD Files do not

necessarily represent the latest Contract Documents, existing conditions and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.

- b. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
- c. Receiver shall not hold Architect/ Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
- d. Receiver shall understand that even through Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
 - 1. Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses or damage caused by presence of computer virus in file or media.
- 3. Upon request to the Architect, and at the Architect's sole discretion, Base Plan Drawings only may be provided to the Prime Contractor in electronic format (for example, AutoCAD format) by the Architect at charge rate to cover the architect's cost for producing.
- 4. Prior to the Architect's dispensing of documents in electronic format, the Contractor shall execute and deliver an "Electronic Media Release Agreement," provided upon request by Architect, along with said payment.
- C. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
 - 1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1. General Coordination Provisions

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2. Cleaning and Protection

- A. Prime Contractor is to clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise Construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. High-speed operation.
 - 20. Improper lubrication.
 - 21. Unusual wear or other misuse.
 - 22. Contact between incompatible materials.
 - 23. Destructive testing.
 - 24. Misalignment.
 - 25. Excessive weathering.
 - 26. Unprotected storage.
 - 27. Improper shipping or handling.
 - 28. Theft or vandalism.

3.3. Requests for Interpretation (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI and forward to the Construction Manager via the internet web-based service.

- B.** RFI'S shall originate with Contractor. RFI's submitted by entities other than Contractor will be returned with no response.
 - 1.** Coordinate and submit RFI's in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- C.** Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1.** Project Name.
 - 2.** Date.
 - 3.** Name of Contractor.
 - 4.** Name of Architect and Construction Manager.
 - 5.** RFI number, numbered sequentially. Use prefix based on Contract (i.e. MC, EC).
 - 6.** Specification Section number and title and related paragraphs, as appropriate.
 - 7.** Drawing number and detail references, as appropriate.
 - 8.** Field dimensions and conditions, as appropriate
 - 9.** Contractor's suggested solution(s). If Contractor solution(s) impact the Contract Time or the Contract Sum, Contractor shall state the impact in the RFI.
 - 10.** Contractors Signature.
 - 11.** Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings and other information necessary to fully describe items needing interpretation.
 - a.** Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies and attachments.
- D.** Architect's Action: Architect will review each RFI, determine action required, and return it.
 - 1.** The following RFIs will be returned without action:
 - a.** Requests for approval substitutions.
 - b.** Requests for coordination information already indicated in the Contract Documents.
 - c.** Requests for adjustments in the Contract Time or the Contract Sum.
 - d.** Requests for interpretation of Architect's actions on submittal.
 - e.** Incomplete RFIs or RFIs with numerous errors.
 - 2.** Architect's action may include a request for additional information.
 - 3.** Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
 - a.** If Contractors believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 10 days of receipt of the RFI response.
- E.** On receipt of Architect's and Construction Manager's action, immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.

3.4. Deficiency Reports

- A.** If the Owner, Architect, or Construction Manager notes a deficiency in an installation, material, etc., they will issue a deficiency report via the internet web-based service to the

appropriate contractor. The contractor has the designated time listed to correct the deficiency and upon completion must respond back in the internet web-based service. The A/E will then perform a follow-up inspection to confirm that the deficiency was adequately corrected.

3.5. Department of Labor Overtime Request

- A.** The DOL overtime request form shall be filled out and forwarded by each contractor to the Construction Manager prior to the start of any onsite work. Contractors will not be allowed to work Weekends or after hours unless the DOL has been properly notified.

END OF SECTION 013100

SECTION 013119 – PROJECT MEETINGS**PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section “Coordination” for procedures for coordinating project meetings with other construction activities.
 - 2. Division 1 Section “Submittals” for submitting Contractor’s Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

- A. A preconstruction (Kick-off Meeting) conference will be scheduled before starting construction, at a time convenient to the Owner, Construction Manager and the Architect, but no later than 15 days after issuance of the Letter of Intent. The conference will be held at the Project Site or another convenient location.
- B. Attendees: Authorized representatives of the Construction Manager, Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All conference participants must be knowledgeable about the Project and authorized to make decisions regarding the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, Product Data, and Samples.

8. Preparation of record documents.
 9. Use of the premises.
 10. Parking availability.
 11. Office, work, and storage areas.
 12. Equipment deliveries and priorities.
 13. Safety procedures.
 14. First aid.
 15. Security.
 16. Housekeeping.
 17. Working hours.
- D. Reporting: Construction Manager shall prepare and issue minutes to attendees and interested parties.

1.4 PREINSTALLATION CONFERENCES

- A. The Construction Manager will conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction.
- B. Attendees: The Installer and representatives of the Prime Contractor, manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Construction Manager and Architect of scheduled meeting dates.
1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Shop Drawings, Product Data, and quality-control samples.
 - g. Review of markups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities.
 - q. Space and access limitations.
 - r. Governing regulations.

- s. Safety.
 - t. Inspecting and testing requirements.
 - u. Required performance results.
 - v. Recording requirements.
 - w. Protection.
2. The Construction Manager will record significant discussion and agreements and disagreements of each conference and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
 3. Contractors should not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
 4. Reporting: The Construction Manager will issue minutes to attendees, Owner and Architect.

1.5 PROGRESS MEETINGS

- A. Progress meetings will be held at the Project Site at regular intervals (typically weekly) as determined by the Construction Manager.
- B. Attendees: In addition to representatives of the Owner, Construction Manager, and the Architect, each Prime Contractor shall be represented at these meetings. Attendance is mandatory at meetings and contractor will include in their bid a sum of \$250.00 per meeting to have an authorized individual in attendance capable of making decisions and providing direction. Each contractor shall plan for meetings during second shift work on a biweekly basis. During summer construction activities, the Project will require weekly meetings from the end of the school year through October of each year.

This total dollar amount will be listed as a separate line item on the contractor's Schedule of Values. If the contractor misses a meeting without prior written authorization from the Construction Manager, they will be issued a deduct change order in the amount of \$250.00 per occurrence. Subcontractors, suppliers, or other entities will be invited at the discretion of the Owner, Construction Manager, and the Architect. All conference participants must be knowledgeable about the Project and authorized to make decisions regarding the Work.

- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule

revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Status of submittals.
 - e. Deliveries.
 - f. Off-site fabrication problems.
 - g. Access.
 - h. Site utilization.
 - i. Temporary facilities and services.
 - j. Hours of work.
 - k. Hazards and risks.
 - l. Housekeeping.
 - m. Quality and work standards.
 - n. Change Orders.
 - o. Documentation of information for payment requests.

- D. Reporting: Approximately 5 days after each meeting, the Construction Manager will prepare and distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.6 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- D. The CM's Field Manager will conduct daily meetings with the prime contractors and major subcontractors' foremen. The purpose of the meetings is to provide the opportunity for each contractor to communicate to the Field Manager any items relating to their respective construction activity for that day (request for shutdown, deliveries, etc.) The meetings will commence from 7:00 o'clock am until 7:30 o'clock am. These meetings are generally informal. The CM's Field Manager will keep minutes of these meetings when appropriate and will be available upon request.

1.7 SAFETY MEETINGS

- A. Each Contractor will be responsible to conduct their own safety meetings on a regular basis (but not less than four times during any thirty-day period.)
- B. Minutes of the Safety Meeting must be maintained by each contractor onsite and must be made available upon request. Failure to conduct and submit meeting minutes will be grounds to reject the Prime Contractor's progress payment.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 013119

SECTION 013216 – CONSTRUCTION PROGRESS SCHEDULE**1.1. DESCRIPTION**

- A. Each Contractor shall develop a full schedule, in sufficient detail and clarity of form and technique so that the contractor can plan and control his work properly and the Construction Manager/Owner can readily monitor and follow the progress for all portions of the work. The Contractor shall complete the detailed schedule and submit to the CM within 10 days after contract award.
- B. The schedule shall comply with the various limits imposed by the scope of work and by any contractually intermediate milestone and completion dates included in the contract.
- C. The activities identified in the schedule shall be analyzed in detail to determine activity time durations in units of whole working days. All durations shall be the results of definitive manpower and resource planning by the Contractor. The Contractor will provide specific manpower loading information/crew size to support the duration proposed. (e.g. – 4-man crew get 1,000 sf/day project has 11,000 sf: thus, duration was identified as 11 days).
- D. The activity data shall include activity codes to facilitate selection, sorting and preparation of summary reports and graphic. Activity codes shall be developed for:
 - 1. Area: Subdivision of the site into logical modules or blocks and levels.
 - 2. Responsibility: contractor or subcontractor responsible for the work.
 - 3. Specifications: 33 Division CSI format
 - 4. System: Division of the work into building systems or summary purposes.
 - 5. Milestone: Work associated with completion of interim completion dates or milestones.
 - 6. Pay Item: Work identified with a pay item on the Schedule of Values.

1.2. REPORTS

- A. For initial submittal and each update, the contractor shall prepare the following standard report:
 - 1. Tabular Schedule Report sorted by Activity code and Early Start.

1.3. GRAPHICS

- A. For initial submittal the contractor shall prepare the following graphic:
 - 1. Pure logic diagram (Precedence Format) of entire data, not time scaled, grouped by Activity code
 - 2. Detailed bar chart sorted by Activity Code with Early Start and Early Finish
 - 3. Summary bar chart summarizing by Activity Code with Early Start and Early Finish.
- B. For each update the contractor shall prepare the following graphic:
 - 1. Bar Chart showing work activities with Early Start in the next 40 work days sorted by Activity Code and Early Start.
 - 2. Summary Bar Chart summarizing by Activity Code showing progress with Early Start and Early Finish.
- C. For each Change Order involving adjustment in the contract time for performance the contractor shall prepare a pure logic diagram showing the changed work with all predecessor and successor activities (Fragnet).

1.4. SUBMITTALS

- A. In no case shall first application for payment be approved prior to submission of acceptable preliminary schedule, detailed submittal schedule, and schedule of values.
- B. Monthly updates, required schedules and graphics shall be submitted to the Construction Manager/ Owner within five working days following the end of the preceding month. Monthly updates, schedules and graphics shall be submitted electronically.
- C. If any of the required submissions are returned to the Contractor (10) calendar days after the return date. Resubmittals shall be in the same quantities as noted above. Review and response by the Construction Manager/ Owner will be given within (10) calendar days after resubmission.

1.5. PAYMENT WITHHELD

- A. If the contractor fails to submit the required schedule information as indicated in this section within the time prescribed or revision thereof within the requested time, the Construction Manager/ Owner may withhold approval of Progress Payment Estimates until such time as the Contractor submits the required information.

1.6. UPDATES

- A. Updates of the Schedule shall be made every two weeks reflecting actual or reasonably anticipated progress as of the last working day of the month. Monthly updates of the Detailed Schedule will be made each month until all work is substantially complete.
- B. The Contractor will meet with the Construction Manager/ Owner at the end of the updated period to review information in draft form before preparation of the required schedules and graphics. The Contractors will present data, prepared in advance, for review and approval of the Construction Manager/ Owner including:
 - 1. Actual Start Dates
 - 2. Actual Completion Date
 - 3. Activity percent complete and /or Remaining Duration
 - 4. Revised logic, changes in activity duration's or resource assignments.
 - 5. Narrative report discussing progress through the update period; changes delay or other circumstance affecting progress; status of the project with respect to completion schedule; any efforts by the Contractor to improve progress.
- C. The update meeting will establish the values to be submitted for payment and will be directly related to the schedules of values in the application for payment.
- D. The Contractor shall prepare a report of the meeting and make all changes, additions or corrections to the data resulting from the review. The contractor shall promptly prepare the monthly submittal following the update meeting.

1.7. CHANGES, DELAYS AND EXTENSIONS OF TIME

- A. When changes or delays are experienced, the Contractor shall submit to the Construction Manager/Owner a Time Impact Analysis illustrating the influence of each change or delay on the current Contract scheduled completion date. Each time analysis shall include a Fragnet (network analysis) demonstrating how the Contractor proposed to incorporate the change or delay into the Detailed Schedule. Additionally, the analysis shall demonstrate the time

- impact based on the date the change was given to the Contractor, the status of construction at the point in time, and activity duration of all effected activities. The activity duration used in this analysis shall be those included in the latest update of the Detailed Schedule, closest to the time of delay or as adjusted by mutual agreement.
- B. Each Time Impact Analysis shall be submitted within ten (10) calendar days after a delay occurs or a notice of change order is given to the Contractor. In cases where the Contractor does not submit a Time Impact Analysis for a specific change or delay with a specified period of time, it shall be mutually agreed that no time extension is required. Final evaluation of each Time Impact Analysis by the Construction Manager/ Owner shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary. Adjustments in the Contract time for performance shall be made only by written change order approved by the Owner. Upon approval of the Owner, Fragnets illustrating the influence of changes and delays shall be incorporated into the Detailed Schedule by the contractor during the first update after agreement is reached.
 - C. The time difference between the Early Finish date and the Late Finish date is defined as "float." The "float" belongs to the Project and may be used by the Construction Manager/ Owner to benefit the Project. Changes or delays that influence activities in the network with "float" and do not extend the Critical Path (the network of activities with zero days "float") shall not be justification for an adjustment in Contract time for performance.

END OF SECTION 013216

SECTION 013300 - ELECTRONIC SUBMITTAL PROCEDURES

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Submittal schedule.
 - 3. Daily construction reports.
 - 4. Shop Drawings.
 - 5. Product Data.
 - 6. Samples.
 - 7. Quality assurance submittals.
- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and payment bonds.
 - 4. Insurance certificates.
 - 5. List of subcontractors.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section " Payment Procedures" specifies requirements for submittal of the Schedule of Values.
 - 2. Division 1 Section " Project Management and Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 - 3. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
 - 4. Division 1 Section "Quality Requirements" specifies requirements for submittal of inspection and test reports.
 - 5. Division 1 Section "Closeout Procedures " specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
 - 1. Preparation of Coordination Drawings is specified in Division 1 Section " Project Management and Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.4 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - 1. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - 1. Submittals must be transmitted in accordance with the requirements of Section 1.6.
 - 2. Allow between 8 - 10 business days for initial review of the first round of submittals. See 1.6 for more information. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - 3. If an intermediate submittal is necessary, process the same as the initial submittal.
 - 4. Allow an additional 5 business days for reprocessing each resubmittal.
 - 5. No extension of Contract Time will be authorized because of contractor's failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
 - 6. **If the contractor delays on key submittals which can negatively impact the project schedule, the owner and his agent(s) can withhold payments as necessary until the proper submittal paperwork is received.**
- B. Submittal Preparation:
 - 1. Each copy of each submittal will have a "submittal cover sheet" attached identifying all information requested by Architect. (see copy after this section) All SCS must be approved by contractor (see electronic stamp B.5) signed, dated and have all fields completely filled-out. Any submittal received without proper use of this Cover Sheet will be returned immediately to the contractor. Cover sheet for contractor's use is included at the end of this section.
 - 2. A Submittals Website, an internet (web-based) service shall be used by all contractors to provide an on-line database and repository which shall be used to transmit and track project related documents. The Submittals Website is provided by the Construction Manager. Upon Contract award the successful bidders will be given log on instructions. The intent for using the Submittals Website is to expedite the construction process by reducing paperwork, improving information flow, and decreasing submittal review turnaround time.
 - 3. Project submittals (shop drawing, product data and quality assurance submittals) shall be transmitted by the Contractor in Portable Document Format (PDF) to the Submittals Website, where it will be tracked and stored for retrieval for review. After the submittal is

reviewed it is uploaded back to the Submittals Website for action or use by the Contractor and Owners Representatives.

4. The service also tracks and stores documents related to the project such as RFI's (Request for Information), Contacts, Meeting Minutes, Punchlist, and Non-Compliance Notices.
5. For each submittal, the Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents, including verification of manufacturer/product, dimensions and coordination of information with other parts of the work. (contractor sign and date)
6. It is the Contractor's responsibility to provide the submittals in a PDF format. The contractor may use any of the following options:
 - a. Subcontractors and suppliers provide paper submittals to the Contractor, who electronically scans and converts them to PDF format.
 - b. Contract a Scanning Service, which will allow the Contractor and the Contractor's subcontractors and suppliers to provide paper submittals to the Scanning Service, which electronically scans and converts them to PDF format. It will be the Contractor's responsibility to transmit the scanned submittals to the Submittals Website.
7. Image Quality:
 - a. Image resolution: The PDF files shall be created at a minimum resolution of 200 dots per inch utilizing the original document size. The Contractor will be responsible to increase the resolution of the scanned file or images being submitted as required to adequately presenting the information.
 - b. Image Color Rendition: When information represented requires color to convey the intent and compliance, provide full color PDF reproduction.

C. Contractor Internet Service and Equipment Requirements:

1. The Contractor will be required to have an Email address and Internet access at Contractor's main office.
2. Unless the Contractor will exclusively be using a Scanning Service to create all PDF documents, the Contractor will be required to own a PDF reviewing, creating and editing software, such as Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF reviewing, creating and editing software for applying electronic stamps and comments.
3. The Contractor will be required to have a web browser such as Internet Explorer 11, Firefox 40-60.
4. The Contractor will be required to have Adobe Reader version 11: Sage uses a pdf creator to generate forms. In order to print / view forms you will need Adobe Reader.
5. Contractors are required to have network securities in place such as anti-virus that is active and up to date. Do not access Contract Management from unsecured or public network location such as free WI-FI hotspots.

D. Training and Support:

1. A training manual shall be available, free of charge from the Construction Manager, for all project participants regarding use of the Submittals Website and PDF submittals.
2. Training if required, will be provided by the Construction Manager via Zoom. The appropriate personnel from each contractor office are required to attend this meeting.

E. Paper Copies:

1. Contractor Copies: The Contractor will be responsible for making copies, for the Contractor's own use and for use by its subcontractors and suppliers.

F. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the CM electronically using a transmittal form.

The CM will then transmit to the Architect. The Architect will not accept submittals received from sources other than the Construction Manager.

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
2. Transmittal Form: Use AIA Document G810 and submit Sage notification to ACCI that the submittal has been uploaded. The contractor's transmittal must have the subject description properly filled out, so that all parties can see what section/product is being submitted without having to open the actual submittal.
3. Transmittal Form: Use the sample form at the end of this Section for transmittal of submittals.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Distribution: It is the contractor's responsibility to coordinate submittals with each subcontracting trade. Each contractor shall be required to provide their subcontractors with a complete list of their submittals in order that other contractors can request required submittal information.
 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

1.6 SUBMITTAL SCHEDULE

- A. Submittals must be prepared and transmitted as follows, unless otherwise approved by the Construction Manager:
 1. Within 15 working days after Notice to Proceed:
 1. HVAC Units (UV, VRF, CU, ACCU, EF, etc)
 2. Aluminum Windows, Entrances. Storefronts, FRP & Glass
 3. Boiler, Breeching and Flue Liner at Bedford Hills
 4. Light Fixtures, Site Lighting Poles
 5. Panelboards & Switchgear
 6. Doors & Hardware
 7. Hot Water heaters and Booster Pumps
 8. All other submittals critical to the schedule.
 2. Balance of Submittals – after 15 days but within 30 days after Notice to Proceed.
 3. If the contractor misses the milestone submittal timeframes listed above, the owner / agents can withhold requisition payments until the required paperwork is received. **If there are any open submittals beyond 45 days of contract award, the owner will stop all contractor payments until all missing paperwork is received.**
 4. Upon approval by the Construction Manager, non-critical submittals may be transmitted later.
 5. Prepare submittals including information in paragraph 1.4B above.
- B. Schedule Updating: Revise the submittal schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.7 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site, and submit one copy to the Architect and one copy to the Construction Manager by 10:00

am the following day. Any contractor not submitting required reports will not receive approval on the subsequent application for payment until such time that all required information is submitted:

1. List of subcontractors at the site.
2. Count of personnel at the site (substantiates payroll).
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, and losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and startups.
13. Partial Completions, occupancies.
14. Substantial Completions authorized.

1.8 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 1. Dimensions.
 2. Identification of products and materials included by sheet and detail number.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurement.
 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
 7. All Technical Submittals: Electronic shop drawing submittal to Construction Manager.
 8. Do not use Shop Drawings without an appropriate final stamp indicating action taken.
 9. Maintain approved copies on site to record "as-built" conditions.
 10. Submit additional copies of as-built, approved drawings as specified in project closeout.

1.9 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Submit prior to shop drawings or simultaneously when products are specified items or A/E approval is granted. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following that are not required, mark copies to indicate the applicable information. Include the following information:
 - I. Manufacturer's printed recommendations.

2. Compliance with trade association standards.
 3. Compliance with recognized testing agency standards.
 4. Application of testing agency labels and seals.
 5. Notation of dimensions verified by field measurement.
 6. Notation of coordination requirements.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Submit digitally through the Submittals Website to CM.
 4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 1. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
 2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.10 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern. Sample are submitted directly to the architect's home office and copy Construction Manager with transmittal.
 1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 1. Specification Section number and reference.
 2. Generic description of the Sample.
 3. Sample source.
 4. Product name or name of the manufacturer.
 5. Compliance with recognized standards.
 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 1. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 2. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 3. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
 4. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
 3. Preliminary Submittals: Submit a full set of choices where Samples are required for selection of color, pattern, texture, or similar characteristics from a range of standard and premium choices.

- I. The Architect will review and distribute selections made or other action.
4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 6 sets to the Architect who will distribute one set to CM and two (2) to the contractor marked with the action taken.
5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
 1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 2. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
 1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
 - I. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.11 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

1.12 ARCHITECT'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 1. Compliance with specified characteristics is the Contractor's responsibility, as stated on the approval stamp.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 1. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.
 2. Final Unrestricted Release: When the Architect marks a submittal "Furnish as Corrected", the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 3. Final-But-Restricted Release: When the Architect marks a submittal "Make Corrections Noted", the Work covered by the submittal may proceed provided it complies with notations

or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance. (No resubmittal is required.)

4. "Revise and Resubmit" When the Architect marks a submittal "Revise and Resubmit", do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay.
5. Returned for Resubmittal: When the Architect marks a submittal "Rejected", do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark.
 - I. Do not use, or allow others to use, submittals marked "Rejected" at the Project Site or elsewhere where Work is in progress.
6. Other Action: Where a submittal is for information or record purposes only and does not require approval and the contractor is responsible for the conformance of the product, the Architect will return the submittal marked "Reviewed".
7. "Submit specified item": When submittal is marked "Submit Specified Item", the Contractor shall immediately submit the specified item,

EXECUTION (Not Applicable)

END OF SECTION 013300

Submittal Cover Sheet

Name of Contractor: _____

Project Name: _____

District Name: _____

Date: _____ Architect's Project No.: _____

Items Submitted: _____

Manufacturer: _____

Model No's: _____

Submission Number: _____ Spec Section: _____

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:

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013500 – COMMISSIONER REGULATIONS (PART 155.5) AND SAFETY STANDARDS

PART 1 – COMMISSIONER REGULATIONS (PART 155.5)

A. Monitoring of construction and maintenance activities:

The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy and shall be monitored during construction or maintenance activities for safety violations by school district personnel. It is the responsibility of the board of education or board of cooperative educational services to assure that these standards are continuously maintained when the building or any portion thereof is occupied.

B. Investigation and disposition of complaints relating to health and safety received as a result of construction and maintenance activities.

Boards of education and boards of cooperative educational services shall follow procedures established under section 155.4(d)(7) of this Part.

C. Pre-construction testing and planning for construction projects.

1. Boards of education and boards of cooperative educational services shall assure that proper planning is made for safety of building occupants during construction. For all construction projects for which bids are issued on or after September 30, 1999, such boards shall assure that safety is addressed in the bid specifications and contract documents before contract documents are advertised for bid. All school areas to be disturbed during renovation or demolition shall be tested for lead and asbestos. Appropriate procedures to protect the health of building occupants shall be included in the final construction documents for bidding.

2. Boards of education and boards of cooperative educational services shall establish procedures for involvement of the health and safety committee to monitor safety during school construction projects. The health and safety committees in school districts other than in cities with one million inhabitants or more shall be expanded during construction projects to include the project architect, construction manager, and the contractors. Such committee shall meet periodically to review issues and address complaints related to health and safety resulting from the construction project. In the case of a city school district in a city of one million inhabitants or more, the board of education shall submit procedures for protecting health and safety during construction to the commissioner for approval. Such procedures shall outline methods for compliance with this section.

3. The district emergency management plan shall be updated to reflect any changes necessary to accommodate the construction process, including an updated emergency exit plan indicating temporary exits required due to construction. Provisions shall be made for the emergency evacuation and relocation or release of students and staff in the event of a construction incident.

4. Fire drills shall be held to familiarize students and staff with temporary exits and revised emergency procedures whenever such temporary exits and revised emergency procedures are required.

D. Pre-construction notification of construction projects.

The board of education or board of cooperative educational services shall establish procedures for notification of parents, staff and the community in advance of a construction project of \$10,000 or more to be conducted in a school building while the building is occupied. Such procedures shall provide notice at least two months prior to the date on which construction is scheduled to begin, provided that in the case of emergency construction projects, such notice shall be provided as far

in advance of the start of construction as is practicable. Such notice shall include information on the district's obligations under this section to provide a safe school environment during construction projects. Such notice requirement may be met by publication in district newsletters, direct mailings, or holding a public hearing on the project to inform parents, students, school personnel and community members.

E. General safety and security standards for construction projects.

1. All construction materials shall be stored in a safe and secure manner.
2. Fences around construction supplies or debris shall be maintained.
3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
4. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
5. Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

F. Separation of construction areas from occupied spaces.

Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

1. A specific stairwell and/or elevator 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.

G. Maintaining exiting and ventilation during school construction projects.

The following information shall be included in all plans and specifications for school building projects:

1. A plan detailing how exiting required by the applicable building code will be maintained during construction. The plan shall indicate temporary construction required to isolate construction equipment, materials, people, dust, fumes, odors, and noise during the construction period. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.
2. A plan detailing how adequate ventilation will be maintained during construction. The plan shall indicate ductwork which must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project.

H. Fire and hazard prevention.

Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy. In addition, the following shall be strictly enforced:

1. No smoking is allowed on public school property, including construction areas.
2. During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris not block fire exits or emergency egress windows.
3. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

I. Noise abatement during construction and maintenance activities.

Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of the noise. Complaints regarding excessive noise shall be addressed through the health and safety committee. The district should anticipate those times when construction noise is unacceptable and incorporate "no work" periods into the bid specifications.

J. Control of chemical fumes, gases, and other contaminants during construction and maintenance projects.

The bid specifications and construction contracts for each construction project shall indicate how and where welding, gasoline engine, roofing, paving, painting or other fumes will be exhausted. Care must be taken to assure fresh air intakes do not draw in such fumes.

1. The bid specifications shall require schedules of work on construction and maintenance projects which include time for off-gassing of volatile organic compounds introduced during construction before occupancy is allowed. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or off-gas before re-occupancy.
2. Manufacturer's material safety data sheets (MSD) shall be maintained at the site for all products used in the project. MSDS must be provided to anyone who requests them. MSDS indicate chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.

K. Asbestos abatement protocols.

All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56 (12 NYCRR 56), and the Federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be

performed in unoccupied areas of an occupied building in accordance with the above referenced regulations.

L. Lead paint.

Any construction or maintenance operations which will disturb lead based paint will require abatement of those areas pursuant to protocols detailed in the "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" (June 1995; U.S. Department of Housing and Urban Development, Washington, D.C. 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). All areas scheduled for construction as well as areas of flaking and peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines.

M. Radon.

Districts shall take responsibility to be aware of the geological potential for high levels of radon and to test and mitigate as appropriate. This information is available from the New York State Department of Health Radon Measurement Database.

N. Post construction inspection.

The school district or board of cooperative educational services shall provide the opportunity for a walk-through inspection by the health and safety committee members to confirm that the area is ready to be reopened for use.

PART 2 – ADDITIONAL SAFETY STANDARDS

A. 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.

B. 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 J below does not apply. If negative for Lead, Item K below does not apply. If negative for Polychlorinated Biphenyls (PCB) item L does not apply.

C. 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:

1. All construction materials shall be delivered during the times as stipulated by the School District. Locations for on-site storage shall be coordinated with the Owner's Representative.
2. Temporary construction fencing shall be erected around construction activity areas in accordance with Specification Section 015000. 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.
3. 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. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building in accordance with Specification Section 015000.
1. 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.
 2. 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 with the General Requirements of Division 01, Specification Sections 013200 and 015000. 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.
- E. 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.
- F. 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.
- G. 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.
- H. Construction Fume Control: The Contractor shall be responsible for the control of chemical fumes, gasses and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes.
- I. 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.
- J. 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.

- K. 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.
- L. 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.

- M. 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 01 – GENERAL REQUIREMENTS

SECTION 014213 – 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 014219 – Applicable 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 01 – GENERAL REQUIREMENTS
SECTION 014219 – APPLICABLE STANDARDS

PART 1 - 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.

B. Related Documents:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. 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.

1.03 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States. "
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- C. Applicable standards listed in these Specifications include, but not necessarily limited to, standards promulgated by the following agencies and organizations:
1. AABC - Associated Air Balance Council; www.aabc.com.
 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 5. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 6. ABMA - American Boiler Manufacturers Association; www.abma.com.
 7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 10. AF&PA - American Forest & Paper Association; www.afandpa.org.
 11. AGA - American Gas Association; www.aga.org.
 12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 14. AI - Asphalt Institute; www.asphaltinstitute.org.
 15. AIA - American Institute of Architects (The); www.aia.org.
 16. AISC - American Institute of Steel Construction; www.aisc.org.
 17. AISI - American Iron and Steel Institute; www.steel.org.
 18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 20. ANSI - American National Standards Institute; www.ansi.org.
 21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 22. APA - APA - The Engineered Wood Association; www.apawood.org.
 23. APA - Architectural Precast Association; www.archprecast.org.
 24. API - American Petroleum Institute; www.api.org.
 25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
 26. ARI - American Refrigeration Institute; (See AHRI).
 27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
 28. ASCE - American Society of Civil Engineers; www.asce.org.
 29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
 31. ASME – ASME International; (American Society of Mechanical Engineers); www.asme.org.
 32. ASSE - American Society of Safety Engineers (The); www.asse.org.
 33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
 34. ASTM - ASTM International; www.astm.org.
 35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
 36. AWEA - American Wind Energy Association; www.awea.org.
 37. AWI - Architectural Woodwork Institute; www.awinet.org.
 38. AWMAC – Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
 39. AWPA - American Wood Protection Association; www.awpa.com.

40. AWS - American Welding Society; www.aws.org.
41. AWWA - American Water Works Association; www.awwa.org.
42. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
43. BIA - Brick Industry Association (The); www.gobrick.com.
44. BICSI - BICSI, Inc.; www.bicsi.org.
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
46. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
47. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
48. CDA - Copper Development Association; www.copper.org.
49. CE - Conformite Europeenne; <http://ec.europa.eu/growth/single-market/ce-marking/>.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - CSA Group; www.csagroup.com.
64. CSA - CSA International; www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; www.eima.com.
75. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
76. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; www.evo-world.org.
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.
82. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.
86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).

91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Accreditation Service; www.iasonline.org.
96. ICBO - International Conference of Building Officials; (See ICC).
97. ICC - International Code Council; www.iccsafe.org.
98. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
99. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
100. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
101. IEC - International Electrotechnical Commission; www.iec.ch.
102. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
103. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
104. IESNA - Illuminating Engineering Society of North America; (See IES).
105. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
106. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
107. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
108. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
109. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
110. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
111. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
112. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
113. ISO - International Organization for Standardization; www.iso.org.
114. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
115. ITU - International Telecommunication Union; www.itu.int/home.
116. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
117. LMA - Laminating Materials Association; (See CPA).
118. LPI - Lightning Protection Institute; www.lightning.org.
119. MBMA - Metal Building Manufacturers Association; www.mbma.com.
120. MCA - Metal Construction Association; www.metalconstruction.org.
121. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA - Material Handling Industry of America; www.mhia.org.
124. MIA - Marble Institute of America; www.marble-institute.com.
125. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
126. MPI - Master Painters Institute; www.paintinfo.com.
127. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
128. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
129. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
130. NADCA - National Air Duct Cleaners Association; www.nadca.com.
131. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
132. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
133. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
134. NCMA - National Concrete Masonry Association; www.ncma.org.
135. NEBB - National Environmental Balancing Bureau; www.nebb.org.
136. NEC - National Electrical Code (See NFPA).
137. NECA - National Electrical Contractors Association; www.necanet.org.
138. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
139. NEMA - National Electrical Manufacturers Association; www.nema.org.
140. NFHS - National Federation of State High School Associations; www.nfhs.org.

141. NFPA - National Fire Protection Association; www.nfpa.org.
142. NFPA - NFPA International; (See NFPA).
143. NFRC - National Fenestration Rating Council; www.nfrc.org.
144. NHLA - National Hardwood Lumber Association; www.nhla.com.
145. NLGA - National Lumber Grades Authority; www.nlga.org.
146. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
147. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
148. NRCA - National Roofing Contractors Association; www.nrca.net.
149. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF - NSF International; www.nsf.org.
151. NSPE - National Society of Professional Engineers; www.nspe.org.
152. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA - National Wood Flooring Association; www.nwfa.org.
155. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
156. PDI - Plumbing & Drainage Institute; www.pdionline.org.
157. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
158. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
159. RFCI - Resilient Floor Covering Institute; www.rfci.com.
160. RIS - Redwood Inspection Service; www.redwoodinspection.com.
161. SAE - SAE International; www.sae.org.
162. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
163. SDI - Steel Deck Institute; www.sdi.org.
164. SDI - Steel Door Institute; www.steeldoor.org.
165. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
167. SIA - Security Industry Association; www.siaonline.org.
168. SJI - Steel Joist Institute; www.steeljoist.org.
169. SMA - Screen Manufacturers Association; www.smainfo.org.
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
171. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.
177. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
178. STI - Steel Tank Institute; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; www.masonrysociety.org.
187. TPI - Truss Plate Institute; www.tpinst.org.
188. TPI - Turfgrass Producers International; www.turfgrassod.org.
189. TRI - Tile Roofing Institute; www.tilerroofing.org.
190. UL - Underwriters Laboratories Inc.; www.ul.com.
191. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
192. USAV - USA Volleyball; www.usavolleyball.org.
193. USGBC - U.S. Green Building Council; www.usgbc.org.

194. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
195. WA - Wallcoverings Association; www.wallcoverings.org.
196. WASTEC - Waste Equipment Technology Association; www.wastec.org.
197. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
198. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
199. WDMA - Window & Door Manufacturers Association; www.wdma.com.
200. WI - Woodwork Institute; www.wicnet.org.
201. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
202. WWPA - Western Wood Products Association; www.wwpa.org.

D. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut für Normung e.V.; www.din.de.
2. IAPMO – International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

E. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DHHS - Department of Health and Human Services; www.hhs.gov.
4. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
5. DOD - Department of Defense; www.quicksearch.dla.mil.
6. DOE - Department of Energy; www.energy.gov.
7. EPA - Environmental Protection Agency; www.epa.gov.
Part 61, Sub-Part M
National Air Emissions Standards for Hazardous
Air Pollutants (NESHAP)
40 CFR Part 763, Subpart E
Asbestos Hazard Emergency Response Act (AHERA)
8. FAA - Federal Aviation Administration; www.faa.gov.
9. FG - Federal Government Publications; www.gpo.gov/fdsys.
10. GSA - General Services Administration; www.gsa.gov.
11. HUD - Department of Housing and Urban Development; www.hud.gov.
12. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
13. NIOSH – National Institute for Occupational Safety & Health; www.cdc.gov/niosh/index.htm.
14. OSHA - Occupational Safety & Health Administration; www.osha.gov.
15. SD - Department of State; www.state.gov.
16. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
17. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
18. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
19. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
20. USP - U.S. Pharmacopeial Convention; www.usp.org.
21. USPS - United States Postal Service; www.usps.com.

- F. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- G. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS - California Department of Health Services; (See CDPH).
 4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
 6. SED/SLD - State Education Department and State Labor Department; www.nysed.gov & dol.ny.gov.
 7. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.
 8. TFS - Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION

SECTION 014500 - QUALITY REQUIREMENTS**PART 1 - GENERAL****1.1. Section Includes**

- A. Requirements for monitoring the quality of the constructed project.
- B. Work of this Section also includes services of an independent testing laboratory for quality assurance testing.

1.2. Related Sections

- A. The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Testing Laboratory Services" specifies requirements for coordination and notification of any owner-tested items.
 - 2. Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.
 - 3. Division 1 Section "Special Inspections & Structural Testing"

1.3. Quality Assurance- Control of Installation

- A. Each Prime Contractor shall continually monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or workmanship that is more precise
- C. Perform work by persons qualified and skilled to produce workmanship of specified quality.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- E. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- F. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.
 - 1. Contractor Responsibilities:
 - a. Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum unless specifically identified as provided by others.
 - b. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.

- c. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.
- d. Where individual Sections specifically indicate that certain inspections, tests and other quality-control services are the Owner's responsibility, the Owner will engage the services of a qualified independent testing agency to perform those services. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders.

1.4. Mock Up

- A. Tests will be performed under provisions identified in this section and identified in This Section and identified in the respective product specification sections.
- B. Assemble and erect specified mock-ups with specified attachment and anchorage devices, flashing, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining work.
- D. Where a mock-up has been accepted by the Engineer/Architect and is specified to be removed, the Contractor shall remove the mock-up and restore the area of the mock-up when directed to do so by the Engineer/Architect.

1.5. Quality Assurance - Testing Laboratory

- A. In order to establish compliance with the Contract Documents, materials shall be tested, examined and evaluated before they are incorporated into the work. During and after installations, additional tests, examinations, and evaluations shall be made to determine continued compliance throughout the course of the work.
- B. Testing laboratory shall be a reputable, experienced firm that is capable of performing all of the required testing and authorized to operate in the state in which the project is located.
- C. Perform all sampling and testing in accordance with specified procedures and use the materials, instruments, apparatus, and equipment required by the codes, regulations and standards. Where specific testing requirements or procedures are not described, perform the testing in accordance with all pertinent codes and regulations and with recognized standards for testing.
- D. in the event that samples and test specimens are not properly taken, handled, stored or delivered or if other requirements of this Section are not complied with, Engineer/Architect reserves the right to delegate any or all of this work to others, or to take whatever action deemed necessary to ensure that sampling and testing are properly accomplished, for which all costs shall be borne by Contractor.
- E. Construction Manager/Architect reserves the right to disapprove the use of a specific testing laboratory, even after prior approval, if the laboratory fails to meet or comply with the requirements of this Section. If this should occur, immediately discharge the testing laboratory and retain the services of a different laboratory acceptable to Engineer/Architect.
- F. The testing laboratory shall meet the following criteria:
 - 1. Be capable of performing all of the required tests.
 - 2. Be regularly engaged in performing the types of services required.
 - 3. Have adequate facilities, materials, equipment, and personnel to perform the services.

4. Have an adequately trained, experienced and qualified staff.
5. Have at least one registered professional engineer licensed in the state in which the project is located who shall be capable of performing field tests, supervising laboratory testing and interpreting test results. The professional engineer shall be thoroughly knowledgeable in materials, soils, asphalt paving and concrete.
6. Shall be able to be on the Project site within two hours after being notified.
7. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.6. Reference Standards

- A. Conform to reference standards by the date that the project was last bid.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification from Engineer/Architect before proceeding.
- D. The contractual relationship of the parties of the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.7. Submittals

- A. Within fifteen (15) calendar days from the date of the Notice to Proceed, submit documentation from three (3) testing laboratories that clearly indicates experience, location, qualifications of staff, and descriptions of any limitations or restriction of the firm.
- B. Certified copies of each test report shall be mailed, sent overnight via a major courier, or emailed directly to the Engineer/Architect. The Contractor shall arrange with the laboratory to secure copies for their use.
- C. Each report shall be in writing and shall include the testing method used, the test results, the specified results, the exact location of where the test specimens were taken, the date taken, Project identification, Contractor's name and other pertinent information required for a complete and meaningful test report,
- D. Each report shall be signed and certified by the responsible officer of the testing laboratory.
- E. Mail, send via overnight courier, or email reports directly to the Engineer/Architect within 24 hours after the sample is taken, except in those instances when tests cannot be immediately performed because of required curing, incubation periods, or lengthy testing procedures.
- F. The laboratory shall verbally communicate test results when requested by the Engineer/Architect. This does not eliminate nor replace the requirements for a written report.

1.8. Scheduling- Laboratory Services

- A. Except where otherwise specified, the Architect/Construction Manager will determine the number of samples to be taken, the date and time samples will be taken and tests made, the number and type of tests to be performed, who will collect the samples, how they will be handled and stored and when laboratory personnel are required on site.

- B. Architect/Construction Manager will notify Contractor of his decision to take samples and/or have tests made and provide him with the pertinent information. Contractor is responsible for notifying the testing laboratory and for having the testing performed, on schedule.
- C. In addition to the above, Contractor shall make his own arrangements for the sampling and testing of materials he proposes to incorporate into the work. This shall not be paid for out of cash allowance.
- D. Notify Architect/Construction Manager at least 48 hours in advance of the times at which scheduled samples or tests will be conducted.
- E. If samples and/or tests cannot be taken or performed when required, delay the work until such time that they can be accomplished. Where possible, any work that has been installed but has not been sampled or tested as required, shall be tested by other means. Upon Architect/Construction Manager request, uncover any work, which has been buried or covered, and perform special tests designated. If the work cannot be tested by other means, Architect/Construction Manager may declare the work unacceptable. All cost associated with noncompliance and for special testing shall be borne by the Contractor and not be paid for out of the cash allowance.
- F. Should the testing laboratory be scheduled to take or collect samples or to perform tests, and finds that it is unable to do so as a result of delays in construction, inclement weather, or any other reason, reschedule the tasks for a date acceptable to Architect/Construction Manager. Costs associated with times testing laboratory is unable to perform scheduled services shall be borne by the Contractor and will not be paid for under the allowance.
- G. Plan all work and operations to allow for the taking and collection of samples and allow adequate time for the performance of tests. Delay the progress of questionable work until the receipt of the certified test reports.

1.9. Testing Requirements

- A. Dry Paint Thickness Measurement: Perform dry paint thickness using calibrated SSPC Type 2 fixed probe gages.

1.10. Testing Schedule

- A. Dry Paint Thickness Measurement:
 1. Make five (5) separate spot measurements spaced evenly over 100 square feet of area.
 2. For structures exceeding 1000 square feet of finished surface, three 100 square feet areas shall be randomly selected by the Engineer Architect plus one 100 square foot area for each additional 1000 square feet of finished surface. This requirement shall be subject to change as required by the Engineer/Architect.

1.11. Field Observation of Contractor's Work

- A. The Architect/ Construction Manager will provide periodic observation of the Contractor's work in accordance with the General Conditions of the Contract.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1. Examination

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached. Examine and verify specific conditions described in individual specification sections. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2. Preparation

- A. Clean substrate surfaces prior to applying next material or substance. Seal cracks or openings of substrate prior to applying next material or substance.
- B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3. Field Quality Control

- A. Allow representative of the testing laboratory access to the work at all time. Provide all equipment, labor, materials and facilities required by the laboratory to properly perform its functions. Cooperate with and assist laboratory personnel during the performance of their work.
- B. Test specimens and samples shall be taken by the person (s) designated in other Sections, or as directed by Architect/Construction Manager. Conduct field sampling and testing in the presence of Architect/Construction Manager. Provide all materials, equipment, facilities and labor for securing samples and test specimens and for performing all field-testing.

END OF SECTION 014500

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014523 – TESTS, INSPECTIONS & SPECIAL INSPECTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to Work of this Section.

1.02 SCOPE / SUMMARY

- A. Scope: This project will require both general inspections and special inspections coordinated with all required testing and certifications throughout the Project Manual and/or the Building Code of the State of New York, as listed below. The Project Manual shall be carefully reviewed by the Prime Contractors for actual and detailed descriptions concerning responsibilities with regard to testing parameters. All testing which is assigned to a Prime Contractor shall be borne as a part of their submitted Base Bid for this project, and shall not be subject to additional costs to the Owner. There are specific general inspections, as well as coordination of inspections, which are to be included in each Prime Contractor's Base Bid submitted; refer to each specification section for complete information. **Note: The cost of all General and Special Inspections performed by the independent testing laboratory/laboratories retained by the Owner shall be directly borne by the Owner, implemented by and coordinated through the Owner's Representative and/or the Construction Manager.**
- B. Summary:
 - 1. This Section includes responsibilities relating to quality control services and extent of quality control services to be performed.
 - 2. Related Work Specified Elsewhere
 - a. Section 014529 – Testing Laboratory Service.
 - 3. Definitions: Quality control services include inspections and tests, special inspections and actions related thereto including reports, but do not include contract enforcement activities performed directly by Architect/Engineer. Quality control services include those inspections and tests, special inspections and related actions performed by independent agencies and governing agencies as well as directly by Contractor.
 - a. Testing service is required to immediately notify the Architect and the Construction Manager of discrepancies observed in the Work performed and to be performed to the Contract Documents.
 - 4. Inspections, tests, special inspections and related actions specified in this Section and elsewhere in Contract Documents are not intended to limit a Contractor's quality control procedures which facilitate compliance with requirements of Contract Documents.
 - 5. Requirements for quality control services by Contractor, as requested or to be requested by Architect/Engineer, Owner, governing authorities, or other authorized entities are not limited by provisions of this Section.

6. Contractors shall review and become familiar with the requirements of Article 13.5, Tests and Inspections, of the General and Supplementary Conditions covering the provisions for testing of the Work.

1.03 RESPONSIBILITIES

- A. Contractor shall coordinate with independent testing agency performing inspections, tests, and quality control services.
 1. Construction Manager will schedule services of independent testing agency to perform services so specified. When no Construction Manager is hired by the Owner, it will be the Contractor's contractual responsibility to schedule the services of independent testing.
 2. The Owner will pay for services of the independent testing laboratory, awarded through the Owner's Representative. Source of services as well as payment and rates of payments will be as directed by the Owner's Representative. Testing specified herein shall be performed at a minimum. Construction Manager or Architect may request additional testing; payment for additional testing is subject to the provisions of the General Conditions.
- B. Retest Responsibility: Where results of required inspection, test, or similar service are unsatisfactory (do not indicate compliance of related work with requirements of Contract Documents), retests are responsibility of Contractor. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work. Retesting shall be performed by testing laboratory as directed by the Owner's Representative.
- C. Responsibility for Associated Services: Contractor is required to cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at project site.
- D. Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of work and without the need for removal/replacement of work to accommodate inspections and tests. It is the contractual responsibility of the Contractor to continually notify the Owner's Representative of all scheduling of times for inspections, tests, taking of samples, and similar activities.

1.04 SAMPLING AND TESTING (GENERAL)

- A. Sampling and testing are required for the following Sections of Work and, unless otherwise indicated, shall be performed by an independent testing lab and paid for by the Owner through the Owner's Representative. ***Note: Certain sections indicated under this item also have specific BCNYS Special Testing & Inspection requirements, which shall be conducted in conformance with BCNYS Chapter 17 guidelines; all special testing & inspection costs shall be borne by the Owner. Refer to item 1.22 for the listing of special inspections required. Where an item may be duplicated under both general and special inspections, only one set of testing is required; special inspection requirements shall prevail.***
 1. Section 033000 – Cast-in-Place Concrete: Inspection of reinforcing steel placement; field quality control of concrete; tests for concrete materials and mix design tests (slump, air content, temperature, compression test, compressive strength tests (cylinders) taken at 7 & 28 days. Testing of FF/FL floor tolerances.
 2. Section 033000 – Cast-in-Place Concrete: Curbs: Random batch testing shall be made. Refer to 03311, 2.01.C.2 for additional information. ***Note: this item also has specific BCNYS***

Special Testing & Inspection requirements, which shall be conducted in conformance with BCNYS Chapter 17 guidelines; all special testing & inspection costs shall be borne by the Owner.

3. Section 035416 – Self Leveling Cementitious Underlayment: Field quality control slump testing and cubes tested in accordance with ASTM C109. Refer to 035416 for additional information.
4. Section 042000 – Unit Masonry: Field quality control of unit masonry and masonry assemblies.
5. Section 051200 – Structural Steel Framing: Field quality control for welds; field quality control for high strength steel torqued bolted connections; field quality control for structural steel alignment.
6. Section 051200 – Structural Steel Framing: Source quality control (per 051200) materials and fabrication procedures; Per 051200 – Inspection of high-strength bolted connections, shop and field welding.
7. Section 052100 – Steel Joist Framing: Source quality control SJI (Steel Joist Institute) certifications through steel fabricator. Inspection of high-strength bolted connections, shop and field welding.
8. Section 053000 – Metal Decking: GC to supply certified shop drawings per Section 053000.
9. Section 054000 – Cold Formed Metal Framing: for field quality control.
10. Section 078100 – Spray-Applied Fire Resistive Materials: Conduct testing per 078100 requirements.
11. Section 078413 – Penetration Firestopping: Conduct testing per 078413 requirements.
12. Section 078443 – Joint Firestopping: Conduct testing per 078443 requirements.
13. Section 085113 – Aluminum Windows: Field quality control testing per 085113.
14. Section 099000 – Paints: Field quality control for painting.
15. Section 221000 – Plumbing Domestic Water Piping System: Plumbing Contractor to conduct testing per 221000.
16. Section 221316 – Plumbing Sanitary Piping System: Plumbing Contractor to conduct testing per 221316.
17. Section 221400 – Plumbing Storm Water Piping System: Plumbing Contractor to conduct testing per 221400.
18. Section 230593 – Inspection, Testing & Balancing: HVAC Contractor to conduct testing per 230593.
19. Section 260500 – General Provisions – Electrical Contractor to conduct testing per 260500 requirements.
20. Section 262416 – Panelboards: Electrical Contractor to conduct testing per 262416 requirements.
21. Section 284613 – Fire Alarm System: Electrical Contractor to conduct testing per 284613 requirements.

22. Section 310000 – Earthwork – Daily testing of in-situ soil, submitted to the Owner's Representative.
23. Section 310000 – Earthwork: Soil testing and inspection service during earthwork operations for subgrades and fill.
24. Section 310000 – Earthwork – Excavating, Backfilling & Compacting for Utilities: Testing at intervals not exceeding 200'-0" of trench for first and every other 8" lift of compacted trench backfill.
25. Section 310000 – Earthwork – Excavating, Backfilling & Compacting: Testing at intervals not exceeding 200'-0" of trench for first and every other 8" lift of compacted trench backfill. Refer to 02224, 3.09A for additional information.
26. Section 321216 – Asphalt Paving: Field density testing, moisture & density relationship, mechanical analysis, plasticity index, base material, thickness and compaction, source testing. Refer to 02230, 3.02A-D for additional information.
27. Section 321216 – Asphalt Paving: Testing paid for by General Contractor – Per 02602, 3.04B, testing of finished surface of the base course shall be accomplished by the GC; utilizing a 16 foot straight edge (a 10 foot straight edge used on vertical curves).
28. Section 321216 – Asphalt Paving: Quality control testing of uncompacted asphalt concrete mix and in-place compacted pavement.

Note: For those projects utilizing a Construction Manager, the Construction Manager's involvement with testing shall be limited to coordinating, documenting (recording the date, time, location and type of test being performed), witnessing, filing copies of reports prepared by the testing agency, and transmitting copies of the reports to the Owner. The reports shall be prepared by the testing agency in accordance with criteria established by 1.04 of this Section and BCNYS Chapter 17 and in a format approved by, the Architect/Engineer. Where no Construction Manager is retained, the coordination and documentation of all required tests shall be the complete and sole responsibility of the Prime Contractor responsible for the work being tested in conjunction with the testing agency.

Note: The Construction Manager will coordinate and document (recording the date, time, location and type of test being performed) all special inspections or testing as required by BCNYS Chapter 17 requirements.

- B. Additional Information: All Prime Contractors shall review all specifications of their disciplines for additional information concerning general testing services necessary for this project. The list provided above shall not be considered mutually exclusive.
- C. Test procedures to be used shall be submitted for approval of the Owner's Representative where other than those specified are recommended by the testing agency.

1.05 QUALIFICATION OF LABORATORY

- A. Shall meet "Recommended Requirements of Independent Laboratory Qualifications," published by American Council of Independent Laboratories. For concrete and steel the laboratory shall comply with the basic requirements of ASTM E 329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."

- B. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of deficiencies reported by inspection.
- C. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to either:
 - 1. National Bureau of Standards.
 - 2. Accepted values of natural physical constants.
 - 3. Submit copy of certificate of calibration, made by accredited calibration agency.
- D. Refer to Section 014529 – Testing Laboratory Service for additional requirements.
- E. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract documents.
 - 2. Approve or accept portion of work.
 - 3. Perform duties of the Contractor.

1.06 SUBMITTALS

- A. Testing document submittal procedures shall be as requested by the Construction Manager and the Architect.
- B. Promptly submit two (2) copies to the Owner's Representative one (1) to be turned over to the Owner, two (2) copies directly to the Architect/Engineer, and one (1) to the Contractor of reports of inspections and test, including the following information, as applicable:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name and address.
 - 4. Name and signature of field inspector.
 - 5. Date of inspection or sampling.
 - 6. Record of temperature and weather.
 - 7. Name and signature of laboratory inspector.
 - 8. Identification of product and specification section.
 - 9. Location in project.
 - 10. Designation of the work and test method.
 - 11. Observations regarding compliance with Contract Documents.
 - 12. Complete inspection or test data.
 - 13. Test results and interpretation of test results.
 - 14. Recommendation on retesting.

1.07 SOIL COMPACTION TESTING

- A. The Contractors for the Work of Division 31 specification – “Earthwork” shall cooperate and coordinate with the soil testing and inspection service for quality control testing during earthwork operations as follows:
1. Field density test reports.
 2. One optimum moisture-maximum density curve for each type of soil encountered.
 3. The Contractor shall arrange for Soils Engineer to be on the site for observation and testing during times when the following operations are being performed:
 - a. Proofrolling.
 - b. Compaction of subgrades and fill. During compaction operations, the Soils Engineer shall carefully monitor existing foundations to detect possible foundation movements. If movement is detected, Work shall be stopped and the Architect immediately notified.
- B. Percentage of Maximum Density Requirements: Provide not less than following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place.
1. Foundations: Compact top 12 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 2. Building Slabs and Steps: Compact top 12 inches of subgrade and each 8 inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 3. Lawn, Unpaved Areas, and Borrow Pit: Compact top 6 inches of subgrade and 8 inch layer of backfill or fill material to 90 percent Modified Proctor maximum dry density.
 4. Walkways: Compact top 6 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 5. Pavements: Compact top 12 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 6. Underground Utilities: Provide the preceding requirements for the respective utility location(s).
 7. Underground Piping and Conduit Outside Building:
 - a. Bedding shall begin by placing 4 to 6 inch bedding of the approved backfill material and compacting to between 85 to 90 percent of the Modified Proctor Maximum Dry Density. The width of the bedding shall be the diameter of the pipe plus 2 feet.
 - b. Haunching shall consist of placing the approved backfill material to the spring line of the pipe and conduit and compacting between 85 to 90 percent of the Modified Proctor Maximum Dry Density. This lift shall not exceed 9 inches loose. The pipe and conduit bedding and flow line shall not be disturbed as a result of the haunching operation.
 - c. Initial backfill shall consist of placing the approved backfill material to the top of the pipe and conduit and compacting to between 85 and 90 percent of the Modified Proctor Maximum Dry Density. This lift shall not exceed 9 inches loose. Crushed or buckled pipe and conduit as a result of the backfilling operations will be removed and replaced with no additional payment.

- d. Initial backfill shall continue in 6-inch lifts with the approved backfill material to a depth of 12 inches above the pipe.
 - e. Finish backfilling of the trench shall consist of placing the approved backfill or material from the trench excavation in 6-inch lifts to the grade of the trench. Finish backfilling within paved areas shall continue to the base of the compacted aggregate with the approved backfill material.
8. Retaining Walls: Compact each 8 inch layer of backfill or fill material to 95 percent Standard Proctor Maximum Dry Density.
- C. Quality Control Testing During Construction: Testing service must inspect and approve subgrades and fill layers before further construction work is performed thereon. Tests of subgrades and fill layers will be taken as follows:
- 1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect, except that a minimum of one test shall be performed for each 15,000 sq.ft. of building area.
 - 2. Paved areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq.ft. of paved area or building slab, but in no case less than 3 tests.
 - 3. Foundation and Retaining wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.
 - 4. Trench Backfill: For each compacted backfill layer make one field density test between each drainage structure.
- D. If, in the opinion of the Architect, based on reports of testing service and inspection, subgrade or fills which have been placed are below specified density, additional compaction work and testing shall be provided by the Contractor for the Section of Work involved at no additional expense, until subgrades or fills meet or exceed specified density.

1.08 BITUMINOUS PAVING TESTING

- A. The Contractor for the Work of Division 32 specification "Asphalt Pavement" shall cooperate and coordinate with the testing laboratory to perform field inspection of the pavement work, unless specifically noted otherwise.
- B. Field quality control testing shall be performed during paving operations. Perform the following sampling and testing of asphalt concrete mixtures for quality control during paving operations. Record the locations where samples are taken to correlate with subsequent testing.
- C. Test uncompacted asphalt concrete mix and report the following:
 - 1. Sampling: AASHTO T168 (ASTM D979).
 - 2. Asphalt Cement Content: AASHTO T164 (ASTMD2172).
 - 3. Perform at least one initial test for paving, unless otherwise specified or directed.
- D. Test in-place, compacted pavement for density and thickness, as herein specified. Perform one test for each 500 sq.yds. but not less than one test per day, unless otherwise specified or directed.

- E. The Contractor shall pay for and perform additional Work and testing as may be required if any of the previous tests indicate insufficient values or if directed by the Architect. Continue Work and testing until specified values have been attained.
- F. Asphalt concentrate material not complying with specified requirements will not be acceptable. The Contractor shall repair or remove and replace defective paving as directed by the Architect, at no additional cost to the Owner.

1.09 INSPECTION OF REINFORCING STEEL PLACEMENT

- A. The Contractor for the Work of Division 03 specifications for "Cast-In-Place Concrete", shall cooperate and coordinate with the testing laboratory to perform field inspection of the placement of reinforcing steel prior to, and in some specified instances during the placement of concrete structures, unless specifically noted otherwise.
- B. Inspection shall include the following:
 - 1. All structures:
 - a. Size of all reinforcing bars.
 - b. Measurement of bar laps.
 - c. Spacing of reinforcing bars.
 - d. Measurement of reinforcing concrete cover.
 - e. Adequacy of reinforcement ties to prevent movement during concrete placement.
 - f. Placement of reinforcing chairs, bolsters, and concrete blocks supporting reinforcement.
 - g. Condition of reinforcing free of corrosion scale, grease, oil, and other foreign materials which would reduce bond of concrete to reinforcement.
 - 2. Slabs-on-Grade:
 - a. Nominal size of welded wire fabric.
 - b. Measurement of fabric lap.
 - c. Type, size, and spacing of supports for welded wire fabric.
 - d. Adequacy of maintaining welded wire fabric in correct position during the concrete placement. If concrete workers walk on fabric during concrete placement, is fabric lifted back in to correct position prior to set of concrete. (THE TESTING LABORATORY SHALL BE PRESENT DURING THE PLACEMENT OF SLABS-ON-GRADE, WHICH USE WELDED WIRE FABRIC OR REINFORCING STEEL BARS).
 - e. Slabs-on-grade with fibrous reinforcement do not require this inspection.
- C. The Testing Laboratory shall report inspection results in writing to the Architect, Construction Manager, and Contractor the same day that tests are made. Reports shall indicate the specific structural items inspected and the location, with column grid references, where possible to clearly identify the inspected items.
- D. Additional Inspections: Where inspections indicate deficiencies and concrete placement of any structural item is made without this required inspection, the testing laboratory shall conduct additional tests, including concrete coring, magnetic detection devices, sonic testing devices, and other methods as required to verify the conformance of the reinforcing steel placement to the Contract Documents. The Contractor shall pay for such inspections conducted and other additional inspections as may be required when unacceptable or un-inspected reinforcing steel placement is verified.

1.10 CONCRETE TESTING

- A. The Contractor for the Work of Division 03 specification for "Cast-In-Place Concrete", shall cooperate and coordinate with testing laboratory to perform field quality control testing during concrete work under Division 03.
- B. Quality Control Testing During Construction: Perform sampling and testing for field quality control during the placement of concrete, as follows:
1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 2. Slump: ASTM C143, one test for each concrete load at point of discharge, and one for each set of compressive strength test specimens.
 3. Air Content: ASTM C231, pressure method; one for every other concrete load at point of discharge or when the indication of change requires.
 4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees F. and above; and each time a set of compressive test specimens is made.
 5. Compression Test Specimens: ASTM C31, one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 6. Compressive Strength Tests: ASTM C39, one set for each day's placement exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - a. When the frequency of testing will provide less than 5 strength tests for a given mix design, conduct testing strength tests for a given mix design, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When the total quantity of a given mix design of concrete is less than 50 cu.yds., the strength tests may be waived by the Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 - c. When the strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- C. The testing laboratory shall report test results in writing to the Architect, Construction Manager, Contractor, and ready-mix supplier on the same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, type and amount of fibrous reinforcement, compressive breaking strength, and type of break for both 7 day tests and 28 day tests.
- D. Additional Tests: The testing service will make additional tests of in-place concrete, as directed by the Architect, when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42 or by load testing specified in ACI 318 or other acceptable nondestructive testing methods, as directed. The Contractor shall pay for such tests conducted and other additional testing as may be required, when unacceptable concrete is verified.

- E. Evaluation of Quality Control Tests: Do not use concrete delivered to the final point of placement, which has slump or total air content outside the specified values.
1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of 3 consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type or class of concrete; and no individual strength test falls below the required compressive strength by more than 500 psi.
 2. Strength tests of specimens cured under field conditions may be required by the Architect to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.
 - a. Provide improved means and procedures for protecting concrete when the 28 day compressive strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders.
 - b. When laboratory cured cylinder strengths are appreciably higher than the minimum required compressive strength, field cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
 - c. If individual tests of laboratory cured specimen produce strengths more than 500 psi below the required minimum compressive strength or if tests of field cured cylinders indicates deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
 3. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength.
- F. Deficient concrete shall be removed and replaced by the Contractor without additional cost to the Owner.

1.11 CONCRETE MATERIALS AND MIX DESIGN

- A. Concrete Materials and Mix Design: The Contractor(s) for Division 03 specification "Cast-In-Place Concrete" shall provide the following in conformance with the requirements of the Division 03 specifications:
1. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94.
 2. Product Data: Submit copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, waterstops, joint systems, chemical floor hardeners, and dry shake finish materials.
 3. Laboratory Test Reports: Submit copies of laboratory test reports for concrete materials and mix design tests. The Architect's review will be for general information only. Production of concrete to comply with specified requirements is the Contractor's responsibility.
 4. Mix Design: Submit copies of concrete mix designs for each type of mix required by the Concrete Schedule indicating the amount of each ingredient (by weight) in one cubic yard of concrete, the calculated water/cement ratio, and the slump.
- B. Tests for Concrete Materials:

1. For normal weight concrete, test aggregates by the methods of sampling and testing of ASTM C33.
 2. For lightweight concrete, test aggregates by the methods of sampling and testing of ASTM C330.
 - a. For portland cement, sample the cement and determine the properties by the methods of test of ASTM C33.
 3. Submit written reports for each material sampled and tested, prior to the start of Work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
- C. Submit signed statement from ready-mix plant that concrete furnished for the Project will exactly conform to the approved design mixes.

1.12 TESTS FOR FF/FL (Refer to Division 03 specification for "Cast-In-Place Concrete")

1.13 TESTS FOR MORTAR

- A. The Contractor for the Work of Division 04 – "Unit Masonry", shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Division 04 – "Unit Masonry", unless specifically noted otherwise.
- B. For colored and noncolored mortars test for compressive strength by the methods of sampling and testing of ASTM C109 and ASTM C780.
 1. Provide a minimum of one set of cubes for testing per 5,000 sq.ft. of masonry wall construction and as directed by Architect.
- C. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
- D. If the compressive strength tests fail to meet the minimum requirements specified, the mortar represented by such tests will be considered deficient in strength.
- E. Deficient mortar shall be removed and replaced by the Contractor without additional cost to the Owner.

1.14 TESTS FOR GROUT

- A. The Contractor for the Work of Division 04 – "Unit Masonry", shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under the Division 04 specification, which covers "Masonry Grout", unless specifically noted otherwise.
- B. Grout for filling reinforced or unreinforced concrete masonry cores or brick cavities test for compressive strength by methods as described in Division 04 section covering – "Masonry Grout".
 1. Provide a minimum of one set of 3 test specimens for testing per 5,000 square feet of masonry wall construction or for each ready-mix truck load of grout and as directed by the Architect.

- C. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the reference specification for each material, specific location where material represented by sample is used, slump and compression test results. Indicate whether or not material is acceptable for intended use.
- D. If the compressive strength tests fail to meet the minimum requirements specified, the grout represented by such tests shall be considered deficient in strength.
- E. Deficient grout shall be removed and replaced by the Contractor without additional cost to the Owner.

1.15 TESTS OF CONCRETE MASONRY PRISMS

- A. The Contractor for the work of Division 04 specification – “Unit Masonry”, shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Division 04 specification – “Unit Masonry”.
- B. When required by the masonry plan, construct a set of 3 masonry prisms using mortar and concrete masonry units to be used in the masonry work. Unless otherwise noted, construct prisms 8 inches by 8 inches by 16 inches high (nominal) in compliance with ASTM E447, Method B.
- C. When prism tests are required to establish the strength of masonry in lieu of Masonry Inspection, provide a minimum of one set of 3 masonry prisms for testing for each 5000 sq.ft. (gross) of masonry wall construction.
- D. Submit written reports for each prism tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, name of material suppliers, specific location where masonry represented by the prism is used, compression test strength results, and specified required strength.
- E. If the compressive strength tests fail to meet the minimum strength specified in the Plans, the masonry represented by the tests shall be considered deficient.
- F. When tests indicating deficient masonry represent masonry already constructed, such masonry shall be removed and replaced by the Contractor without additional cost to the Owner. In lieu of removal and replacement, additional cores may be grouted as required and directed by the Architect without additional cost to the Owner.

1.16 MASONRY INSPECTION

- A. Provide masonry construction inspection of concrete or brick masonry walls to insure that masonry construction is in conformance with the Contract Documents. Masonry inspection is required for those masonry elements, which must be constructed to attain high design strengths.
- B. Qualification of Inspection Agency: Refer to Section 014529 – “Testing Laboratory Service”. Individual inspector shall be certified as a masonry construction inspector by the National Concrete Masonry Association or by a qualified state Masonry Institute or Association.
- C. Inspection shall use NCMA-TEK 18-3 Quality Assurance as a guideline.
- D. The individual or individuals who will perform the masonry inspection shall be present for the Pre-Masonry Conference.

- E. The masonry inspector shall prepare a written report or reports for each day of inspection. The format for this report shall be furnished by the Owner's Representative upon request.
- F. The masonry inspector shall be present and observe all masonry construction operations in walls requiring inspections. The masonry inspector shall be present at the project site within sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the Contract Documents and that grouting may proceed. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for the grouting operation.

1.17 WELDING QUALITY CONTROL

- A. Welding operators shall be qualified under the provisions of the AWS Structural Welding Code on test pieces in positions and with clearances equivalent to those actually to be encountered in construction. Welders shall make only those types of welds for which they are specifically certified.
- B. Welds requiring inspection shall be so indicated in the Drawings.
 - 1. Welds indicated as requiring visual inspection shall be visually inspected by an independent inspector, acceptable to the Architect, prequalified by the American Welding Society Qualification Test.
- C. The Contractor performing the welding requiring visual inspection shall coordinate with an independent testing service, acceptable to the Architect to perform weld testing.
- D. Submit written reports for each weld tested. Provide project identification and number, date of report, name of Welding Contractor, name of testing service, location of weld, type of weld, and test results. Indicate whether or not weld is acceptable for intended use.
- E. If by inspection welds fail to meet minimum acceptable criteria, the welds shall be cut out and replaced at no additional cost to the Owner.

1.18 BOLTED STRUCTURAL CONNECTIONS QUALITY CONTROL

- A. The Contractor for the work of the Division 5 specification for "*Structural Steel*" shall cooperate with a separate testing laboratory, to perform field quality control inspection of slip-critical and snug-tight bolted connections.
- B. Inspection of slip-critical connections shall be visual. The inspector shall be present at the beginning of steel erection to insure that the erector is conforming to the Contract Documents and AISC Specifications. The inspector shall verify that the erector is marking the bolts and nuts prior to the turn-of-nut procedure. Ten percent of all slip-critical bolted connections shall be observed as they are installed. Any connections, which, in the opinion of the inspector, do not meet the tightening requirements of the Contract Documents, shall be corrected by the erector.
 - 1. Inspection of snug-tight connections shall be made by use of a spud wrench. Ten percent of all snug-tight bolted connections selected randomly over the entire limits of the building structure shall be tested to verify tightness. If more than 20 percent of the bolts tested do not meet the General Requirements of the Contract Documents, the erector shall be required to retighten all snug-tight bolted connections on the Project.

1.19 STRUCTURAL STEEL ALIGNMENT QUALITY CONTROL

- A. The Contractor for the Work of the Division 05 specification section "*Structural Steel*", shall cooperate with a separate testing laboratory, to perform field measurement of structural steel beams, columns, joist, and deck alignment.

- B. Alignment shall be measured and compared to AISC “Code of Standard Practice for Steel Buildings and Bridges”.
- C. The Testing Agency shall submit, to the Architect, a written report summarizing the measurements performed and the equipment used in the fieldwork. Where alignment fails to meet AISC requirements, the Contractor for the work in “Structural Metal Framing” shall make the required corrections.

1.20 COLD FORMED METAL FRAMING QUALITY CONTROL

- A. The Contractor shall cooperate with a separate testing laboratory to perform field quality control inspections.
 - 1. Test and inspect cold formed metal framing used for exterior curtain wall system to verify framing meets the following specified and indicated items:
 - a. Thickness of framing members (gauge).
 - b. Spacing of framing members.
 - c. Attachment details of framing members to structural substrate.
 - d. Supplemental bracing and reinforcement are correctly provided including spacing, size and type of bracing and thickness of bracing.

1.21 FIRE RESISTANT PENETRATIONS & JOINTS QUALITY CONTROL

- A. The Contractor shall cooperate with a separate testing laboratory to perform field quality control inspections in accordance with NYS BC 1705.17.
 - 1. A pre-construction meeting shall take place to discuss the application of firestop protection systems including the coordination of work among trades and each contractor’s responsibility of the installation of firestop systems for the penetrations and joints.
 - 2. The pre-construction meeting should address the following:
 - a. Agree on all the penetrations to be protected in accordance with the approved construction plans.
 - b. Schedule the trades work in conjunction with the firestop installation work.
 - c. Schedule the firestop inspections and coordinate with the firestop contractor work.
 - 3. The Contractor shall cooperate with a separate testing laboratory to perform field quality control inspections. Major elements of quality firestopping inspections are as follows:
 - a. Firestop systems must not be concealed from view before being inspected and approved.
 - b. Walk through visual inspections should be made during the firestop installation.
 - c. When necessary or required, destructive evaluation will be made on various types of firestop systems.
 - d. Flashlights, coring device and other appropriate tools make a proper inspection easier.
 - e. Proper depths, annular space and product types are critical to the effectiveness of the system.
 - f. Construction documents detailing the firestop locations and systems must be kept on site to assist in the conduct of the inspection.
 - g. Observe that empty containers, wrappings or boxes of the specified materials are in sufficient quantity to have been installed correctly.
 - h. Observe that the actual products, containers, wrappings or boxes are labeled with the approved testing agency marks and are as specified in the submitted details.

- i. Measure the depth and width of materials as indicated in the details (sometimes density measurements are also required for products such as thermal insulation).
- j. Observe that joints have been installed in such manner that the required movement can be achieved (temporary screws used to hold studs to ceiling runners must be removed).
- k. Compare the installed firestop system with the approved submitted details.
- l. Observe a reasonable degree of workmanship, which would indicate compliance with the specified designs.
- m. Deficient installations must immediately be corrected and then re-inspected before concealment.

1.22 PAINTING QUALITY CONTROL

- A. The Contractor for the Work of Section 099000 – “Painting”, shall cooperate with a separate testing laboratory to perform field quality control testing of painted finishes.
- B. Wet Film Thickness:
 - 1. Wet film thickness shall be tested at the rate of one reading per 1000 sq. ft. of painted surface. Ten random locations for readings will be chosen throughout building.
 - 2. Wet film thickness shall be as specified in Section 099000 – “Painting”; or if not specified, as specifically recommended by the paint manufacturer for the type of substrate, type of paint and system used, and application methods and coverage requirements.
 - 3. Testing Instrument:
 - a. Wet Film Thickness Gage, KTA-Tator, Inc., Pittsburgh, PA.
- C. Dry Film Thickness:
 - 1. Dry film thickness shall be tested at the rate of 5 readings per 100 sq.ft. of painted surface. Twenty random locations for readings will be chosen throughout the building.
 - 2. Average of all readings for a given area or surface area to be within the dry film thickness range specified in Section 099000 – Paints, and no individual reading should be more than 20 percent below the specified dry film thickness.
 - 3. Testing instruments; shall be destructive or nondestructive type applicable for the type of substrate the coating is applied to. The following lists acceptable types of testing instruments:
 - a. Type I, (Magnetic Pull-Off) Dry Film Thickness Gage, KTA-Tator, Inc., Pittsburgh, PA.
 - b. Fixed Probe Dry Film Thickness gage – Elcometer 345 Basic, KTA-Tator, Inc., Pittsburgh, PA.
 - c. Fixed Probe Dry Film Thickness Gage – Elcometer 345 Top, KTA-Tator, Inc., Pittsburgh, PA.
 - d. Fixed Probe Dry Film Thickness Gage Elcometer 300F-P2, KTA-Tator, Inc., Pittsburgh, PA.
 - e. Type II – Fixed Probe Dry Film Thickness Gage – Minitest 200F, KTA-Tator, Inc., Pittsburgh, PA.
 - f. Fixed Probe Dry Film Thickness Gage – Positector 6000-F1, KTA-Tator, Inc., Pittsburgh, PA.
 - g. Fixed Probe Dry Film Thickness Gage – Positector 6000-F3, KTA-Tator, Inc., Pittsburgh, PA.
 - h. Fixed Probe Dry Film Thickness Gage – Quanix 2200, KTA-Tator, Inc., Pittsburgh, PA.
 - i. Fixed Probe Dry Film Thickness Gage – Quanix 2300, KTA-Tator, Inc., Pittsburgh, PA.
 - j. Destructive Dry Film Thickness – Tooke Gage, KTA-Tator, Inc., Pittsburgh, PA.

1.23 STRUCTURAL TESTING AND SPECIAL INSPECTION CONFORMANCE IN COMPLIANCE WITH BUILDING CODE OF NEW YORK STATE

- A. General: In addition to the above Division 02-33 general testing requirements, the provisions of Chapter 17, "*Structural Tests and Special Inspections*" of the *Building Code of New York State (BCNYS)* additionally governs the quality, workmanship and requirements for all materials, as applicable. Materials of construction and tests shall conform to the applicable standards listed in the BCNYS.
- B. New Materials: New building materials, equipment, appliances, systems or methods of construction not provided for in the BCNYS, and any material of questioned suitability proposed for use in the construction of a building or structure shall be subjected to the tests prescribed in Chapter 17 of the BCNYS.
- C. Used Materials: The use of second-hand materials that meet the minimum requirements of Chapter 17 of the BCNYS shall be permitted.
- D. Special Inspections – All special inspections shall conform to the requirements of Section 1704 of Chapter 17 of the BCNYS. The Owner shall employ one or more Special Inspectors to provide inspections during construction on the types of work listed under Section 1704 of Chapter 17 of the BCNYS. The Special Inspector shall be a qualified person who shall demonstrate competence to the satisfaction of the code enforcement official for inspection of the particular type of construction or operation requiring special inspection. **Refer to Specification Section 014529, "Testing Laboratory Service" for the specific qualifications of the Special Inspector.**
- E. Report Requirements: Special inspectors shall keep records of all inspections, and shall furnish said records to the code enforcement official, to the Architect and the Owner. If a Construction Manager has been retained by the Owner, all test results shall be submitted in quadruplicate, via the Construction Manager. Reports shall indicate that work inspected was done in conformance to the approved Construction Documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the code enforcement official and to the Architect, prior to the completion of that phase of the work. A final report of inspections documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted periodically at a frequency agreed upon by the Owner, the Architect and the Construction Manager, prior to the start of the work.
- F. Inspection of Fabricators: Where fabrication of structural load bearing members and assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be required by Section 17, and as required elsewhere in the BCNYS.
- G. Fabrication and Implementation Procedures: The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to the approved construction documents and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.
- H. Fabricator Approval: Special inspections required by the BCNYS are not required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon the review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the code enforcement official, stating that the work was performed in accordance with the approved construction documents.

SPECIAL INSPECTIONS & TESTS – The table below summarizes the special inspections & testing requirements of the contract, in conformance with BCNYS 1704.1.1. The Owner shall pay for all Special Inspections & Tests indicated below. (Note: This chart includes all items indicated within the BCNYS as requiring special inspections. These inspections shall be performed for all work items that are included within the project scope of work. If there is testing indicated for a material or component that is not required on the project, then it follows that there is no testing required for that item on the particular project in question.)

A. Soils				1704.7
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.7 – Required Verification and Inspection of Soils)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
1. Verify materials below footings are adequate to achieve the design bearing capacity.		X		1704.7
2. Verify excavations are extended to proper depth and have reached proper material.		X		1704.7
3. Perform classification and testing of controlled fill materials.		X		1704.7
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X			1704.7
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		X		1704.7
B. Foundation and Soil Investigations				1802.2
1. Questionable soil.	X			1802.2.1
2. Expansive soil.		X		1802.2.2
3. Groundwater table.		X		1802.2.3
4. Pile and pier foundations.	X			1802.2.4
5. Rock strata.		X		1802.2.5
6. Seismic Design Category C.		X		1802.2.6
7. Seismic Design Category D, E, F.		X		1802.2.7
C. Soil Classification		X		1802.3
D. Concrete Construction (per NYSBC Table 1704.4)				1704.4
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.4 – Required Verification and Inspection of Concrete Construction)	CONTINUOUS	PERIODIC	REFERENCE STANDARD (where applicable, see also Section 1707.1, special inspections for seismic resistance)	BCNYS REFERENCE
1. Inspection of reinforcing steel, including prestressing tendons and placement.		X	ACI 318; 3.5, 7.1-7.7	1913.4
2. Inspection of reinforcing steel welding, in accordance with Table 1704.3, Item 5B of BCNYS.			AWS D1.4, ACI 318; 3.5.2	
3. Inspection of bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased.	X			1911.5
4. Verify use of required design mix.		X	ACI 318; Ch.4, 5.2-5.4	1904.2.2, 1913.2, 1913.3

5. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X		ASTM C172, ASTM C31; ACI 318; 5.6, 5.8	1913.10
6. Inspection of concrete and shotcrete placement for proper application techniques.	X		ACI 318; 5.9, 5.10	1913.6, 1913.7, 1913.8
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI 318, 5.11, 5.13	1913.9
8. Inspection of prestressed concrete: a. Application of prestressing forces. b. Grouting of bonded prestressing tendons in the Seismic-force-resisting system.	X X		ACI 318; 18.20: ACI 318; 18.18.4	
9. Erection of precast concrete members.		X	ACI 318; Ch. 16	
10. Verification of in-situ concrete strength prior to stressing of tendons in posttensioned concrete and prior to removal of shores and forms from beams and structural slabs.		X	ACI 318; 6.2	
11. Inspect formwork for shape, location and dimensions of the concrete member being formed.		X	ACI 318; 6.1.1	
E. Pile Foundations: Installation and load tests.				1704.8
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.8 – Required Verification and Inspection of Pile Foundations)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
1. Verify pile materials, sizes and lengths comply with requirements.	X			
2. Determine capacities of test piles and conduct additional load tests, as required.	X			
3. Observe driving operations and maintain complete and accurate records for each pile.	X			
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document and pile damage.	X			
5. For steel piles, perform additional inspections in accordance with Section 1704.3.				1704.3
6. For concrete piles and concrete filled piles perform additional inspections in accordance with Section 1704.4				1704.4
7. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.				
8. For augured uncased piles and caisson piles, perform inspections in accordance with Section 104.9				1704.9
F. Pier Foundations: Seismic Design Category C, D, E, F				1704.9

INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.9 – Required Verification and Inspection of Pier Foundations)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE
1. Observe drilling operations and maintain complete and accurate records for each pier.	X				
2. Verify placement locations and plumbness, confirm pier diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end bearing strata capacity.	X				
3. For concrete piers, perform additional inspections in accordance with Section 1704.4					1704.4
4. For masonry piers, perform additional inspections in accordance with Section 1704.5					1704.5
G. Masonry Construction					
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) L1 = Level 1 Inspection required for empirically designed & nonessential facilities. (Per NYSBC Table 1704.5.1)	CONTINUOUS	PERIODIC	ACI 530/ASCE5 / TMS 402, BCNYS Ch. 35	ACI 530.1/ASCE6 / TMS 602, BCNYS Ch. 35	BCNYS REFERENCE
1. As masonry construction begins, the following shall be verified, to ensure compliance:					
a. Proportions of site-prepared mortar.		X	2.6A		
b. Construction of mortar joints.		X	3.3B		
c. Location or reinforcement, connectors, prestressing tendons and anchorages.		X	3.4, 3.6A		
d. Prestressing technique.		X	3.6B		
e. Grade and size of prestressing tendons and anchorages.		X	2.4B, 2.4H		
2. The Inspection Program shall verify:					
a. Size and location of structural elements.		X	3.3G		
b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	1.2.2(e), 2.1.4, 3.1.6		
c. Specified size, grade and type of reinforcement.		X	1.13, 2.4, 3.4		
d. Welding of reinforcing bars.	X		2.1.10.7.2, 3.3.3.4(b)		
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)		X	1.8C, 1.8D		2104.3, 2104.4
f. Application and measurement of prestressing force.		X	3.6B		
3. Prior to grouting, the following shall be verified to ensure compliance:					
a. Grout space is clean.		X	3.2D		
b. Placement of reinforcement and connectors and prestressing tendons and anchorages.		X	1.13, 3.4		
c. Proportions of site prepared grout and prestressing grout for bonded tendons.		X	2.6B		
d. Construction of mortar joints.		X	3.3B		
4. Grout placement shall be verified to ensure compliance with code and construction document provisions.	X		3.5		
a. Grouting of prestressing bonded tendons.	X		3.6C		

5. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X			1.4	2105.2.2, 2105.3
6. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		X		1.5	
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) L2 = Level 2 Inspection required for essential facilities. See 1704.5 for clarification. (Per NYSBC Table 1704.5.3)	CONTINUOUS	PERIODIC	ACI 530/ASCE5 / TMS 402, BCNYS Ch. 35	ACI 530.1/ASCE6 / TMS 602, BCNYS Ch. 35	BCNYS REFERENCE
1. From the beginning of masonry construction, the following shall be verified to ensure compliance:					
a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons.		X		2.6A	
b. Placement of masonry units and construction of mortar joints.		X		3.3B	
c. Placement of reinforcement, connectors and prestressing tendons and anchorages.		X	1.13	3.4, 3.6A	
d. Grout space prior to grouting.	X			3.2D	
e. Placement of grout.	X			3.5	
f. Placement of prestressing grout.	X			3.6C	
2. The Inspection Program shall verify:					
a. Size and location of structural elements.		X		3.3G	
b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	X		1.2.2(e), 2.1.4, 3.1.6		
c. Specified size, grade and type of reinforcement.		X	1.13	2.4, 3.4	
d. Welding of reinforcing bars.	X		2.1.10.7.2, 3.3.3.4(b)		
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)		X		1.8C, 1.8D	2104.3, 2104.4
f. Application and measurement of prestressing force.	X			3.6B	
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X			1.4	2105.2.2, 2105.3
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		X		1.5	
H. Steel Construction (per NYSBC Table 1704.3)					
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.3 – Required Verification and Inspection of Steel Construction)	CONTINUOUS	PERIODIC	REFERENCE STANDARD (where applicable, see also Section 1707.1, special inspections for seismic resistance)		BCNYS REFERENCE
1. Material verification of high-strength bolts, nuts & washers:					
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		X	Applicable ASTM material specifications. AISC 360, Section a3.3		
b. Manufacturer's certificate of compliance required.		X			
2. Inspection of high-strength bolting:					
a. Bearing-type connections.		X	AISC 360, Section M2.5		1704.3.3

b. Slip-critical connections.	X	X		
3. Material verification of structural steel:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.			ASTM A6 or A568	1708.4
b. Manufacturer's certified mill test reports.			ASTM A6 or A568	
4. Material verification of weld filler materials:				
a. Identification markings to conform to AWS specification in the approved construction documents.			AISC 360, Section A3.5	
b. Manufacturer's certificate of compliance required.				
5. Inspection of welding.				
a. Structural Steel:				
1) Complete & partial penetration groove welds.	X		AWS D1.1	1704.3.1
2) Multi-pass fillet welds.	X			
3) Single-pass fillet welds > 5/16"	X			
4) Single-pass fillet welds < 5/16"		X		
5) Floor and deck welds.		X		
b. Reinforcing Steel:				
1) Verification of weldability of reinforcing steel other than ASTM A706.		X	AWS D1.4, ACI 318:3.5.2	
2) Reinforcing steel-resisting flexural & axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls & shear reinforcement.	X			
3) Shear Reinforcement.	X			
4) Other reinforcing steel.		X		
6. Inspection of steel frame joint details for compliance with approved construction documents:		X		1704.3.2
a. Details such as bracing & stiffening.				
b. Member locations. c. Application of joint details at each connection.				
I. Wood Construction: Fabrication of wood structural elements & assemblies.				1704.6, 1704.2
J. Sprayed Fire-Resistant Materials				1704.10
1. Structural member surface conditions.				1704.10.1
2. Application.				1704.10.2
3. Thickness.			ASTM E 605	1704.10.3
4. Density.			ASTM E 605	1704.10.4
5. Bond Strength.			ASTM E 736	1704.10.5
INSPECTION AND TESTING (Continuous & Periodic as defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
K. Mastic and intumescent fire-resistant coatings			AWCI 12-B	1704.11
L. Exterior Insulation and Finish Systems (EIFS)				1704.12
M. Special Cases (unusual in it's nature)				1704.13
N. Smoke Control Systems (Ductwork)				1704.14
O. Special Inspections for Seismic Resistance: Applicable to specific structures, systems and components (Seismic Category C, D, E, F) **				1707
1. Structural steel (welding).	X		AISC 341	1707.2
2. Structural wood.	X	X		1707.3

3. Cold-formed steel framing.		X		1707.4
4. Pier Foundations		X		1707.5
a. During placement of reinforcement.		X		
b. During placement of concrete.	X			
5. Storage racks & access floors.		X		1707.6
6. Architectural components.		X		1707.7
7. Mechanical & electrical components.		X		1707.8
8. Designated seismic system verifications.				1707.9, 1708.5
9. Seismic isolation system.		X		1707.10
P. Structural Testing for Seismic Resistance: Applicable to specific structures, systems and components. (Seismic Category C, D, E, F) **				1708
1. Testing and verification of masonry materials and assemblies. (Level 1, 2 or 3)				1708.1
2. Testing for seismic resistance.				1708.2
3. Reinforcing and prestressing steel.			ACI 318, ACI 318:3.5.2	1708.3,
4. Structural steel.			AISC 341; AWS D1.1, ASTM A435, A898	1708.4
5. Mechanical & electrical equipment.				1708.5
6. Seismically isolated structures.			Section 17.8 ASCE 7	1708.6
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
Q. Structural Observations: Applicable to specific structures. (Seismic Category C, D, E, F) **				1709
R. Design Strengths of Materials			All design strengths and permissible stresses of any structural materials shall conform to the specifications and methods of design of accepted engineering practice or the approved rules in the absence of applicable standards.	1710.1
a. New Materials			For materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests as provided for in Section 1711.	1710.2; 1711
S. Alternative Test Procedures			Provide duly authenticated reports from approved agencies in respect to the quality & manner of use of new materials or assemblies as provided for in Section 104.11. Costs of all tests and other investigations required under the provisions of this code shall be borne by the Owner.	1711.1
T. Test Safe Load				1712.1
U. In-Situ Load Tests (Completed Building or Structure)				1713.1, NYSBC

				Chapter 35
V. Preconstruction Load Tests (Structural Adequacy)				1714, NYSBC Chapter 35
a. Load Test Procedures specified				1714.2
b. Load Test Procedures not specified				1714.3
c. Wall and partition assemblies				1714.4
d. Exterior window & door assemblies				1714.5
e. Test Specimens				1714.6
W. Material & Test Standards				1715
a. Joist Hangers & Connectors				1715.1
b. Concrete and Clay Roof Tiles				1715.2
X. Misc.				
1. Fire Resistant Penetrations & Joints Fire Stops Testing for Smoke Control		X	Ch.7 ASTM E119 UL 263	1705.17 1705.18
Y. Other (List)				
End				

**** - For Seismic Classification, see Code Analysis located within the Construction Drawings.**

Note: For projects utilizing a Construction Manager, the Construction Manager's involvement with Special Inspections and Testing shall be limited to documenting, witnessing, acquiring and filing copies of all reports prepared by the Special Inspectors and testing agencies, and sequentially transmitting copies of the reports to the Architect and the Owner. All reports shall be prepared and certified by the Special Inspector and Testing Agency in accordance with criteria established by, and in a format approved by, the Architect/Engineer, in complete conformance with the requirements of BCNYS Chapter 17, Section 1704. Where no Construction Manager is retained, coordination and documentation of tests shall be the sole responsibility of the Prime Contractor responsible for the work being tested, in conjunction with the testing agency's Special Inspector.

1.24 QUALITY ASSURANCE FOR WIND REQUIREMENTS

- A. Each of the main wind force-resisting systems that are identified within the construction documents are subject to special inspections and testing, in accordance with Section 1704 and other applicable sections of the Building Code of New York State.
- B. Wind force-resisting systems include the following; (refer to construction documents for more specific information concerning systems contained within a specific project.)
 1. Roof cladding and roof framing connections;
 2. Wall connections to roof and floor diaphragms and framing.
 3. Roof and floor diaphragm systems, including collectors, drag struts and boundary systems.
 4. Vertical windforce-resisting systems, including braced frames, moment frames and shear walls.
 5. Windforce-resisting system connections to the foundation.

6. Fabrication and installation of components and assemblies required to meet the impact resistance requirements of Section 1609.1.4 of the *BCNYS*.

Exception: Fabrication of manufactured components and assemblies that have a label indicating compliance with the wind-load and impact-resistance requirements of the *BCNYS*.

- C. Special inspections and testing, observations, frequency and distribution of reports shall be as indicated within other areas of this section.
- D. Contractor Responsibility: Each contractor responsible for the construction of a main wind force-resisting component listed in the quality assurance plan shall submit a written contractor's statement of responsibility to the code enforcement official and to the Owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:
 1. Acknowledgement of awareness of the special requirements contained in the quality assurance plan;
 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the code enforcement official;
 3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting, and the distribution of the reports;
 4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

1.25 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE (Section 1707 of *BCNYS*)

- A. Special Inspections for Seismic Resistance: Special inspection as specified herein is required for the following, where required in Section 1704.1 of *BCNYS*. Special inspections itemized in Sections 1707.2 through 1707.8 of the *BCNYS* are required for the following:
- B. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1616 of the *BCNYS*.
- C. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
- D. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Sections 1707.6 and 1707.7 of the *BCNYS*.
- E. For Seismic Classification specific to this project, see Code Analysis located within the Construction Drawings.

PART 2 – PRODUCTS – (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services performed on Work, repair damaged work and restore substrates and finishes to eliminate deficiencies including defects in visual qualities of exposed finishes. Except as otherwise indicated, comply with the requirements of the "Cutting and Patching" specification. Protect work exposed by or for service

activities and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of assignment of responsibility for inspection, testing or similar service.

END OF SECTION

SECTION 014529 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. From time to time during the progress of the Work, the Construction Manager or Owner may require that testing be performed to determine that the Work complies with the specified requirements.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 33 00 - Electronic Submittal Procedures specifies requirements for development of a schedule of required tests and inspections.
 - 2. Section 01 45 00 – Quality Requirements specifies the administrative and procedural requirements for quality control services.
 - 3. Section 01 45 33 – Special Inspections & Structural Procedures identifies the areas which must be tested.

PART 2 - PRODUCTS

2.1 TESTING LABORATORY

- A. The New York State Certified testing laboratory will be selected by the Owner.

PART 3 - EXECUTION

3.1 PAYMENT FOR TESTING SERVICES

- A. Except where specifically indicated as being the Contractor's responsibility, tests and inspections required by the Owner, Construction Manager and/or Architect will be paid for by the Owner.
- B. Retesting: When initial tests indicate non-compliance with Contract Documents, the responsible Prime Contractor is required to pay for all subsequent re-testing until compliance is accomplished.
- C. Contractor's Convenience Testing: Testing requested by the contractor for his information or convenience shall be paid for by Contractor.
- D. Code Compliance Testing Where indicated in the Documents, tests required by Building Code or Ordinances or by an approval authority shall be paid for by the Owner.

3.2 COOPERATION WITH TESTING LABORATORY

A. Access:

1. Provide representatives of the testing laboratory access to the work at all times.
2. Provide facilities for such access in order that the laboratory may properly perform its function.

B. Schedule and Notification:

1. When tests are required by the Contract Documents or by the Construction Manager, Architect or Owner, contractor will notify Construction Manager within 48 hours prior to expected time for operations requiring testing services.
2. If, after such notification, the testing laboratory is prevented from performing its work due to incompleteness of the project work, all extra costs for testing attributable to the delay shall be paid by the Contractor.

3.3 SPECIMENS

- A. All sampling equipment and personnel shall be provided by the testing laboratory.
- B. All deliveries of specimens and samples to the testing laboratory shall be performed by the testing laboratory.

END OF SECTION 014529

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

General

1.1 SUMMARY

This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

Temporary utilities include, but are not limited to, the following:

1. Sewers and drainage.
2. Water Service and distribution.
3. Stormwater control within building
4. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
5. Ventilation.
6. Electric power service.
7. Lighting.

Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Tree and plant protection.
3. Site enclosure fence.
4. Security enclosure and lockup.
5. Barricades, warning signs, and lights.
6. Temporary enclosures.
7. Site road access and traffic control
8. Temporary partitions.
9. Fire protection.

Unless work of this section is indicated to be provided under a specific contract, each Prime Contractor must provide, maintain and remove required temporary facilities necessary to perform his own construction activities.

Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

1.2 QUALITY ASSURANCE

Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.

3. Utility company regulations.
4. SED 155.5 Regulations
5. Police, fire department, and rescue squad rules.
6. Environmental protection regulations.
Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
7. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.3 PROJECT CONDITIONS

Temporary Utilities: Each contractor will prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-preventive measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist onsite.

1.4 DIVISION OF RESPONSIBILITIES

General: These Specifications assign the Contractor responsibilities. Each

Prime Contractor is responsible for the following:

1. Installation, operation, maintenance and removal of each temporary facility considered as its own normal construction activity, as well as the costs and use charges except as listed below.
2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
3. Generator power for their own work.
4. Its own storage, lockable Conex boxes and fabrication sheds. (Locate/Move as directed by CM)
5. Hoisting requirements, including hoisting loads in excess of 2 tons, hoisting material or equipment into spaces below grade, and hoisting requirements outside the building enclosure. (Rigging insurance must be provided when contractor hoisting equipment)
6. Collection and disposal of its own waste material.
7. Secure lock-up of its own tools, materials and equipment.
8. Construction aids PPE and miscellaneous services and facilities necessary exclusively for its own construction activities.
9. Maintaining temporary facilities provided by Contractor.

10. Containers for non-hazardous waste and debris generated by their own removals and construction operations.

1.5 USE CHARGES

General: Cost or use charges for temporary facilities are not chargeable to Owner, Architect or Construction Manager and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. The Architect and Construction Manager
2. Other Contractors.
3. Owner's construction forces, including testing agencies
4. Personnel of authorities having jurisdiction.

Water Service: Each contractor needs to provide their own water connections to existing services.

Electric Power Service: Temporary electric power including set-up and maintenance is the responsibility of the **Electrical Contractor**. Use charges by owner.

PART 2 - PRODUCTS

2.1 MATERIALS

General: Provide new materials. If acceptable to the Architect / CM, the Contractor may use undamaged, previously used materials in good condition. Provide materials suitable for use intended.

Lumber and Plywood:

1. For signs and directory boards, provide exterior-type, Grade B-B high density concrete form overlay plywood of sizes and thicknesses indicated.
2. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8- inch-thick exterior plywood.

Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

2.2 EQUIPMENT

Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Protect adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required.

Contractor shall provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

1. Arrange with utility company CM and Owner to make connections for temporary services.

3.2 CONTRACTOR FIELD OFFICES

Contractors may with permission from the construction manager establish a field office for their own use. Said offices for the individual prime contractor, sub-contractors, specialty contractors and the like shall be of such size and design as approved by the CM and shall be located in the Construction Managers designated area. Each representative contractor will arrange for telephone service and electric service, if required, directly with the utility company.

Maintain onsite, all articles for First Aid treatment. The contractor shall also establish standing arrangements for the immediate removal and hospital treatment of any employees and other persons on the job site who may be injured or who may become ill during the course work.

No space will be provided within existing buildings for use as a contractor field office.

3.3 TEMPORARY AND PERMANENT SERVICES, GENERAL

The Contractor's use of any permanent system or service of the building or portions thereof shall be subject to the Owners approval.

The Contractor shall be responsible for any and all damage to permanent services used and shall make good any and all damage to the satisfaction of the owner, prior to final completion and acceptance.

NOTE - In accordance with OSHA and other applicable regulations, the representative Contractors performing erection of structural "skeleton" type work are solely responsible for the netting, guard rail protection and such other safety devices as deemed necessary to protect the workers and public from harm.

3.4 TEMPORARY LIGHT AND POWER

Temporary Electric Power Service: **Electrical Contractor** shall provide and pay all costs to provide a weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period.

1. Responsibility: All work under this section to be provided by the **Electrical Contractor**.
2. Temporary services for temporarily or permanently installed building equipment such as sump pumps, boilers, cabinet heating and/ or cooling units and fans shall be furnished, installed, operated and maintained so that the said equipment may be operated for drainage and temporary heat when required and/ or when so ordered by the Architect/ Construction Manager.
3. Electrical Contractor shall maintain all parts of the electrical system (temporary and

permanent power) active and in-service at all times throughout the contract duration as governed by the Construction Manager. All temporary lighting to be controlled by standard switches per code (outside of power panels).

4. Electrical Contractor shall maintain power during the hours established by Construction Manager.
5. Temporary Service: Install service and grounding in compliance with the National Electric Code (NFPA 70). Include necessary meters, transformers, overload protected disconnect and main distribution switch gear. Comply with all NECA, NEMA and UL Standards
6. Provide temporary service with an automatic ground-fault interrupter feature, activated from the circuits of the system.
7. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead. Rise vertically where wiring will be least exposed to damage from construction operations.
8. Provide metal conduit, tubing or armored cable for protection of temporary power wiring where exposed to possible damage during construction operations. Where permitted by code, wiring of circuits not exceeding 110-120 Volt 20 Amp rating and wiring of lighting circuits may be non-metallic sheathed cable in areas where located overhead and exposed. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide metal enclosures or boxes for wiring devices.
9. Provide overload-protected disconnect switch as required by code.

TEMPORARY ELECTRICAL AND TELEPHONE SERVICES

1. Temporary Power Source: At each building / renovation area, use the existing electrical power distribution system for temporary power source.
2. Owner's Requirements: Do not disrupt the Owner's needs for continuous power at each building.
3. Electrical Contractor shall provide temporary power and lighting facilities for use of all trades. All temporary light and power shall be in accordance with the required Codes and Safety Standards.
4. Construction Manager trailer hook up at the Bedford Fox Lane Campus staging area was already completed in last phase. Electrical Contractor shall include in their base bid all costs for disconnection and removal of electrical service.
5. All other contractor trailer use / connection charges for power and telephone to be paid for by the respective contractor.

TEMPORARY POWER DISTRIBUTION

1. General Requirements: Electrical Contractor shall provide feeders and branch circuits of adequate size and proper characteristics as required to supply temporary receptacle and lighting loads. Size service and feeder conductors to restrict voltage drop to maximum 5 percent at 80 percent power factor. Provide properly sized overcurrent protection for each temporary electrical circuit.

RECEPTACLE REQUIREMENTS

1. General Requirements: Provide temporary receptacle outlets as required Minimum Requirements: Provide a minimum of one quad 120-volt receptacle per 250 square feet of building floor area, with maximum spacing of 50 feet on center for operation of portable tools and appliances during the construction period.
2. Branch Circuits: All temporary receptacle branch circuits to be rated 20 amps with a maximum of (3) duplex receptacles per circuit. Temporary receptacle branch circuits shall be independent of temporary lighting circuits.

LIGHTING REQUIREMENTS

1. General Requirements: **Electrical Contractor** shall provide both interior and exterior lighting at areas as required to provide adequate illumination for safe and proper construction operations and Project Site security.
2. Minimum Requirements: Provide illumination levels adequate for construction operations and safe traffic conditions. As a minimum provide one 200-watt lamp per 400 square feet of building floor area, with maximum spacing of 20 feet. Any rooms in excess of 500 sf will receive one 400-watt metal halide fixture for each 1000 sf of area. (or LED equivalents).
3. Supplemental Lighting: If required, supplemental lighting beyond minimum requirements shall be provided via suitable portable lighting units with cord and plugs, and shall be paid for by the Contractor or Sub- Contractor requiring such additional lighting.
4. Branch Circuits: All temporary lighting branch circuits to be loaded to a maximum of 1400 watts per 20amp circuit. Temporary lighting branch circuits shall be independent of temporary receptacle circuits.
5. Restrictions: Do not use permanent lighting systems for temporary construction lighting purposes.

MAXIMUM LOADS

1. General: Lighting and power loads connected to the temporary power distribution system shall be limited to the following maximum individual loads:

a.	Load Type	Maximum
b.	120 volt, 1-phase	1.5 KVA
c.	208 volt, 1-phase	2.5 KVA
d.	208 volt, 3-phase	5.0KVA
2. General: The temporary power distribution system shall be sufficiently sized to provide temporary power as required within this section. Meter and Meter connections to be part of electrical contractors base bid.

ELECTRICAL WELDERS

1. Separate Power Sources Required: Power for electric welders and for other loads larger than the maximum allowable sizes shall be taken from portable power sources provided, paid for and operated by the Contractor or Sub- Contractor requiring the use of such equipment. Remove such power sources when no longer needed.

ELECTRICAL ENERGY COSTS

1. Paid By Owner: Charges for electrical energy usage for temporary power and lighting will be paid by the Owner, when taken from the Owner's electrical services. Contractor and Sub-Contractors shall exercise measures to conserve energy usage. Use of owner electric for items not specific to project (e.g. heating construction shanties, etc.) will not be permitted

3.2 TEMPORARY TOILET & SANITARY FACILITIES

Sanitary Facilities: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than

specified requirements. Install in locations which will best serve the project's needs. Existing facilities should not be used.

The **General Contractor** is responsible for sanitary facilities at both FLHS & FLMS building locations. These responsibilities include: maintenance, cleaning and supplies for use by all trades for the entire duration of the project. Sufficient quantity/locations to properly handle the number of workers onsite. (Minimum 1 per 10 employees) Provide separate toilet facilities for male and female construction personnel.

Supply and maintain toilet tissue, paper towels, paper cups and other disposable materials as appropriate for each facility, including Owner's Representative's temporary offices for full contract duration. Provide covered waste containers for used material. Provide separate toilet facilities for male and female construction personnel.

3.7 TEMPORARY WATER

Each Contractor shall handle their own temporary water services:

1. Provide and pay for all connections
2. Protect temporary and permanent lines against any damage.
3. Provide all hose and other extensions from connections installed by the Plumbing Contractor and all labor, materials and supplies required to supply water to the work.
4. Prevent water damage to the work.

3.8 STORAGE FACILITIES

Each Contractor shall provide temporary storage and other facilities as required for their own use. Temporary structures shall be located at the Construction Manager's designated staging area and shall be removed upon completion of the work or when directed.

Materials delivered to the site shall be safely stored and adequately protected against loss or damage in watertight, environmentally controlled, lockable, Conex boxes. Particular care shall be taken to protect humidity/temperature sensitive materials (e.g. – wood doors, casework, ceiling tile, etc) in the proper climate-controlled environment. All costs for properly storing materials is paid for by applicable contractor in their base bid.

Due to limited on site storage space, each Contractor shall coordinate delivery of his materials with the Construction Manager who will determine when large deliveries shall be made and shall be designate storage locations on site for delivered materials. **All stored materials must be stored in locked, watertight trailers, paid for by applicable contractor.**

3.9 SCAFFOLDING AND STAGING

All scaffold, staging and appurtenances thereto shall comply in total to the requirements of Safety and Health Regulations for Construction Chapter XVII of OSHA, Part 1926 and all related amendments.

3.10 RUBBISH CONTAINER

Each Contractor shall provide suitable rubbish container device(s) for his own use, properly maintained and serviced, replaced as required and protected from access by the public fencing as may be specified herein or approved by the Architect or Construction Manager.

Each Prime Contractor and Subcontractor shall sweep up and gather together daily all his own rubbish and removed materials and place same in containers.

3.11 CONSTRUCTION FENCING

Temporary construction fencing shall be of good quality and neat in appearance; 6' high chain link fencing, 9 ga fabric. Open-Mesh Chain Link Fencing: Provide 0.120-inch-thick, galvanized steel posts, (on stanchions at paved areas) and 2.875" dia. Gate posts. Provide lockable gates. (Keys to owner, architect and CM). Provide 10' wide removable fence panels with roller, as shown on provided drawings.

Site access gates shall be provided as required, complete with all operating hardware and security devices.

Should fencing be required to be relocated or modified during the course of the project due to additional access needed by the contractor, same shall be done at the total expense of the contractor.

General Work Contractor shall provide staging areas at FLHS & FLMS as per marked drawing at the end of this Specification Section

- a) In addition to the staging plan fencing, the General Contractor shall provide an additional enclosure. 75' x 75' x 6' high on stanchions with 20' gate to be located at the Construction Managers direction. (include all costs in base bid).

3.12 DAILY CLEANUP

Each Contractor shall furnish daily janitorial services for the project and perform any required maintenance of facilities as deemed necessary by the Construction Manager during the entire life of the contract. If any contractor fails to keep the site safe and broom clean within 4 hours of being notified by CM, either verbally or in writing, the construction manager will have the cleanup work performed by others and the contractors will be back charged accordingly.

1. In addition to the above, the **General Contractor** shall provide a daily sweep and a weekly damp mop of all work areas.

3.13 BURNING

Burning will not be permitted.

3.14 FIRE PREVENTION CONTROL

Each Contractor shall comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to the work and, particularly, in connection with any cutting or welding performed as part of the work.

3.15 TEMPORARY FIRE PROTECTION

Each Contractor shall take all possible precautions for the prevention of fires.

1. Where flame cutting torches, blow torches, or welding tools are required to be used, their use shall be as approved by the Construction Manager at the site.
2. When welding tools or torches of any type are in use, have available in the immediate vicinity of the work a fire extinguisher of the dry chemical 20 lbs. Type. The fire extinguisher(s) shall be provided and maintained by the Contractor doing such work.

Fuel for cutting and heating torches shall be gas only and shall be contained in Underwriters laboratory approved containers.

No volatile liquids shall be used for cleaning agents or as fuels for motorized equipment or tools within a building except with the express approval of the Owner and/or Architect and in accordance with local codes. On-site bulk storage of volatile liquids shall be outside the buildings at locations directed by the Owner, who shall determine the extent of volatile liquid allowed within the building at any given time.

Each Contractor shall comply with the following requirements relating to compressed gas:

3. Where compressed gas of any type is used for any purpose at the site, it shall be contained in cylinders complying with ICC regulations. Gases of different types shall not be stored together except when in use and when such proximity is required.
4. All persons required to handle gas cylinders or to act as temporary firemen (Fire Watchers) shall be able to read, write and understand the English language; they shall also be required by the Contractor to read Part 3 of Pamphlet P-1 "Safe Handling of Compressed Gases" published by the Compressed Gas Association, 500 Fifth Avenue, New York, NY 10036.

Each Contractor shall comply with the following requirements relating to welding and cutting:

5. All cutting and/or welding (electric or gas) must be done only by skilled, certified and licensed personnel.
6. During welding or cutting operations, a contractor's man shall act as a fire watcher. The fire watcher shall have proper eye protection and suitable firefighting equipment including fire extinguisher (bearing current inspection Certificate), protective gloves and any other equipment deemed necessary.
7. Tanks supplying gases for welding or cutting are to be placed in an upright position securely fastened, and close as practical to the operation. Tanks, actives or spares, shall be protected from excess heat and shall not be placed in stairways, hallways or exits. When not in use, protective valve cap shall be screwed on the cylinder.
8. Adequate fire extinguishing equipment shall be maintained at all welding or cutting operations.

3.16 VENTILATION AND HUMIDITY CONTROL FOR CONSTRUCTION:

General Contractor will provide temporary ventilation as required for protecting the building from any adverse effects of high humidity during construction activities. Select dehumidification and ventilating equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements and have sufficient quantity of units to produce necessary ambient conditions.

1. **Interior Dust Mitigation & Environmental Protection / Plan** - The construction work will be taking place next to occupied area thus the General Contractor will provide and maintain a strict negative air environment with machines of sufficient size/qty to properly ventilate the square footage of the work areas. Any dust/fumes must be exhausted through a flexible hose using a temporary up-blast fan to above roof to completely eliminate any vapors/odors/dust. This includes properly sealing windows, doors and openings to create a negative air environment. The contractor's protection plan will be submitted in advance and include a detailed and highlighted sketch of the program and a narrative explaining sequencing and procedures to insure no infiltration to other areas
2. Each Contractor shall be responsible for his own temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity.
3. Ventilate enclosed area to dissipate humidity, and to prevent accumulation of dust, fumes, vapors or gases.

4. Provide equipment as necessary for air and fresh exchange for the work area per OSHA standards.
5. If Contractor fails to adequately ventilate the building during the construction process, thereby causing humidity and possible mold issues, the owner will hire others to properly address and deduct costs from the Contractor accordingly.
6. General Contractor will provide negative air environment of sufficient size/qty to fully ventilate the square footage of work areas and exhaust any dust/fumes through flexible duct hose to exterior top eliminate any orders / smoke.
7. Any contractor allowing water infiltration to building is responsible for cleanup and commercial dehumidifiers of sufficient size/qty to prevent mold growth. Failure to immediately address (4 hours' notice) will result in the owners hiring others and back-charging in order to insure a safe environment.

3.17 TEMPORARY ROADS, TRACKING PADS, PARKING AREA AND CONCRETE WASHOUT PITS: (all work by GC)

1. **Temporary roads/ Parking Area /Tracking pad areas at each field location** will consist of one-layer soil separation fabric, 8" of 2" crushed stone. Contractor will maintain and field dress with additional material as necessary to prevent ruts and potholes.
2. Above work includes access / delivery to work areas, and to equipment and storage areas and sheds.
3. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust. Contractor must maintain dust control on a continuous basis.
4. Road Cleaning: Maintain roads and walkways in an acceptably clean condition. This includes the removal of debris daily, if required, and/or a minimum of once a week due to all project traffic. Road cleaning equipment to be wet/vacuum type. The General Contractor will clean any construction-related dirt/debris from Town and State roadways as well as district access drives and parking lots throughout the duration of the project. Temporary parking by construction personnel shall be allowed only in areas so designated.
5. General Work Contractor is responsible for all snow and ice removal for access to their work locations. This includes, temporary roadways, CM trailer and access to staging areas. Stockpile snow in areas as designated by Construction Manager.

3.18 DE-WATERING FACILITIES AND DRAINS

Each Prime Contractor is directly responsible for de-watering of their excavations. The responsibility of de-watering of the site as to facilitate the work will be the responsibility of the Sitework Contractor, coordinate with CM.

Comply with requirements in applicable Division 31 Sections for temporary drainage and de-watering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.

Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.

3.19 ROOF PROTECTIONS

- A. All Contractors shall provide temporary protection on the roof surface when it is necessary for work to take place on completed sections. (Minimum 2" Poly-Iso insulation and plywood)
- B. Upon such notification as required in subparagraph A, the Contractor shall assume responsibility for damages, if any, to the roofing system caused by the work of other trades, except that financial liability for any and all damages rests with the offending trade.

3.20 TEMPORARY SITE SAFETY AND DIRECTIONAL SIGNS

- A. The **General Contractor** shall provide signs as required below. Install signs where required or indicated to inform public and persons seeking entrance to project. All signage and posts become the property of the owner at the conclusion of the project.
- B. Construct signs in accordance with section 619 of the NYS DOT standard specifications (MUTCD overall sign size, letter size, metal signage). Support on breakaway metal posts or attach to fencing; do not attach signs to buildings or permanent construction.
- C. Include relocating temporary site safety and directional signs as many times as required or directed.
- D. For construction traffic control/flow at entrances/exits, as designated by the Owner (6 required) Large sign 4' x4' Orange with Black Letters ("Construction Entrance Only")
- E. To direct visitors (4 required)
- F. For construction parking (2 required)
- G. To direct deliveries (4 required)
- H. Emergency egress only – Construction area (4 required)
- I. Per OSHA standards as necessary
- J. For "No Smoking" safe work site at multiple locations (12 required)
- K. Construction Area – Do Not Enter (30) mount on fence
- L. No Trespassing (30) mount on fence
- M. A premobilization meeting to establish location and quantities of all signage will be held with contractor, Construction Manager, and owner. Prior to the start of any actual work the signage must be reviewed / approved by the Construction Manager.

3.21 STORMWATER CONTROL

The General Work Contractor shall provide earthen embankments, silt fence, haybales, and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains during sitework activities.

3.22 BARRICADES, WARNING SIGNS AND LIGHTS:

Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard.

3.23 TEMPORARY ENCLOSURES

- A. **General Contractor** will provide temporary 2" x4" wood framing, 2" polyiso insulation, ½" plywood, and cover with 6 mil plastic; for any open exterior window removal, wall removal, door entrance locations, etc. created as part of their contract for weather and security protection at the end of each workday.

Any other temporary enclosures for specific openings for a contractor to perform their work are the responsibility of the contractor creating the opening and shall be installed to protect the building from exterior elements, security issues, odors / noise resulting from construction.

3.24 TEMPORARY DUST PARTITIONS and FLOOR PROTECTIONS

- A. **General Contractor** shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate work areas from fumes.
1. Construct dustproof, floor to ceiling partitions of not less than 3-5/8" – 20 Ga. studs, 2 layers of 6 mil poly sheets inside / outside, sound batt insulation, exterior sheathing 5/8" plywood, interior sheathing 5/8" gypsum taped/painted where owner occupied. Caulk seal joints and perimeter to prevent dust migrations. Equip partitions with dustproof doors and security locks.
 2. Cover floor with 2-layer poly and extend up the side 18". Overlap and tape full length joints
 3. In addition to any temporary partition locations shown on attached drawing, General Contractor will include in his base bid 7 ea. 9' x12' temporary partitions meeting the above criteria for use where directed.
 4. Temporary Floor Protections – Shall be "Ram-Board" **Heavy Duty** with taped joints or equivalent. Finish Flooring (new or existing) will be fully covered by GC. Areas of isolated MEP work will be protected with Ram- Board by the individual prime contractor
 5. Any unfinished openings (e.g. – windows, doors fire shutters, etc.) which remain in place by the start of school in September will be completely enclosed with fire-rated AC plywood painted.

3.25 OPERATION, TERMINATION, AND REMOVAL

Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

Termination and Removal: Unless the Architect/ CM requests that it be maintained longer, remove each temporary facility when the need has ended or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been affected because of interference with the temporary facility.

Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractors property.
2. At Substantial Completion, clean and renovate permanent facilities used during the construction period including.

END OF SECTION

Section 015600 CONSTRUCTION DUST CONTROL

PART 1: General - General Work Contractor shall provide Construction Dust Control and IAQ Plan

1.1. Related Documents

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Divisions -1 Specification Sections, apply to work specified in this section.

1.2. Summary

A. Section Includes:

1. Airborne construction dust/ containment control in:
 - a. Buildings occupied during remodeling
 - b. Existing building temporarily unoccupied
 - c. Finished spaces that are unoccupied and construction dust/airborne containments are still being generated (i.e. punch list completion)

B. Related Sections:

1. Division 1 – Cutting and Patching
2. Division 1 – Electronic Submittal Procedures dust/airborne contaminants.
3. Division 1 – Temporary Facilities & Controls
4. Division 2 – Selective Demolition

1.3. Policy

- A. Airborne contaminants control is critical in all areas noted in Paragraph 1.2A. Contractor shall limit dissemination of airborne contaminants produced by construction-related activities, including dust, chalk, powders, aerosols, fumes, fibers and other similar materials, in order to provide protection of persons and equipment.
 1. Construction activities causing disturbance of existing dust, or other airborne contaminants, must be conducted in tight enclosures cutting any flow particles into occupied areas.
 2. Ceilings, walls in Project area must be secure at all time.

1.4. Submittals

- A. Progress Schedules: Submit work areas and procedure schedules for containment of construction dust/airborne contaminants.
- B. Construction Indoor Air Quality Plan (IAQ): Narrative, Drawings and detail of extent of enclosures, construction of necessary temporary dust barriers and negative exhaust fans, and description of procedures to be used to achieve and maintain control of construction-related airborne contaminants.

1.5. General Access Procedures

- A. No work is to be performed in Occupied Areas.
- B. Duct Control Preconstruction Meeting: Before any construction on site begins, Contractor and workers are required to attend a mandatory dust control preconstruction orientation

session held by Construction Manager/Architect for training and instruction on precautions to be taken.

1. Conditions in construction area may be presumed to be in a condition similar to other existing surfaces or a survey of work area to record pre-existing damage may occur at this time.
- C. Notification; Contractor shall notify Construction Manager / Architect a minimum of 48 hours prior to starting construction activity which might be expected to produce excessive construction dust and airborne contaminants in occupied areas so that additional precautions may be taken.

1.6. Testing

- A. The Owner may provide the following test and observations:
 1. Air Samples: Baseline particles count and conduct periodic air sampling of Project Areas during construction to monitor effectiveness of containment procedures.
 2. Air Pressure: Using visual indicators, the maintenance of negative air pressure in Containment Area relative to Project Areas will be verified on a daily basis.

1.7. Definitions

- A. Containment producing activities include, but are not limited to:
 1. Demolition and removal of walls, floors, ceilings and other finish materials.
 2. Demolition of plumbing, mechanical and electrical systems and equipment.
 3. Finish operations such as saw cutting, shot blasting/grinding, sanding, painting, and application of special surface coatings.
- B. Containment Areas: Includes area of construction, adjacent staging and storage areas, and passage, as well as areas connected to construction area by mechanical system air intake, exhaust and ductwork.
- C. Project Areas: Includes occupied areas adjacent to Project Area, either occupied or used for passage as well as areas connected to construction area by mechanical air system air intake, exhaust and ductwork.

PART 2: Products

2.1. Materials

- A. Carpet or Mats: Provide carpets or mats at both sides of the containment entrances, vacuumed or change as often as necessary (minimum daily) to prevent accumulation of dust. All vacuuming outside areas not under negative pressure shall be with a certified HEPA-filtered vacuum.
- B. Dust Caps: Block off all existing ventilation ducts within the construction area. Method of capping ducts shall be dust tight, withstand airflow and potential damage from construction activities.
- C. Portable Enclosure: Whenever work is done outside existing barricaded work areas, provided 4 mil portable polyethylene enclosure capable of sealing off opening fitted tight to ceiling, or provide prefabricated unit.
- D. Polyethylene: Polyethylene shall be fire retardant type listed by Fire Underwriter's Laboratories, Griffolyn #T55R WITH Griffolyn fire retardant tape, or equal.

- E. Exhaust Fans / Negative Air Fans: Maintain continuous uninterrupted operation. Fans to have standard construction filtration prior to exiting the building. Filters to be maintained, cleaned and or replaced on a daily basis

PART 3: Execution

3.1. Inspection

- A. Before any demolition or construction begins, a complete field review of all Project Areas (airborne contaminant control areas) and policies will be conducted and work plan revised if required. Initial work plan shall be presented at dust control preconstruction meeting.

3.2. Containment Enclosures and Barriers

- A. Air Quality Contaminant Control: Fasten windows shut, ventilate partitioned construction areas by use of fans to the outside of building.
 1. Maintain a minimum negative airflow of 3 Air Changes per hour with door fully open at construction entrance by use of negative air fans vented to outside of building.
 2. Secure operable exterior windows and doors/windows not required for construction access as required to maintain negative airflow.
 3. Provide additional local exhaust during welding.
- B. Contractor shall install dustproof enclosures for work as submitted on work plan.
 1. Construction must be conducted in tight enclosures cutting off any flow of dust particles into occupied areas.
 2. The contractor shall provide additional dustproof enclosures as requested by the Owner when enclosure locations are not adequately containing the dust.
 3. Provide all barricades, warning signs, and warning lights to protect the Occupants, the existing building, storage areas and materials or equipment.
- C. Dust Partitions: See 015000 Temporary Partitions and Floor Protections - Full height, noncombustible construction, with minimum 5/8-inch type x gypsum board both sides with 3-1/2-inch R -11 insulation batts. Seal top, bottom, and all seams to prevent spread of dust to occupied areas, including above ceiling.
 1. Doors as shown: 3'-0" minimum width (pair of 3'-0" wide doors as required by plans), solid core wood with metal frame and hardware, panic hardware if within occupied areas requiring such, hold open tied to Fire Alarm Systems, including closer, tightly weather-stripped to prevent flow of dust. Locate as directed and swing out of construction are (unless directed otherwise by fire marshal). Keep barriers locked outside of working hours. Provide signage at each door "Keep Door Closed." Three keys for emergency access shall be furnished to the Owner.
 2. Seal all penetrations, ductwork, piping, conduit, structure and miscellaneous penetrations in enclosure barricades.
 3. Materials for barricade shall be precut in unoccupied areas.

- D. Enclosure outside of work area (including spaces above ceilings): Whenever work is necessary outside of the construction area the space where work is being done, including ladders, shall be contained within full height enclosure. Contractor may use prefabricated unit.
 1. All work performed outside the construction barricade shown on drawings including all work in corridors and lobbies shall be performed outside of normal working hours and shall be schedule in advance with Owner except where specified otherwise.
 2. At no time shall any construction equipment or material be stored outside the construction area.

- E. Furniture and Equipment Protection:
 1. Cover all furniture and equipment remaining in the space with polyethylene. Seal with tape to prevent dust/dirt from reaching the furniture and equipment.

3.3. Procedures

- A. **General Work Contractor shall provide** and maintain the Construction Indoor Air Quality Plan including all barriers, negative air systems, filters, ventilation, walk-off mats and cleaning and removal procedures as detailed in the work plan.
 1. Traffic between work areas into Occupied areas is not allowed. Instruct workers to refrain from opening windows or doors allowing construction dust/airborne contaminants into adjacent occupied or finished areas. Any dust tracked outside of construction area shall be cleaned up immediately. Contractor shall have the necessary manpower and equipment (HEPA vacuum cleaners, dust and wet mops, brooms, buckets and clean wiping rags) to keep adjacent occupied areas clean at all time. Keep door to such areas closed at all times. Transport materials and refuse into an area from an external site without violating occupied areas by transporting in covered containers.
 2. Provide negative pressure in construction area by use of negative air system to the outside of the building. Block supply and return ventilation as to not recirculate air from construction area to air handlers suppling occupied areas. Rebalance air handling equipment to maintain correct airflow to occupied area.
 - a. Provide adequate forced ventilation of enclosed areas to cure installed materials, to prevent excessive humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases in the building.
 - b. Direct exhaust from equipment away from building air intakes and operable windows; assure that filters on building air intakes are operational and protected from excessive amounts of airborne contaminants. Cover intakes of air handling equipment not in operation in proximity to exhaust locations.

- B. Sealing of Openings: Use tape or other impenetrable sealant to seal barrier wall seams, crack around window and door frames, exhaust system ductwork, pipes, floor penetrations, joints and ducts. Seal or filter all open return and exhaust ductwork.

- C. Dust Control: The Contractor shall take appropriate steps throughout the term of the Project to prevent airborne dust due to work under this contract. Water shall be applied wherever practical to settle and hold dust to a minimum particularly during demolition and moving of materials. No chemical palliatives shall be used without permission of the Owner's Representative.
 - 1. Spray surfaces with water mist during dust- producing interior demolition activities. Hard surface floors in work area, adjacent hallways and passage areas require vacuuming with HEPA- Filtered vacuum cleaners and frequent wet-mopping during demolition and construction; project adjacent carpeted areas with plastic and plywood and vacuum with HEPA-filtered vacuum cleaners.
 - 2. Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent airborne dust from dispersing into atmosphere.
- D. Whenever access panels are opened in occupied areas, for work above ceilings, provide portable enclosure ladder and sealing off opening, fitted tight to ceilings.
- E. Provide thorough cleaning of existing surfaces which become exposed to dust, before start of Owner's occupancy.

3.4. Final Cleaning

- A. Removal of construction barriers shall be done carefully, and when necessary, outside of normal work hours. Remove all tape residue from existing/new surfaces. HEPA vacuum and clean all surfaces free of dust after the removal prior to Owner's occupancy.
- B. Rebalance existing HVAC systems to restore modified systems back to the original design intent

3.5. Enforcement

- A. Failure to maintain containment areas will result in issuance of written warning: if situation is not corrected within Four (4) hours of receipt of warning, Owner will have cause to stop the work as provided in the General Conditions of the Contract for Construction. All costs associated with Owner's written order to stop the Work and remobilization shall be borne by the Contractor.

CONSTRUCTION INDOOR AIR QUALITY (IAQ) PLAN

The **General Work Contractor** shall complete and submit this Plan no later than thirty (30) days after receipt of Notice to Proceed and not less than 15 days from the start of work.

General Work Contractor:

Name: _____ Title: _____

Telephone: _____ Fax: _____

Email: _____

I have read and understood and will implement the following Construction IAQ Plan

Signature: _____ Date: _____

I. CONSTRUCTION DUST CONTROL AND VENTILATION

<p>Provide a written narrative and plan associated with the required dust control and ventilation</p>	
<p>Required</p>	<ul style="list-style-type: none"> • Dust Partitions as per the phasing and logistics plans included with specification section 015000 • Modify and/or Add Partitions as shown withing phasing and logistics plan • Floor Protections as required • Temporary ventilation/Negative Air Environment will be provided during all dust producing activities. See item I Construction Ventilation above. All supply air diffusers and return air grilles will be covered. • Negative Air Ventilation with filtration to provide no less than three air changes per hour. Negative Air Fans and System per floor or Work Area as needed. • Ventilation will be continuous for a period no less than 72 hours after completion of installation of any VOC emitting materials.

END OF SECTION 015600

DIVISION 01 – GENERAL REQUIREMENTS
SECTION 016000 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Sections:
 - 1. Section 002113 – Instructions to Bidders
 - 2. Section 004200 – Proposed Equivalent Form
 - 3. Section 004300 – Proposed Substitution Form
 - 4. Section 012300 – Alternates
 - 5. Section 014219 – Applicable Standards

1.03 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "assembly methods," "manufacturer," "brand," "tradename," or "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. "Or Equal" Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
 - 4. Reference to be approved equal or similar terms mean that approval of the Architect is required.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification. If the Contractor chooses to furnish an alternately named manufacturer or product, a substitution request must be made in accordance with Section 002113 and Section 004300.

1.04 SUBMITTALS

- A. "Or Equal" Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Or Equal" Section 2.02 in this Specification.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 10 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section – 013300 – Submittal Procedures.
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section – 013300 – Submittal Procedures. Show compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.06 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.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather- protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.08 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. **Manufacturer's Warranty:** Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.
1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
 2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. **Submittal Time:** Comply with requirements in Section 017000 – Contract Closeout.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

- A. **General Product Requirements:** Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "as selected," sample to be matched is the Architect's.
6. Where products are accompanied by the term "match existing," sample to be matched is material adjacent.
7. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
8. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Or Equal" Section 2.02 in this Specification to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience may not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience may not be considered.
3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered if requested and documentation is submitted to Architect/ Engineer for review as required elsewhere in these specifications.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Or Equal Products" Section 2.02 for consideration of an unnamed product.
4. Manufactures:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered if requested and documentation is submitted to Architect/ Engineer for review as required elsewhere in these specifications.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Or Equal Products" Section 2.02 for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Or Equal Products" Section 2.02 for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Instructions to Bidders Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
 - 1. Architect is permitted to require a custom color, at no charge to the Owner, when a standard or premium finish does not align with an existing color match or with the intent of the Architect's color palette selections.

2.02 "OR EQUAL" PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

2.03 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.

2.04 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 affected by Change Order.

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 017329 – CUTTING AND PATCHING**PART 1 - GENERAL****1.1. SUMMARY**

- A. This section includes procedural requirements for cutting and patching.
- B. Related sections include the following:
 - 1. Division 02 through 28 sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.
 - a. Requirements in this Section also apply to Mechanical and Electrical installations associated with this project.
- C. Division of Responsibilities for Cutting and Patching Work: Each Prime Contractor shall perform cutting and patching required for its portion of the work.

1.2. DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other work.

1.3. SUBMITTALS

- A. Cutting and Patching Plan: Where approval of procedures for cutting and patching is required before proceeding (see Article 1.4 below), submit a proposed plan describing procedure at least 14 days before the time cutting and patching will be performed requesting approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to existing construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in buildings appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 6. Structural Elements: Where cutting and patching involved adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4. QUALITY ASSURANCE

- A. Minimize cutting and patching of work by properly coordinating construction sequences with Architect.
- B. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
 - 1. Obtain Architect's approval before cutting and patching any structural work that is not indicated on drawings.
- C. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 1. Obtain Architect's approval before cutting and patching any operational element that is not indicated on drawings.
- D. Miscellaneous Elements: Do not cut and patching the following elements or related components, that are not indicated on drawings, in a manner that could change their load-carrying capacity, that results in increased maintenance or decreased operation life or safety.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Equipment supports.
 - 4. Piping, ductwork, vessels, and equipment.
 - 5. Noise and vibration-control elements and systems.
- E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCT

2.1. MATERIALS

- A. General: Comply with requirements specified in other sections of these specifications.
- B. OSHA approved systems, equipment, scaffolding, PPE, lanyards, rigging, etc.
- C. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1. EXAMINATION AND SAFETY

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions are corrected.

3.2. PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Roof Water Tightness – Contractor must ensure that proper weather conditions, protections, and manpower are present prior to cutting existing roof areas. Contractor is responsible for any interior damages with any direct/indirect costs which accrue if they fail to maintain water tightness.
- C. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection for any portions of project that might be damaged/soiled during cutting and patching operations.

3.3. PERFORMANCE

- A. General: Each trade shall employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition(s).
 - 2. Related Electrical and Mechanical work will be performed by licensed subcontractors.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Each trade shall patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other sections of these specifications. Utilize workers who are authorized/skilled in the discipline to be patched (e.g.-mason, carpenter, painter, etc.)
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where portions of walls or partitions that are removed extend on finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch, from wall-to-wall or corner-to-corner. Provide additional coats until patch blend with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4. CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely: paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 017329

SECTION 017423 – CLEANING UP - BUILDING**PART 1 - GENERAL****1.1. DESCRIPTION OF THE WORK**

- A. The work of this section relates to the following:
 1. Maintain all premises and public properties/roadways free from accumulation of waste, debris, dirt, mud and rubbish caused by operations on a daily basis.
 2. At completion of work, remove waste materials, rubbish tools, equipment, machinery and surplus materials, and clean all sight exposed surfaces; leave project clean and ready for occupancy.
 3. Remove all overspray caused by construction operations from adjacent construction, surfaces and vehicles
- B. Related Requirements Specified Elsewhere
 1. Division 1, Summary of Work: Section 011000
 2. Cleaning for Specific Products or Work: the respective sections of the Specifications.

1.2. SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with safety and insurance standards.
- B. Hazard Control/Cleaning Products
 1. Store volatile waste in covered metal container and remove from premises daily.
 2. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 1. Do not burn or bury rubbish and waste materials on project site.
 2. Do not dispose of volatile waste such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 3. Do not dispose of waste into streams or waterways.

PART 2 - PRODUCTS**2.1. MATERIALS**

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

PART 3 – EXECUTION**3.1. REQUIREMENTS DURING CONSTRUCTION**

- A. Execute daily cleaning to ensure that the building, grounds, and public properties and roadways are maintained free from accumulations of waste materials, rubbish, dirt, mud and dust.
- B. Moisten dry materials and debris to suppress and prevent airborne dust.
- C. Each day, all contractors shall adhere to the following:
 1. Areas of intense activity, such as cutting and sawing must be swept clean and reorganized at the end of each day. Utilize dust control methods such as plastic containment, containment hut and/or wetting of surfaces.

2. Areas of moderate activity such as installation of plumbing, ductwork, electrical work must be returned to good order at the end of each day.
 3. Debris below scaffolds (and shoring/re-shoring) must at all time, be kept sufficiently consolidated to keep walkways free of tripping hazards. These work areas must also be swept clean immediately upon removal of scaffolds.
 4. All swept up debris, waste materials, and packing must be removed and placed in the dumpster by the end of the workday.
 5. All stored material must be protected and kept in good order.
 6. As portions of the work are completed, all used and excess materials must be removed promptly.
 7. Daily clean-up and good housekeeping is the responsibility of each contractor individually and will be monitored by the Construction Manager. If any contractor fails to perform cleaning when directed or does not properly clean within 4 hours of being notified by Construction Manager, the owner will hire others and charge contractor(s) accordingly.
 8. Contractors shall promptly comply with requests to organize scattered materials.
- D. Each Contractor is responsible for furnishing all dumpsters or other such containers as required for collection, storage and legal disposal of all debris and rubbish resultant from their construction operations. The Construction Manager shall locate and request to move such containers as necessary and legally dispose of waste as containers are filled. Separate and recycle as required authorities and regulations.
- E. Vacuum clean areas when ready to receive finish painting, and continue vacuum cleaning on an as needed basis until building is ready for Substantial Completion or occupancy
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- G. Schedule cleaning operations so that dust and other containment resulting from cleaning process will not fall on wet, newly painted surfaces.

3.2. FINAL CLEANING

- A. Each Contractor shall:
1. Employ professional cleaners for final cleaning.
 2. In preparation for substantial completion or occupancy, conduct final inspection of all exposed interior and exterior surfaces, and of concealed spaces.
 3. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surface so designated to shine finish
 4. Maintain cleaning until project, or portion thereof, is occupied by owner.
 5. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
 6. If the contractor fails to perform final cleaning when directed or does not properly clean within 4 hours of being notified by Construction Manager, the owner will hire others or perform the cleaning with their own work force and charge contractor accordingly.

- B. General Contractor shall complete the following restoration operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:
 - 1. Restoration of any lawn and walk/curb areas disturbed by construction operations. This includes repairs of any ruts / damage created by Heavy Equipment, Lulls, Cranes, etc.
 - 2. Hire professional cleaning company (not construction tradesmen) to thoroughly clean all surfaces, including glass, floors, carpeting, ceramic tile, doors, windows, casework, etc.
 - 3. Clean and wax Resilient floors using the exact same products / coats as the owner's custodial staff for compatibility purposes. Vacuum all carpet areas.
 - 4. Power sweep all asphalt areas using a commercial street sweeper (water method).
 - 5. Remove any stickers, protective coverings, etc.
 - 6. Clean all materials & equipment etc. inside and out.
- C. Mechanical Contractor shall complete the following cleaning operations before requesting final inspection for certification of Substantial Completion for entire Project or portion of Project:
 - 1. Clean all mechanical units, including removal of any stickers, protective covering. Wipe down all of surface.
 - 2. Vacuum out all ductwork, grills / louvers to insure there is no construction debris or dust.
 - 3. Replace all air filters at no additional cost immediately prior to owner occupancy.
- D. Electrical Contractor shall complete the following cleaning operations before requesting final inspection for certification of Substantial Completion for entire Project or portion of Project:
 - 1. Clean surfaces of all electrical equipment from any dust. Remove any labels or protective films.
 - 2. Replace any burned out or non-functioning bulbs.

3.3. RUBBISH REMOVAL

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

END OF SECTION 017423

SECTION 017700 – CLOSEOUT PROCEDURES**PART 1 - GENERAL****1.1. RELATED DOCUMENTS**

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

1.2. SUMMARY

- A. This section includes administrative and procedural requirements for contract closeout including but not limited to, the following:
 1. Substantial Completion & Inspection procedures.
 2. Project record documents.
 3. Operation and maintenance manual submittal.
 4. Start-up and adjustments.
 5. Spare Parts.
 6. Demonstration & Training.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections.
- C. Multiple Prime Contracts: Provisions of this section apply to the construction activities of all Prime Contractors.

1.3. SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.
 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.
 2. Advise the Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 4. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra stock, and similar items.

7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems and instructions of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements. Startup of existing removed/replaced rooftop HVAC units will include written confirmation from contractor's mechanical subcontractor that all systems are adjusted and functioning properly.
 9. Complete final cleanup requirements, including touch-up painting.
 10. Touch up and otherwise repair and restore marred, exposed finishes.
- B.** Initial Inspection: Conducted between Construction Manager and Contractor, once all incomplete items identified are completed, a request for review by the Architect shall be made.
- C.** Inspection Procedures: On receipt of a Request for Inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will conduct a re-inspection upon request, provided the work is substantially complete. If multiple inspections are required due to the contractor's failure to complete the work, the resulting costs will be charged to the Owner and deducted from the contractor through a change order.
 2. Results of the complete inspection will form the basis of requirements for final acceptance.

1.4. FINAL ACCEPTANCE

- A.** Preliminary Procedures: Before requesting final inspection for Certification of Final Acceptance and Final Payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 8. All items in the Construction Checklist must be received and approved prior to any retainage reduction.
- B.** Re-Inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been complete except for items whose completion is delayed under circumstances acceptable to the Architect.
1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance. Note that multiple inspection due to Contractor not being complete will result in a charge to the Owner in which the amount shall be deducted from said Contractor via change order.
 2. If necessary, re-inspection will be repeated, but may be chargeable to the Owner and back-chargeable to the Contractor in conditions within his control.

END OF SECTION 017700

SECTION 017701 – CHECKLIST FOR PROJECT CLOSEOUT AND PROCESSING OF FINAL PAYMENT**PART 1 - GENERAL****1.1. FINAL PAYMENT**

Final payment will not be processed until all items indicated are received in accordance with Section 017701 – Checklist for Project Closeout.

1.2. CLOSE-OUT SUBMITTALS**One (1) bound, hard cover, 3-ring binder:**

- Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
- Contractor's Affidavit of Release of Liens: AIA G706A with:
- Separate AIA G706A for subcontractors, suppliers, and others with lien rights against the property of owner, together with a list of those parties.
- Consent of Surety to Final Payment: AIA G707.
- Operation and Maintenance Manuals for all equipment installed on the project.
- As-Built Drawings (1 full-size hard copy).
- Fully executed Certificate of Substantial Completion: AIA G704.
- Contractor's written warranty and extended warranties as required by the Contract.

Two (2) complete electronic copies (thumb drives) of the following:

- All items listed above.
- Typed or printed instructions covering the care and operations of equipment and systems furnished and installed.
- Manufacturers instruction books, diagrams, spare parts lists covering all equipment.
- Instruction of Owner's Representative in care and maintenance of new equipment.
- All approved shop drawings.
- Certificates of compliance and inspection (where applicable – electrical, elevator, etc.).
- Spare parts and Maintenance Materials (receipt signed by ACCI & Owner).
- Evidence of compliance with requirements of governing authorities (Certificates of Inspection, Waste Manifests).
- Certificates of insurance for products and completed operations.
- Notarized statement that only non-asbestos materials were installed on this project.
- Maintenance bond as per the requirements of the Contract.
- Project Record Documents.

NOTE: Retainage reduction are allowed as outlined in the Contract.

END OF SECTION 017701

SECTION 017719 – PROJECT RECORD DOCUMENTS**PART 1 - GENERAL****1.1. SUMMARY**

- A.** Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract and project specifications.
- B.** All Contractors, Subcontractors, Sub-Subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2. REQUIREMENTS

- A.** Project Record Drawings
- B.** Record Drawing Certification

1.3. PROJECT RECORD DRAWINGS

- A.** The purpose of the project drawings is to record the actual location of the work in place including but not limited to underground lines, concealed piping within buildings, concealed valves and control equipment, and to record changes in the work.
- B.** In addition to the above, these drawings shall be “color-coded”, by each trade, on a daily basis to indicate progress of the work. Color legend will be assigned by the Architect.
- C.** In addition to the sets of contract drawings that are required by the Contractor on the site to perform the work, the Contractor shall maintain, at the site, one (1) copy of all drawings, specifications and addenda that are part of the Contract as awarded.
- D.** Each of these documents should be clearly marked “Project Record Copy”, maintained in a clean and neat condition available at all times for inspections by the Owner, Construction Manager or the Architect, and shall not be used for any other purpose during the progress of the work.
- E.** The Construction Manager will be the custodian on the project record documents until the end of the Project.
- F.** Project Record Requirements
 - 1.** The Contractor shall mark-up the “Project Record Copy” to show:
 - a.** Approved changes in the work.
 - b.** Location of underground work and completed work.
 - c.** Details not shown in the original Contract Documents.
 - d.** Any relocation of work including piping, conduits, ducts and the like.
 - e.** All changes in dimensions.
 - f.** All access doors and “tack” location access points in accessible ceilings.
 - g.** Location of all plumbing, heating, ventilating, air conditioning or electrical assemblies, whether existing to remain or newly installed.
 - h.** Revisions to any electrical circuitry.
 - 2.** Such information shall include, but shall not be limited to:

- a. Footing depth in relation to finished grade elevations.
 - b. Any change in floor elevations.
 - c. Any structural changes.
 - d. Any substitutions
 - e. Elevations and locations of all underground utilities, services, or structures referenced to permanent above ground structures and monuments.
 - f. Designation of all utilities as to the size and use of such utilities.
 - g. All invert elevations of manholes.
 - h. The location of all utilities, services and appurtenances concealed in building structures that have been installed differently from that required by the Contract.
 - i. Any approved change orders.
 - j. Other such data as required by the Architect and/or Owner to establish a complete record of "As-Constructed" conditions.
- G. The Contractor shall keep the project record documents up to date from day to day as the work progresses. Appropriate documents are to be updated promptly and accurately; no work is to be permanently concealed until all required information has been recorded.
 - H. The project record drawings are to be submitted by the Contractor to the Architect through the Construction Manager when all the work is completed and is approved by the Owner and the Architect before the Contractor may request final payment.
 - I. If the project record drawings as submitted are found to be unacceptable due to incompleteness or inaccurate information, the drawings shall be returned to the responsible Contractor for corrective action and resubmitted for approval prior to the release of final payment.
 - J. The Contractor shall submit all approved Shop Drawings of the Work as installed.

1.4. RECORD DRAWING CERTIFICATION

- A. The record drawings required under the terms and conditions of this Section shall be reviewed and processed by each of the Prime Contractors as part of their overall contractual responsibility.
- B. This certification may be issued for individual trades as a collective document to cover the entire record drawing requirements of the project.

The format of this certification shall be as follows:

The record drawings prepared by:

for _____ have been reviewed by the undersigned and:

Appears to be an accurate representation of the work incorporated within the project and are accepted as submitted in accordance with the technical documents.

This record document review made by this office is for determination of compliance to the requirements of the Contract Documents.

Firm Name: _____

Review Date: _____ By: _____

END OF SECTION 017719

SECTION 017823 – OPERATION AND MAINTENANCE REQUIREMENTS**PART 1 - GENERAL****1.1. SUMMARY**

- A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract and the project specifications.
- B. All Contractors, Subcontractors, Sub-Subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2. REQUIREMENTS

- A. Startup and Demonstration
- B. Parts List
- C. Operation and Maintenance Data

1.3. STARTUP AND DEMONSTRATION

- A. The work required herein consists of starting up and demonstrating all systems and equipment to operating personnel and includes training of said operating personnel.
- B. The respective Trade or Subcontractor shall make arrangements, via the Construction Manager and/or the Owner (with notification to the Architect), as to whom the instructions are to be given in the operation of the basic and auxiliary systems and the period of time in which they are to be given.
- C. As specified in individual sections, furnish the services of instructors to train designated personnel in adjustment, operation, maintenance, and safety requirements of equipment and systems. If procedures are not specified for specific items of equipment, follow that recommended by the item manufacturer.
- D. Instructors shall be thoroughly familiar with the equipment and systems and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given after the equipment or system has been accepted and turned over to the Owner. The duration of instruction shall be as specified in individual sections but shall be not less than two (2) days of each portion of operating mechanical/electrical systems. Use Operating and Maintenance Data as a training guide.
- E. The Architect shall be completely satisfied that the Owner's designated representatives have been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Architect, Owner, or Construction Manager determines that complete and thorough instructions have not been given by the Contractor to the Owner's Representative, then the offending Contractor shall be directed by the Architect to provide whatever instructions are necessary until the intent of this paragraph of the Specification has been complied with as determined by the Architect.

1.4. PARTS LIST

- A. As required, the respective Trade or Subcontractor shall furnish instructions for the ordering and stocking of spare parts for all equipment installed. The lists shall include parts numbers and suggested suppliers. Each set shall also include an itemized list of component parts that should be kept on hand and where such parts can be purchased.

1.5. OPERATION AND MAINTENANCE DATA

- A. The Contractor shall submit to the Architect for approval of all instructions for the installation, operation, care and maintenance of all equipment, fixtures and systems.
 1. Provide typed or printed label identifying binder as operating and maintenance data. List title of project, contract number, and location of equipment.
 2. Furnish manufacturer's printed data or sheets neatly typewritten on 8-1/2 inch by 11 inch, 20 pound minimum white paper. Provide indexed tabs.
 3. Drawings: Bind in with text. Provide reinforcement rings. Fold larger drawings to the size of the text pages.
 4. Information shall indicate possible problems with equipment and suggested corrective action.
 5. See Specification Section 017701 Project Record Documents for additional instructions.

1.6. CONTENT OF MANUAL FOR EQUIPMENT AND SYSTEMS

- A. The instructions shall contain information deemed necessary by the Architect and include but not be limited to the following:
 1. Introduction:
 - a. Explanation of Manual and its use.
 - b. Summary description of all mechanical and electrical and equipment operating systems.
 - c. Purpose of systems.
 - d. Maintenance scheduling summary analysis, sheets and software operating instructions and diskette(s).
 2. System:
 - a. Detailed description of all systems.
 - b. Illustrations, schematics, block diagrams, photographs and other exhibits.
 - c. Complete wiring diagrams, tabulations and installation drawings.
 - d. Valve tag charts and control diagrams.
 - e. ½ size reduced copy of "Record Drawings"
 3. Operations:
 - a. Complete detailed, step-by-step, sequential description of all phases of operation for portion of the systems, including startup, shutdown, adjusting and balancing, and emergency procedures. Include all posted instruction charts.
 4. Maintenance:
 - a. Parts list and parts number.

- b. Maintenance, lubrication and replacement charts and Contractor's recommendations for preventative maintenance.
 - c. Troubleshooting charts for systems and components.
 - d. Instructions of testing each type of part.
 - e. Recommended list of on-hand spare parts.
 - f. Complete calibration instructions for all parts and entire systems.
 - g. Instructions for charging, filling, draining and purging.
 - h. General or miscellaneous maintenance notes.
5. Manufacturer's Literature:
- a. Complete listing for all parts with names, addresses and telephone numbers.
 - b. Care and operation.
 - c. All and other pertinent brochures, illustrations, drawings, cuts, bulletins, technical data, certified performance charts and other literature with the model actually furnished to be clearly and conspicuously identified.
 - d. Internal wiring diagrams and engineering data sheets for all items and/or equipment to be furnished.
 - e. Guarantee and warranty data.
6. Instruction for lubricating each piece of equipment installed. Instructions shall state type of lubricant, where and how frequently lubrication is required.
7. Frame all instructions under glass and hang in the Mechanical Room or other location as directed by Architect.

1.7. MANUALS FOR PRODUCTS, MATERIALS, AND FINISHES

- A. Submit three (3) copies of complete manual.
- B. Content: Provide complete information for Architectural products, applied materials, and finishes.
 - 1. Manufacturer's data, including catalog number, size, composition, color and texture designations, and information for reordering.
 - 2. Instructions for care and maintenance, including manufacturer's recommendations for cleaning agents and methods; cautions detrimental cleaning agents and methods; and recommended schedule for cleaning and maintenance.

END OF SECTION 017823

SECTION 01 78 36 – WARRANTIES**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer’s standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor’s period for correction of the Work.

- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section “Submittals” specifies procedures for submitting warranties.
 - 2. Division 1 Section “Closeout Procedures” specifies contract closeout procedures.
 - 3. Divisions 3 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

- C. Disclaimers and Limitations: Manufacturer’s disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer’s disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

- D. Separate Prime Contracts: Each prime contractor is responsible for warranties related to its own contract.

1.2 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.
 - The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace

or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence of entities required.

1.4 SUBMITTALS

- A. Submit written warranties to the Architect and Construction Manager prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the architect.
1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect and Construction Manager within 15 days of completion.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect and Construction Manager, for approval prior to final execution.
1. Refer to Divisions 3 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. **Warranties must be job-specific from the manufacturer and reference this project.** Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. See "Closeout Procedures" and "Checklist for Project Closeout" for additional information.
 2. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 017836

DIVISION 03 - CONCRETE

SECTION 033000 - 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 03 30 20: Concrete Slab on Grade.
- D. 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.

1.4 SPECIAL INSPECTIONS

- A. Refer to Special Inspection Notes and Schedule of Special Inspections in the drawings.

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.

- Show elevations of reinforcement for all members at minimum 1/4 inch = 1 foot scale.
- Show locations of construction and control joints.
- Reference Contract Drawing number and addendum number in each shop drawing.
- Do not place reinforcing information from more than one design discipline (structural, civil, landscape) in each drawing.

B. Mix Designs: Submit proposed mix designs for concrete 15 days minimum before start of concreting.

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.

1.7 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.

1.8 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. 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.
- D. 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. Provide galvanized or stainless steel ties for concrete elements that are reinforced with epoxy-coated or galvanized reinforcing.
 5. Internal wood spreaders are prohibited.

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
1 1/2 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. Chamfer Strips: Provide wood, metal, PVC, or rubber chamfer strips fabricated to provide 3/4-inch chamfer on exposed edges.
- I. 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.
- J. Sleeves:
 - 1. Schedule 40, PVC for 12-inch diameter or smaller.
 - 2. ASTM A 53, hot-dip galvanized for larger than 12-inch diameter.
- K. Anchor Rods and Leveling Plates: Furnished in Section (05100) (05 12 00) and installed under this section.
- L. 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.
- M. 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.
- N. 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 200” 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, misc. concrete.	NA	3,000	0.55	4.5*
Interior walls, foundation walls, piers.	3,000	4,000	0.5	4.5*

Lean concrete	NA	1,500	0.65	4.5*
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* Plus or minus 1.5 percent.

G. Slump:

1. Footings, foundation walls, piers, misc. concrete: 3 inches to 5 inches.
2. 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 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.

3.4 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.

3.5 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.

3.6 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.

3.7 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 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.

3.8 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.

3.9 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.

3.10 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.

3.11 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.

3.12 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.

3.13 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.

3.14 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.

3.15 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.

3.16 TOLERANCES

A. Footings:

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, and Walls:

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 033000

DIVISION 03 - CONCRETE

SECTION 033020 - 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 033000: Cast-In-Place Concrete.
- C. Vapor retarder is specified in Section 312301.

1.2 DESCRIPTION OF WORK

- A. This section supplements Section 033000: Cast-In-Place Concrete, with specific emphasis on concrete slabs on grade. The general requirements of Section 033000 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 Special Inspection Notes and Schedule of Special Inspections in the drawings.

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 warranty 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 033000.
- 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 Sonnebom 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.; "Euco-bar" 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	5,000	611	0.40	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.

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.

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 033000.
- 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 033000.

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 03 30 20

DIVISION 05 – METALS

SECTION 050530 – COLD GALVANIZING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions of Division 01 Specification Sections, apply to work of this section.
- B. Cold galvanizing of structural steel members, assemblies, and metal fabrications.

1.02 RELATED SECTIONS

- A. Section 051200 – Structural Steel Framing
- B. Section 052100 – Steel Joist Framing
- C. Section 053000 – Metal Decking
- D. Section 054000 – Cold Formed Metal Framing
- E. Section 055000 – Metal Fabrications
- F. Section 055200 – Metal Railings

1.03 REFERENCES

- A. Specification Conformance Data:
 - 1. Federal Specification DOD-P-21035A (formerly MIL-P-21035): Galvanizing Repair Specification
 - 2. Federal Specification MIL-P-26915A (USAF Zinc Dust Primer)
 - 3. Federal Specification TT-P-460 (Type 1, Zinc Dust)
- B. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. A239 - Locating the Thinnest Spot in a Zinc (Galvanized) Coating in Iron or Steel Articles by the Preece Test (Copper Sulfate Dip)
 - b. A780 - Repair of Damaged Hot-Dip Galvanizing
 - c. B117 - Salt Spray (Fog) Testing
 - d. D520 - Specification for Zinc Dust (Metallic Zinc Powder)
 - e. E376 - Measuring Coating Thickness by Magnetic Field or Eddy Current (Electromagnetic) Test Methods
 - 2. Steel Structures Painting Council (SSPC):
 - a. SSPC-PS 12.00 - Guide to Zinc-Rich Coating Systems
 - b. SSPC Paint 20 - Zinc-Rich Primers, Type II, Organic
 - c. SSPC-SP1 - Surface Preparation Specification No. 1 Solvent Cleaning
 - d. SSPC-SP3 - Surface Preparation Specification No. 3 Power Tool Cleaning
 - e. SSPC-SP6 - Surface Preparation Specification No. 6 Commercial Blast Cleaning
 - f. SSPC-SP10 - Surface Preparation Specification No. 10 Near White Blast Cleaning

1.04 DEFINITIONS

- A. Cold Galvanizing: A method of applying a zinc coating to structural steel members, assemblies,

and fabrications at ambient temperatures to achieve long-term corrosion protection.

- B. Cathodic Protection: Reduction or prevention of corrosion of a metal surface by making it a cathode in an electrolytic cell.
- C. Galvanic Action: When two dissimilar metals come into electrical contact with each other in the presence of an electrolyte, the less noble metal (zinc) will sacrifice itself (corrode) to protect the more noble metal (steel, iron, or aluminum).

1.05 SYSTEM DESCRIPTION

- A. A metallic zinc coating, containing 95 percent zinc in the dried film that imparts cathodic protection to ferrous and non-ferrous metals through its galvanic action and is recognized by Underwriter's Laboratories, Inc., as an equivalent to commercial hot-dip galvanizing. This coating, in its dry form, is non-toxic and essentially free of such heavy metals as lead, cadmium, barium, antimony, arsenic, chromium, copper, mercury, molybdenum, selenium, silver, and tellurium.

1.06 SUBMITTALS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures.
- B. Submit manufacturer's product data, application instructions, and warranty information.
- C. Contractor shall furnish the Architect/Engineer with certification that the materials furnished under this specification meet or exceed the requirements herein.
- D. Contractor shall furnish the Architect/Engineer with certification that surface preparation of the substrate to be coated has been performed satisfactorily, as herein specified, prior to application of the coating.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Aerosols (12 oz.), half-pints (1.5 lbs.), quarts (6 lbs.), gallons (24 lbs.), or 3.5 gallons (84 lbs.) containers of types suitable to prevent leakage of contents.
- B. Acceptance at site: Material shall be accepted at site providing no damage deleterious to products' function is visible and applicable material safety data sheets are present.
- C. Storage and Protection: Do not store containers above 104°F. Store containers out of sunlight and away from heat and sparks. Keep containers away from children.

1.08 PROJECT/SITE CONDITIONS

- A. Drying time of coating is dependent upon temperature, but product has no application temperature limit.
- B. Surface temperature of the substrate to be coated shall be at least 5° above the dew point to avoid possible condensation.
- C. Humidity shall be less than 85 percent R.H.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. For the purpose of establishing a level of quality and performance, this specification is based on products manufactured by: Z.R.C. Worldwide, 145 Enterprise Drive, Marshfield, Massachusetts, 02050, (781) 319-0400.
1. Z.R.C. Cold Galvanizing Compound, or equal as approved by the Architect/Engineer.
- B. For LEED projects, in lieu of 201.A.1, utilize ZRC Zero-VOC Water-Based Cold Galvanizing Compound.

2.02 MATERIALS

- A. Specifications (Based on ZRC Cold Galvanizing Compound):

Type:	Single pack, premixed, ready to apply, U.L. recognized, liquid organic zinc compound.
Finish:	Flat light gray.
Theoretical Coverage:	450 square feet per gallon at 1.5 mil dry film thickness.
Metallic zinc content:	95 percent by weight in dry film.
Flash point:	104°F (SETA method, ASTM D-3278).
Weight per gallon:	24 lbs.
Solids Content:	52%° by volume (ASTM D-2832).
VOC Content:	385 g/l (3.3 lbs./gal.) (ASTM D-1475).
Viscosity:	1,900 cps. - Brookfield spindle No. 6 at 100 RPM at 25°C (ASTM D-2196).
Maximum service temperature:	750°F (ASTM D-2485).
Specific gravity:	2.797 (ASTM D-1963).
Electrical Conductivity:	73 million ohms per 3 mil dry (resistivity).
Impact resistance:	Greater than 30-inch lbs. (extrusion per ASTM D-2794).
Abrasion resistance:	11.5 liters per dry mil (tested at 3 dry mils per ASTM D-968).
Pot life:	At least 24 hours.
Shelf life:	Bulk type, 3 years minimum; aerosol type, 1 year minimum.
Dry time:	(Set to touch) When ambient air-dried, 20-30 minutes (ASTM D-1640).
Recoat time:	(Second coat) After 12 hours. Under certain conditions, recoat time can be reduced. Please contact manufacturer for specifics.

B. Substrates acceptable for coating.

1. Substrates shall be of iron, steel, or aluminum including structural shapes, pipe, sheet, fabrications, and assemblies.
2. Substrates of iron, steel, or aluminum may be satisfactorily coated regardless of carbon, phosphorus, manganese, or silicon inclusion.

2.03 EQUIPMENT

- A. Coating shall be applied by brush, roller, low pressure compressor-type spray or airless-type spray.
- B. Refer to Section 3.03 B for specific equipment information.

2.04 MIXES

- A. Coating herein specified is a one-component, premixed, ready to apply compound.
- B. Contents of containers shall be stirred well upon opening and during application to ensure homogeneous mix.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Iron, steel, or aluminum surfaces to be coated shall be clean; i.e., devoid of grease, oil, mill scale, oxidation, loosely adherent rust, paint, etc.
- B. Coating shall be applied directly to metal surface to be galvanically active.

3.02 PREPARATION

- A. Surface preparation is dependent upon substrate condition and intended service. Preparation shall be in accordance with manufacturer's requirements for substrate to be coated.
- B. Typical examples are as follows:

Grease and oils:	Solvent clean to SSPC-SP1
Rust scale or easy to remove paint:	Power tool clean to SSPC-SP3
Mill scale or firmly adhered paint:	Sandblast to SSPC-SP6 (commercial)
Water immersion:	(100°F maximum) Sandblast to SSPC-SP10 (near-white)

3.03 APPLICATION

- A. General Application Information:
 1. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film build of 2.5-3.5 mils, using manufacturer's recoat time directions.
 2. The coating has good brushing properties and is suitable for spray application, when such application is specified.

3. Thinning with appropriate thinners as recommended by the manufacturer is allowed provided film thickness requirements can be maintained and other properties of the coating remain uncompromised.
4. The coating shall be well stirred before use so that it is completely homogeneous during application.
5. Continuous agitation (by means of an in-pot power mixer) is strongly recommended to ensure the continuous application of a completely homogeneous material at all times.
6. Omit coating of surfaces to be welded in the field. Coat in the field after welding to obtain uniformity and equal protection with adjacent surfaces.
7. Material partially used at the end of any day shall be protected from skinning by placing thick blanket of solvent over remaining coating followed by careful closing of containers. Coating may be reused on the following day after total rehomogenization.

B. Specific Application Information:

1. Application by brush or roller: Apply as received in container. For Brush application, its recommended only 100% Natural Chinese bristle brushes. For Roller Application, its recommended rollers with a 3/8" nap, made of mohair or lambs wool (sheepskin).

2. Application by low pressure compressor type spray:

Atomized air pressure:	50 lbs.
Fluid pressure:	15-20 lbs.
Orifice of tip:	80/100ths (.080)
Viscosity reduction:	4 parts Coating to 1 part mineral spirits solvent, or 16 parts Coating to 1 part Xylene

3. Application by airless type spray:

Pump:	30:1
Hose:	1/2" (I.D.) Airless type
Orifice of tip:	600 - 26/1000 ths. (.026)
Type of tip:	Tungsten carbide, reversing (self-cleaning)
Filter screens:	Complete removal is recommended. If screens are employed, use no less than 30 mesh.
Viscosity:	No reduction required.
Recommended procedure:	Connect hose directly to pump without filter assembly, ensuring a hose length of 50 feet maximum. Use least pressure possible. Start at 1,500 lbs. and increase as required for good spraying properties.

- C. Clean Up: Use mineral spirits solvent or Xylene.

3.04 FIELD QUALITY CONTROL

- A. Inspect installed galvanized materials, fabrications, and assemblies for coating thickness in accordance with ASTM E-376.

3.05 ADJUSTING

- A. After erection, on all uncoated areas, prepare and apply coating as per Section 3.03 above.

- B. Touch up any areas where shop coat has been damaged in accordance with ASTM A-780.

3.06 PROTECTION

- A. After 24-48 hours, cold galvanizing coating can be painted/coated with acrylic, chlorinated rubber, epoxy, urethane, or vinyl type products if painting is specified in the Contract Documents.
- B. Do not top-coat with alkyd or lacquer type products.

END OF SECTION

DIVISION 05 – METALS

SECTION 053000 – 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. Section 051200 – Structural Steel Framing
- B. Section 052100 – Steel Joist Framing
- C. Section 055000 – Metal Fabrications
- D. Section 078100 – Spray-Applied Fire Resistive Materials

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.
 - 1. A29 - Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for
 - 2. A36 - Standard Specification for Carbon Structural Steel.
 - 3. A108 - Standard Specification for Steel Bars, Carbon, Cold-finished, Standard Quality.
 - 4. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 5. A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coating.
 - 6. A992 - Standard Specification for Steel for Structural Shapes for Use in Building Framing
 - 7. B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- B. "Specification for Structural Steel Buildings" - American Institute of Steel Constructors (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. All submissions shall be made in accordance with Section 013300 – Submittal Procedures.
- B. Product Data:
 - 1. Submit manufacturer's specifications for

- a. Shear stud connectors
 - b. Deck Fasteners, if used
 - c. Primer Paint
- C. 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.
- D. 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.
- E. 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.
- F. 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
- G. Provide proof of Manufacturer, Erector, welder, and mechanical fastener technician qualifications specified under "Quality Assurance".

H. Surveys:

1. 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 than those contained in the standards are given in this section or the Building Code, requirements of this Section or the Building Code shall govern.
 - 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:
 2. As a component part of a floor construction of specified fire resistance rating without need for sprayed fireproofing on underside of deck.
 3. As a component part of a three-hour fire resistive floor construction with use of sprayed fireproofing on underside of deck.
 - 1) Roof deck shall have UL approval as a component part of the specified fire resistive roof construction.
 - 2) 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.

B. 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. Steel for Composite Metal Deck:

1. Formed from galvanic steel sheets conforming to ASTM A653. Size of deck is to follow SDI requirements for thickness and tolerances.
2. Minimum yield strength of 40,000 psi.
3. Formed with integral locking lugs.
4. Formed with deformations to provide bond with concrete.

5. Deck to receive sprayed fireproofing shall be free of lubricants or oils that would impair the adhesion of the fireproofing material.
6. Metal deck that is not exposed to view with architectural paint finish shall have integral hanger tabs providing an approximate 0.5% uniformly distributed open area. The hanger tabs are used for venting purposes only.

B. Steel for Roof Deck:

1. Formed from galvanic steel sheets conforming to ASTM A653. Size of deck is to follow SDI requirements for thickness and tolerances.
2. Minimum yield point of 40,000 psi.
3. Deck to receive sprayed fireproofing shall be free of lubricants or oils that would impair the adhesion of the fireproofing material.

C. 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.

D. Miscellaneous Steel Shapes:

1. 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.

E. 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.

F. Metal Deck Accessories (cants, pour stops, closure pieces, etc.):

1. 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.

G. 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.

H. 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

I. 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) 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 Tekes

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

J. Galvanizing Repair Paint

- 1. Shall conform to the requirements of ASTM A780 and comply with Military Specification MIL-P-21035.

K. Deck Fasteners (if used)

- 1. 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 fasteners where found defective.
6. Fasten side laps of adjacent units between supports 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 roof deck shall be the minimum length possible 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

1. 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 051200 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:
 1. 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 05 – METALS

SECTION 054000 – 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 01 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. Load-bearing and non-load bearing wall framing.
 - 2. Exterior non-load-bearing wall framing.
 - 3. Floor joist framing.
 - 4. Roof rafter framing.
 - 5. Ceiling joist framing.
 - 6. Soffit framing.
- C. Related Sections include the following:
 - 1. Section 033000 – Cast-in-Place Concrete
 - 2. Section 042000 – Unit Masonry
 - 3. Section 051200 – Structural Steel Framing
 - 4. Section 055000 – Metal Fabrications
 - 5. Section 061000 – Rough Carpentry
 - 6. Section 062000 – Finish Carpentry
 - 7. Section 072100 – Building Insulation
 - 8. Section 092900 – 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 A570 – Standard specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
- F. ASTM A653 – Standard specification for steel sheet, zinc coated (galvanized) or zinc iron alloy coated (galvannealed) by the hot-dip process.
- G. ASTM A780 – Standard practice for repair of damaged and uncoated areas of hot-dip galvanized coatings.
- H. ASTM A924 – Standard specification for general requirements for steel sheet, metallic coated by

the hot-dip process.

- I. ASTM A1003 – Standard specification for steel, sheet, cold rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability.
- J. 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.
- K. 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
- L. ASTM B633 – Standard specification for electrodeposited coatings of zinc and iron on steel.
- M. ASTM C754 – Specification for installation of framing members to receive screw attached gypsum wallboard, backing board or water resistant backing board.
- N. ASTM C840 – Standard specification for application and finishing of gypsum board.
- O. ASTM C955 – Standard specification for load bearing (transverse and axial) steel studs, runners (tracks), and bracing or bridging for screw application of gypsum panel products and metal plaster bases.
- P. ASTM C1007 – Standard specification for installation of load bearing (transverse and axial) steel studs and related accessories.
- Q. ASTM C1513 – Standard specification for steel taping screws for cold formed steel framing connections.
- R. ASTM E84 – Standard test method for surface burning characteristics of building materials.
- S. 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 013300 – Submittal Procedures.
- B. Product Data: For each type of cold-formed steel framing product and accessory, submit the following information:

1. Manufacturer's product data, including manufacturer's technical data sheet.
2. ICC-ES Reports.
3. Material Safety Data Sheets.
4. Preparation instructions and recommendations.
5. Storage and handling requirements and recommendations.
6. 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 in which the project is located.
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 reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Show connection details with screw types and locations, weld lengths and locations and other fastener requirements.
4. 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. ClarkDietrich Building Systems.
 3. CEMCO; California Expanded Metal Products Co.
- B. Source Limitations: Provide components and materials specified in this section form a single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified Professional Engineer registered in the state in which the project is located to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 1. Design Loads: As noted on the Drawings.
 2. Deflection Limits:
 - a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height.
 - b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sq. ft.
 - c. Interior Non-Load Bearing Assemblies: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sq. ft.

- d. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/240 of the wall height.
 - e. Floor Joist Framing: Vertical deflection of 1/360 for live loads and 1/240 for total loads of the span.
 - f. Roof Rafter Framing: Vertical deflection of 1/120 of the horizontally projected span for live loads.
 - g. Ceiling Joist Framing: Vertical deflection of 1/120 of the span for live loads and 1/240 for total loads of the span.
 - h. Gypsum Board: 1/360 of span under total design loads.
 - i. Exterior Insulation Finish Systems: 1/360 of span under total design loads.
 - j. Plaster or Stucco: 1/360 of span under total design loads.
 - k. Brick Veneer: 1/600 of span under total design loads.
- 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch.
 - 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Design Standards:
- 1. Floor and Roof Systems: AISI S210.
 - 2. Wall Studs: AISI S211.
 - 3. Headers: AISI S212.
 - 4. Lateral Design: AISI S213.
- D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.03 COLD-FORMED STEEL 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 as follows:
 - 1. Load-Bearing Wall Framing:
 - a. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
 - b. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges.
 - c. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with

stiffened flanges.

- d. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges.
- e. Steel Single- or Double-L Headers: Manufacturer's standard L-shapes used to form header beams, of web depths indicated.

2. Interior Non-Load Bearing Wall Framing:

- a. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
- b. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges.
- c. Vertical Deflection Clips, Interior: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- d. Deflection Track and Firestop Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thicknesses not less than indicated for studs and in width to accommodate depth of studs.
- e. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure.
- f. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure. Install a continuous row of bridging, composed of 1-1/2-inch cold-formed channel secured to each stud with clip angle, or bridging, or spacer bar, at upper-most knockout, not more than 12 inches from top of wall.
- g. Firestop Track: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- h. Bridging and Spacer Bar as required.

3. Exterior Non-Load Bearing Wall Framing:

- a. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
- b. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges.
- c. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- d. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.
- e. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
 - 1) Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure.
 - 2) Inner Track: Of web depth indicated.
- f. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud

from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

4. Floor Joist Framing:
 - a. Steel Joists: Manufacturer's standard cold-formed steel joists, of web depths indicated, punched, with enlarged service holes, with stiffened flanges.
 - b. Steel Joist Track: Manufacturer's standard cold-formed steel joist track, of web depths indicated, unpunched, with unstiffened flanges.
5. Roof Rafter Framing:
 - a. Steel Rafters: Manufacturer's standard cold-formed steel joists used as rafters, of web depths indicated, punched with enlarged holes, with stiffened flanges.
6. Ceiling Joist Framing:
 - a. Steel Ceiling Joists: Manufacturer's standard cold-formed steel joists, of web depths indicated, punched with enlarged service holes, with stiffened flanges.
7. Soffit Framing:
 - a. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges.
- 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 653, 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 653, 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. Hat Shaped Furring Channels: 22 gauge with minimum 1/2" wide flanges. Minimum depth 3/4" unless otherwise noted on drawings.
- E. Framing Accessories:
 1. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
 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. Utility angles.
 - e. Rigid clips.

- f. End clips.
- g. Foundation clips.
- h. Gusset plates.
- i. Stud kickers and knee braces.
- j. Joist hangers/Bridle hangers.
- k. Hole reinforcing plates.
- l. Backer plates.
- m. U-Flex track.
- n. Katz blocking.
- o. BridgeRite clips.
- p. Breakaway clips.

2.04 ANCHORS, CLIPS AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 and as indicated on drawings.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.05 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.06 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with

connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section

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 steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Framing components may be prefabricated into panels prior to erection. Perform lifting of prefabricated panels in a manner to prevent damage or distortion. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses.
- C. Mechanical Fasteners: ASTM C1513, corrosion resistant coated, self-drilling, self-tapping steel drill screws. Minimum two (2) screws per connection.
- D. 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.

PART 3 - EXECUTION

3.01 EXAMINATION

- 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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.03 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.

3.04 LOAD BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
 - 1. Anchor Spacing: To match stud spacing or as indicated on Shop Drawings.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as indicated on drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
 - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
 - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically as indicated on Shop Drawings. Fasten at each stud intersection.
 - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
 - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-

framing system,

3.05 NON-LOAD BEARING WALL INSTALLATION

- A. Install framing system components in accordance with spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16" o.c. unless otherwise indicated on the drawings.
 - 2. Multilayer Application: 16" o.c. unless otherwise indicated on the drawings.
 - 3. Tile Backing Panels: 16" o.c. unless otherwise indicated on the drawings.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 – Building Insulation, vertically and hold in place with Z-shaped furring members spaced 24" o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.06 EXTERIOR NON-LOAD BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as indicated on drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to bypassing studs or infill studs and anchor to building structure.
 4. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - a. Install solid blocking at centers indicated on Shop Drawings.
 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.07 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
 - 1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
 - 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- C. Space joists not more than 2 inches from abutting walls, and as indicated on the drawings.
- D. Frame openings with built-up joist headers consisting of joist and joist track, or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated on Shop Drawings.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
 - 1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.08 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.09 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.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

SECTION 061000 – ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of contract, including General and Supplementary Conditions and Division 01 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. Section 061643 – Exterior Gypsum Sheathing
- B. Section 061713 – Laminated Veneer Lumber
- C. Section 062000 – Finish Carpentry
- D. Section 072100 – Building Insulation
- E. Section 072113 – Ultra Wall Insulation and Air Barrier System
- F. Section 072423 – Direct Applied Exterior Finish Systems
- G. Various Division 07 Roofing Specifications
- H. Various Division 09 Finishes Specifications
- I. If designated as a LEED project, then also:
 - 1. Section 013563 – LEED Requirements
 - 2. Section 017419 – Construction Waste Management

1.04 REFERENCES

- A. AWPA – (American Wood Preservers Association) – All Timber Products Preservative Treatment by Pressure Process.
- B. APA – American Plywood Association.
- C. AITC – American Institute of Timber Construction.
- D. US Department of Commerce (DOC):
 - 1. DOC PS 1 – Performance Standard for Structural Plywood.
 - 2. DOC PS 2 – Performance Standard for Wood-Based Structural Panels.

1.05 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.
- D. Timber: Lumber of 5 inches nominal or greater in least dimension.

1.06 QUALITY ASSURANCE

- A. All materials shall be provided and all work shall be performed in accordance with the NYS 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.

1.07 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures 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. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-Preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Plywood.
 - 4. Engineered wood products.
 - 5. Shear panels.
 - 6. Power-driven fasteners.
 - 7. Powder-actuated fasteners.
 - 8. Expansion anchors.
 - 9. Metal framing anchors.
- D. 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.
- E. 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 013563 – 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 013563 – 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 013563 – 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":
 - a. Dimensional lumber framing.
 - b. Plywood.

1.08 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.
- B. 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.
- B. Building Paper: Asphalt saturated felt, non-perforated conforming to ASTM D226.
- C. In the absence of requirements of section 072713, 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

- D. 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.
- E. 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.
- F. 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 METAL FRAMING ANCHORS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or engineered-approved equals by one of the following:
 - 1. Simpson Strong-Tie Co., Inc.
 - 2. USP Structural Connectors.
- 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. Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4-inch wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.062 inch.
- E. I-Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4-inch wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.
 - 1. Thickness: 0.062 inch.
- F. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 1-1/2 inches.
 - 2. Thickness: 0.062 inch.
- G. Bridging: Rigid, V-section, nail-less type, 0.050 inch thick, length to suit joist size and spacing.
- H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 1-1/4 inches.
 - 2. Thickness: 0.062 inch.
 - 3. Length: As indicated.
- I. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fasteners to side of rafter or truss, face of top plates, and side of stud below.

- J. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- K. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.
- L. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
 - 1. Bolt Diameter: 3/4 inch.
 - 2. Width: 3-3/16 inches.
 - 3. Body Thickness: 0.138 inch.
 - 4. Base Reinforcement Thickness: 0.108 inch.
- M. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches (29 mm) wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.
- N. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.07 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.

2.08 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 06 – WOOD, PLASTICS AND COMPOSITES

SECTION 062000 – FINISH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions, Division 01 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 06, Division 11, and Division 12 sections.

1.03 RELATED SECTIONS

- A. Section 061000 – Rough Carpentry
- B. Various Division 09 Finishes Specifications
- C. If designated as a LEED project, then also:
 - 1. Section 013563 – LEED Requirements
 - 2. Section 017419 – Construction Waste Management

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 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures 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.
- C. LEED Submittals; for projects requiring LEED certification submit the following:
 - 1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 013563 “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 013563 “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 013563 “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":
 - a. Finish lumber and moldings.
 - b. Finish plywood, veneers.

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.
- B. 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.
- C. 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. See Section 061000 – Rough Carpentry for installation of recessed wood blocking.
- C. Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Section 099000 – 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 07 – THERMAL AND MOISTURE PROTECTION

SECTION 072100 – 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.
1. This Section includes the following:
- a. Continuous rigid board insulation at exterior wall construction and under metal wall panels.
 - b. Rigid board insulation at perimeter foundation walls.
 - c. Rigid board insulation at underside of floor slabs.
 - d. Fibrous blanket insulation for thermal purpose, where indicated
 - e. Miscellaneous batt insulation to maintain continuity of building thermal barrier
 - f. Protective cover over insulation board prior to placement of backfill or concrete cover.
 - g. Nailboard insulation used for roof decks.
 - h. Roof insulation used for flat roof installations.
- B. Related Documents: Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- C. Related Sections include the following:
1. Section 033000 – Cast-in-Place Concrete Work
 2. Section 042000 – Unit Masonry
 3. Section 061000 – Rough Carpentry
 4. Section 072113 – Ultra Wall Insulation and Air Barrier – for rigid board insulation at masonry cavity wall construction.
 5. Section 078400 – Firestopping – for fire-stop and smoke-stop materials at voids around penetrations through fire-rated and smoke barrier wall and roof construction assemblies.
 6. Section 084113 – Aluminum Entrances and Storefronts – for miscellaneous batt insulation required at periphery of storefront framing system.
 7. Section 085113 – Aluminum Windows – for miscellaneous batt insulation required at periphery of windows.
 8. Section 092900 – Gypsum Wall Board – for sound attenuation insulation, metal stud and drywall partition construction.
 9. Section 095000 – Acoustic Ceiling Systems – 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 014219.
- B. Manufacturers:
1. Insulation systems shall be manufactured and marketed by a firm with a minimum of 20 years' experience in the production and sales of insulation materials. Obtain insulation material through one source from a single manufacturer. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five years.

C. Installers:

1. The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and authorized by manufacturer, with a minimum five years' record of successful installations on projects of similar scope.

D. Reference Standards:

1. American Society for Testing and Materials (ASTM):
 - a. ASTM A272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 - b. ASTM C177: Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - c. ASTM C518: Steady-State Thermal Transmission Properties by Means of The Heat Flow Meter.
 - d. ASTM C578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.
 - e. ASTM C665: Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - f. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - g. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - h. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials.
 - i. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials.
 - j. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference.
 - k. ASTM E2178: 11 Standard Test Method for Air Permeance of Building Materials.
 - l. ASTM E2357: 11 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
2. International Code Council Evaluation Service (ICC-ES):
 - a. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.
3. National Fire Protection Association (NFPA):
 - a. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
4. 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 013300 – Submittal Procedures.
- B. Product Data: Manufacturers' data on each type of product furnished including:
 1. Preparation instructions and recommendations.
 2. Technical data and tested physical and performance properties of products.
 3. Storage, handling requirements, and recommendations.
- 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:

1. Submit, to the job site, 6" x 6" samples of each type and thickness of insulation.
2. Submit appropriate sample of loose fill insulation.
3. Submit manufacturer's verification that rigid insulation contains at least 20% combined post-consumer and post –industrial recycled content.
4. Submit manufacturer's verification that batt insulation contains at least 30% combined post-consumer and post –industrial recycled content.
5. Submit manufacturer's verification that cellulose insulation contains at least 85% combined post-consumer and post –industrial recycled content.

E. Mock-Up: If requested, provide a mock-up of materials proposed for use for review of workmanship. Accepted mock-ups may remain in place.

F. Preconstruction Meeting: Convene a minimum of two weeks prior to commencing work of this section. Agenda shall include materials proposed for use, sequence of construction and coordination with installation of adjacent and covering materials.

G. Certificates: Submit documentation signed by Manufacturer that products meet Quality Assurance Certification requirements of this Section.

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 in dry locations with adequate ventilation, and in such a manner to permit easy access for inspection and handling.

1. In the event the extruded polystyrene insulation board becomes wet, wipe dry prior to installation.

2. In the event the batt or blanket insulation becomes wet, remove it from the jobsite.

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.

1.06 FIELD CONDITIONS

A. Ambient Conditions:

1. Apply products within the range of ambient and substrate temperatures recommended by manufacturer.
2. Protect substrates from environmental conditions that affect insulation performance.

1.07 WARRANTY

- A. Provide manufacturer's standard limited warranty against manufacturing defects.
- B. Provide Manufacturer's Lifetime Limited Warranty for ASTM C578 performance properties including retaining 90% thermal performance for the life of the product.

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. 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 EXTERIOR WALL SHEATHING CONTINUOUS INSULATION

- A. Basis-of-Design has been specified around standard products as manufactured by Owens Corning®, www.owenscorning.com/insulation/commercial. Provide the named product or a comparable product similar or equal to "FOAMULAR® 150 XPS", extruded polystyrene insulation panels conforming to ASTM C578.
- B. Description: Provide continuous extruded polystyrene insulation (sheathing), unfaced. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third-party inspection agency used for building code qualification.
- C. Performance Data:
 1. Type X per ASTM C578 certified by independent third-party testing agency.
 2. Compressive Strength: 15 psi, minimum per ASTM D1621.
 3. Thermal Resistance (180 day real-time aging as mandated by ASTM C578, measured per ASTM C518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance.
 4. Water Absorption (ASTM C272): Maximum 0.30 percent by volume.
 5. Surface Burning Characteristics (ASTM E84): Flame spread less than 25; smoke developed less than 450, certified by independent third-party testing agency.
- D. Materials:

1. Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD GoldSM.
2. Contains no HCFCs.
3. Zero ozone depleting blowing agent that has warming potential (100 years) of less than 750.
4. Recycled Content: Minimum 20%, certified by independent third party such as SCS Global Services.
5. Provide R-5 per inch of thickness; 1-1/2" thickness minimum at exterior wall locations or as indicated on the drawings thick; 48"x96"; square edge.

E. Fasteners:

1. Screw with Air & Water Sealing Washer: Provide preassembled screw and stress plate fasteners recommended by their manufacturer for securing extruded polystyrene (XPS) continuous insulation. Polymer or other corrosion-protected, coated steel screw fasteners for anchoring to sheathing and metal stud wall framing. Fastener length and size based on wall sheathing thickness and fastener manufacturer recommendation.

F. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

2.03 RIGID PERIMETER AND UNDER SLAB INSULATION

A. Basis-of-Design has been specified around standard products as manufactured by Owens Corning®, www.owenscorning.com/insulation/commercial. Provide the named product or a comparable product similar or equal to "FOAMULAR® 250 XPS", extruded polystyrene insulation panels conforming to ASTM C578.

1. Comparable similar or equal to product: DuPont™ Styrofoam™ Brand Square Edge Insulation as manufactured by DuPont de Nemours Inc.

B. Description: Provide continuous extruded polystyrene insulation unfaced. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third-party inspection agency used for building code qualification.

C. Performance Data:

1. Type IV per ASTM C578 certified by independent third-party testing agency.
2. Compressive Strength: 25 psi, minimum per ASTM D1621.
3. Thermal Resistance (180 day real-time aging as mandated by ASTM C578, measured per ASTM C518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance.
4. Water Absorption (ASTM C272): Maximum.0.30 percent by volume.
5. Surface Burning Characteristics (ASTM E84): Flame spread less than 25; smoke developed less than 450, certified by independent third-party testing agency.

D. Materials:

1. Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD GoldSM.
 2. Contains no HCFCs.
 3. Zero ozone depleting blowing agent.
 4. Recycled Content: Minimum 20%, certified by independent third party such as SCS Global Services.
 5. Provide R-5 per inch of thickness; 2" thickness minimum at foundation wall and under slab locations or as indicated on the drawings thick; 48"x96"; square edge.
- E. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

2.04 FIBERGLASS BLANKET INSULATION

- A. Basis-of-Design has been specified around standard products as manufactured by Owens Corning® Insulating Systems, Toledo, OH 43659, www.owenscorning.com. Provide the named product or a comparable product similar or equal to "PINK Next Gen™ Fiberglas™ Insulation".
1. Comparable similar or equal to product:
 - a. CertainTeed Corporation.
 - b. Johns Manville Corporation.
- B. PINK Next Gen™ Fiberglas™ Insulation Unfaced Batt Insulation: ASTM C 665, Type I, preformed formaldehyde free glass fiber batt type, unfaced. Includes Unfaced PINK Next Gen™ Fiberglas™, Unfaced PINK Next Gen™ Fiberglas™ Sonobatts® Insulation and PINK Next Gen™ Fiberglas™ Sound Attenuation Batts (SAB) Insulation.
1. Noncombustible per ASTM E 136.
 2. Flamespread less than 25, smoke developed less than 50 per ASTM E84.
 3. ICC Building Code Construction Classification: All types.
 4. Water vapor sorption, Maximum by weight: not more than 5 percent.
- C. PINK Next Gen™ Fiberglas™ Insulation Kraft Faced Batt Insulation: ASTM C 665, Type II, Class C preformed formaldehyde free glass fiber batt type, Kraft paper faced one side. Includes Kraft faced PINK Next Gen™ Fiberglas™ Insulation, Kraft faced PINK Next Gen™ Fiberglas™ Sonobatts® Insulation and PINK Next Gen™ Fiberglas™ Insulation ProPink FastBatt Insulation.
1. ICC Building Code Construction Classification: III, IV, V.
 2. Perm Rating: 1 perm maximum per ASTM E96.
- D. Accessories: Provide accessories per insulating system manufacturer's recommendations, including the following:
1. Tape: Polyethylene self-adhering type for Kraft faced insulation and bright aluminum self-adhering type for foil faced insulation.
 2. Insulation Fasteners: Impale clip of galvanized steel; type recommended by insulation manufacturer for particular use intended.
 3. Mechanical Insulation Fasteners: FM approved, corrosion resistant, size required to suit application.
 4. Wire Mesh: Galvanized steel, hexagonal wire mesh.
 5. Spindle Fasteners: Corrosion-resistant wire spindles.

6. Ventilation Baffles: Formed plastic, metal, or cardboard sized to fit full width of rafter spaces.

E. Performance Data:

1. Wood Frame Construction - Walls, R-Value: Per ASTM C518.

- a. R-11, 3 1/2 inch thickness, 15 inch or 23 inch width, 48 inch or 93 inch length.
- b. R-13, 3 1/2 inch thickness, 15 inch or 23 inch width, 48 inch or 93 inch length.
- c. R-15, 3 1/2 inch thickness, 15 inch or 23 inch width, 93 inch length.
- d. R-19, 6 1/2 inch thickness, 15 inch or 23 inch width, 48 inch or 93 inch length.
- e. R-21, 5 1/2 inch thickness, 15 inch or 23 inch width, 93 inch length.

2. Wood Frame Construction - Roof/Floor/Ceiling, R-Value: Per ASTM C518.

- a. R-19, 6 1/2 inch thickness, 15 inch or 19-1/4 inch or 23 inch width, 48 inch or 93 inch length.
- b. R-22, 6 3/4 inch thickness, 15 inch or 23 inch width, 48 inch length.
- c. R-25, 8 inch thickness, 15 inch or 23 inch width, 48 inch length.
- d. R-30C, 8 1/4 inch thickness, 15-1/2 inch or 23-3/4 inch width, 48 inch length.
- e. R-30, 10 inch thickness, 16 inch or 19-1/4 inch or 24 inch width, 48 inch length.
- f. R-38C, 10 1/4 inch thickness, 15-1/2 inch or 23-3/4 inch width, 48 inch length.

3. Metal Frame Construction, R-Value for Batt Insulation: Per ASTM C518.

- a. R-8, 2 1/2 inch thickness, 16 inch or 24 inch width, 96 inch length.
- b. R-11, 3 1/2 inch thickness, 16 inch or 24 inch width, 48 inch or 96 inch length.
- c. R-13, 3 1/2 inch thickness, 16 inch or 24 inch width, 48 inch or 96 inch length.
- d. R-15, 3 1/2 inch thickness, 16 inch or 24 inch width, 96 inch length.
- e. R-19, 6 1/2 inch thickness, 16 inch or 24 inch width, 48 inch or 96 inch length.
- f. R-21, 5 1/2 inch thickness, 16 inch or 24 inch width, 96 inch length.

F. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

2.05 NAILABLE RIGID ROOF INSULATION

A. Basis-of-Design has been specified around products as manufactured by Johns Manville or Architect approved equal. Provide the named product or a comparable product similar or equal to "Nailboard", 4" overall thickness (R-20.5) closed cell polyisocyanurate foam core insulation board (ENERGY 3®) with 5/8" thick OSB.

B. Performance Data: (ENERGY 3® Foam Layer Only)

1. Type V per ASTM C1289.
2. Insulation Board Compressive Strength: 25 psi, minimum per ASTM D1621.
3. Long Term Thermal Resistance (LTTR): 20.5 R-Value, determined in accordance with CAN/ULC S770 at 75 deg F.
4. Water Absorption (ASTM C209): Maximum. 1.0 percent by volume.
5. Foam Core Surface Burning Characteristics (ASTM E84): Flame spread 20-30; smoke developed 55-250, certified by independent third-party testing agency.

C. Materials:

1. Orientated Strand Board (OSB): 5/8" thick with 1/8" routed edges.
2. ENERGY 3® closed cell polyisocyanurate foam core.
3. Standard board size to be 4' x 8' x 4" thick with an averaged R-Value of 20.5.
4. Rigid board shall be UL class A fire rated.
5. OSB must contain no urea-formaldehyde resins.

D. Fasteners:

1. All Nailboards must be mechanically attached with JM-approved fasteners Nail-Lok™ SD and Nail-Lok™ WD.

E. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

2.06 ROOF INSULATION BOARD

A. Basis-of-Design has been specified around products as manufactured by Johns Manville or Architect approved equal. Provide the named product or a comparable product similar or equal to "ENERGY 3®" 2" overall thickness (R-11.4) closed cell polyisocyanurate foam core insulation board or thickness as indicated on the drawings.

B. Performance Data: (ENERGY 3® Foam Layer Only)

1. Type II, Class , Grade 3 per ASTM C1289.
2. Insulation Board Compressive Strength: 25 psi, minimum per ASTM D1621.
3. Long Term Thermal Resistance (LTTR): 5.7 per inch, determined in accordance with CAN/ULC S770 at 75 deg F.
4. Water Absorption (ASTM C209): Maximum. 1.0 percent by volume.
5. Foam Core Surface Burning Characteristics (ASTM E84): Flame spread 20-30; smoke developed 55-250, certified by independent third-party testing agency.

C. Materials:

1. Standard board size to be 4' x 8' x 2" thick with an averaged R-Value of 11.4.
2. Rigid board shall be UL class A fire rated.

D. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.

2.07 MATERIAL REQUIREMENTS

A. 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" 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" 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" thick with a thermal resistance (R-value) of 19; 12" 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.
- B. Staples: Electroplated or galvanized steel wire, type and size as recommended for application.
- C. Wire-Up: Utilize 16 or 18 gauge line wire run diagonally or perpendicular to insulation every 18 to 24 inches.
- D. Impaling Pin: Utilize impaling pins welded or fastened with adhesive. Impale insulation on anchor and secure with washer.
- E. 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.
- F. Protective Board Covering: 1/8" thick biodegradable hardboard, 1/4" minimum thickness of wood fiberboard, or other protective covering as approved by the Architect.

2.08 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 EXAMINATION

- A. Carefully examine all the areas and conditions under which work of this section will be installed. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation in writing before proceeding. 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. Verify adjacent materials are dry and ready to receive insulation.

- C. Verify that wall, opening framing, bridging and structural bracing, and other framing support members and anchorage have been installed per requirements of the Project.
- D. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
- E. Verify that grade, excavation, fill, utilities penetrations, concrete accessories, and vapor retarding membrane have been installed per requirements of the Project.
- F. Verify adjacent waterproofing membrane and materials are dry and ready to receive insulation.
- G. Verify mechanical and electrical services within walls have been tested and inspected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- 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.

3.03 INSTALLATION - GENERAL

- 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 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.
- E. 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.

F. 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.

G. 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.

H. 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 substrate.
7. Protect building surfaces against damage from roofing work.
8. Verify that metal deck units are properly secured in place.

3.04 EXTERIOR WALL SHEATHING CONTINUOUS INSULATION INSTALLATION

- A. Verify manufacturer recommended cure time for air and water barrier system before installing

continuous insulation board.

- B. Install extruded polystyrene (XPS) insulation boards over the exterior gypsum sheathing and air & water resistive barrier layer in accordance with manufacturers' written recommendations.
- C. Install XPS insulation board in maximum sizes to minimize joints.
- D. Locate joints square to framing members. Center joints over framing. Provide additional framing as necessary.
- E. Stagger joints a minimum of one stud space from adjacent joints.
- F. Insulation board edges shall be butted together tightly and fit around openings and penetrations. Install square edges to fit square and tight.
- G. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation.
- H. Apply single layer of insulation boards to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- I. Fasten XPS insulation to exterior face of steel stud wall framing and exterior sheathing using screw and air & water sealing washer and compatible adhesive per manufacturer's written instructions.
 - 1. Screw with Air & Water Sealing Washer:
 - a. Install through XPS insulation into sheathing and stud with self-drilling screws using a standard drill with a variable clutch adjustment and appropriate adapter or auto-feed fastening system.
 - b. Do not attach with impact driver.
 - c. Drive fasteners so the washer is tight and flush with insulation surface but do not countersink.
 - d. Fastener spacing shall be evenly distributed and the minimum necessary per job site conditions as required by Insulation & Fastener Manufacturers to hold the continuous insulation in place until cladding attachment system can be installed to permanently secure the insulation board in accordance with the cladding requirements.
 - e. Two-inch diameter pronged fasteners can bridge between adjoining board edges.
 - 2. Compatible Adhesive:
 - a. Apply compatible adhesive to sheathing & air barrier, per adhesive manufacturer, air barrier manufacturer, and insulation manufacturer recommendations.
 - b. Install XPS insulation in adhesive while wet.
 - c. Hold insulation securely in place until adhesion is satisfactory.
 - d. Application rate and spacing shall be evenly distributed and minimum necessary per jobsite conditions as required by Insulation & Adhesive Manufacturers to hold the continuous insulation in place until cladding attachment system can be installed to permanently secure the insulation board in accordance with the cladding requirements.
- J. Fastening requirements may be revised per job site conditions if insulation board is being installed at the same time as the cladding attachment system that will serve to secure insulation board to the substrate. Contractor must receive written confirmation from the Architect before altering fastener requirements.
- K. Install exterior cladding as soon as possible, best within 60 days.

3.05 RIGID PERIMETER AND UNDER SLAB INSULATION INSTALLATION

- A. Verify all membrane testing has been satisfactorily completed prior to beginning installation.
- B. Verify vapor retarding membrane is installed correctly if required prior to installation of extruded polystyrene insulation.
- C. Verify below grade gas retarding membrane is installed correctly if required prior to installation of extruded polystyrene insulation.
- D. Install extruded polystyrene (XPS) insulation boards over the drainage aggregate and vapor retarding membrane in accordance with manufacturers' written recommendations.
- E. Install XPS insulation board in maximum sizes to minimize joints.
- F. Locate joints square to structure.
- G. Install insulation with long edges of XPS in continuous straight lines with edge joints staggered.
- H. Stagger joints in subsequent layers.
- I. Insulation board edges shall be butted together tightly and fit around openings and penetrations. Install square edges to fit square and tight.
- J. Install in one or more layers to meet thickness indicated to envelop entire area to be insulated.
- K. Apply single layer of insulation boards to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- L. Install reinforced slab immediately after installation of insulation as described in Section 033000.

3.06 FIBERGLASS BLANKET INSULATION INSTALLATION

- A. Comply with manufacturer's installation instructions and ASTM C1320. Do not use unfaced insulation in exposed applications where there is potential for skin contact and irritation. Kraft and standard foil facings will burn and must not be left exposed. The facing must be installed in substantial contact with the unexposed surface of the ceiling, wall or floor finish. Protect facing from any open flame or heat source.
- B. Friction-fit blanket insulation in place, until the interior finish is applied. Install batts to fill entire stud cavity, with no gaps, voids, or areas of compression. If stud cavity is less than 8 feet in height, cut lengths to friction fit against floor and ceiling tracks. Walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes, and other irregularities.
 - 1. Do not install insulation on top of or within 3 inches of recessed light fixtures unless the fixtures are approved for such use.
- C. In crawl spaces and where the underside of floors are exposed to unconditioned space, insulation shall fill the cavity or be installed in contact with the underside of the decking. If vapor retarder is required by local code, a Kraft vapor retarder must be in contact with a 15-minute thermal barrier, typically on the bottom side of the insulation.
- D. Within exterior wall framing, install insulation between pipes and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing.
- E. Where showers and bathtubs are located on exterior walls, typically install insulation and vapor

retarder between units and exterior.

- F. If eave ventilation baffles are required, install ventilation baffles at eaves to hold insulation down from roof sheathing and provide positive ventilation from eave to attic space.
- G. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation in the cavity during installation, creating gaps or voids that could diminish thermal value.
- H. Trim insulation neatly to fit spaces. Fill miscellaneous gaps and voids with insulation.
- I. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- J. For unfaced batt insulation, install with friction fit or retain in place with manufacturer's recommended fasteners or mesh.
- K. For batt insulation with factory-applied facing, install with vapor retarder membrane facing warm in the winter side of building spaces or as specified by local building code. Lap ends and side flanges of membrane over or between framing members. Tape to seal tears, cuts or misalignments in membrane.
- L. Secure insulation in place using one of the following methods: Friction fit; staple or nail facing flanges in place as needed, tape in place, retain in place with spindle fasteners, retain in place with wire mesh secured to framing members.

3.07 ROOF INSULATION BOARD INSTALLATION

- A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch with like material.
- E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- H. Refer to Division 07 Roofing specifications for additional installation requirements.

3.07 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.

3.08 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.
- B. If black tape or coatings are installed over the XPS insulation board, cover the black surfaces as soon as possible to avoid damage due to potential solar heat build-up on the black surface.
- C. Do not permit extruded polystyrene insulation board to come in contact with surfaces or temperatures in excess of 165°F.
- D. Touch-up, repair, or replace damaged products.

3.09 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 07 – THERMAL AND MOISTURE

SECTION 072713 – SELF-ADHERED NON-PERMEABLE AIR BARRIER MEMBRANE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. General Conditions, Supplementary Conditions, Instructions to Bidders and Division 01 General Requirements shall be read in conjunction with and govern this section.
- B. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work.

1.02 DESCRIPTION

- A. Supply labor, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:
 - 1. Connections of the walls to the roof air barrier.
 - 2. Connections of the walls to the foundations.
 - 3. Seismic and expansion joints.
 - 4. Openings and penetrations of window and door frames, store front, curtain wall.
 - 5. Piping, conduit, duct and similar penetrations.
 - 6. Masonry ties, screws, bolts and similar penetrations.
 - 7. All other air leakage pathways in the building envelope.
- B. Materials and installation methods of the primary air/vapor barrier membrane system and accessories.
- C. Materials and installation methods of through-wall flashing membranes.

1.03 RELATED SECTIONS

- A. Section 033000 – Cast-In-Place Concrete
- B. Section 042000 – Unit Masonry
- C. Section 054000 – Cold Formed Metal Framing
- D. Section 061000 – Rough Carpentry
- E. Section 061643 – Exterior Gypsum Sheathing
- F. Section 072100 – Building Insulation
- G. Section 072113 – Ultra Wall Insulation and Air Barrier System
- H. Section 076000 – Flashing and Sheet Metal
- I. Section 079200 – Joint Sealants
- J. Various Division 07 Roofing Specifications – requirement for coordination sequencing of membrane roofing; requirement to seal roof membrane to wall air barrier.
- K. Section 084113 – Aluminum Entrances and Storefronts
- L. Section 084413 – Glazed Aluminum Curtain Walls
- M. Section 085113 – Aluminum Windows

1.04 REFERENCES

- A. The following standards are applicable to this section:
 - 1. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

2. ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
3. ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
4. E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.
5. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
6. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
7. ASTM E96: Water Vapor Transmission of Materials.
8. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.

1.05 SUBMITTALS

- A. General: Comply with requirements of Section 013300 – Submittal Procedures.
- B. Submit documentation from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Building Code of New York State Energy Code and in accordance with ASTM E2178.
 1. Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.
- C. Submit copies of manufacturers' current ISO certification.
- D. Submit manufacturers' current product data sheets for the air barrier membrane system.

1.06 QUALITY ASSURANCE

- A. Submit document stating the applicator of the primary air/vapor barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.
- B. Perform Work in accordance with manufacturer's written instructions and this specification.
- C. Maintain one copy of manufacturer's written instructions on site.
- D. Allow access to Work site by the air barrier membrane manufacturer's representative.
- E. Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
- F. Single-Source Responsibility:
 1. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
 2. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.07 MOCK-UP

- A. Construct mock-up in accordance with Section 042000, including all components of the specified wall system.

- B. Where directed by architect, construct typical exterior wall panel, 6 foot long by 6 foot wide, incorporating substrate, window frame, attachment of insulation and showing air barrier membrane application details.
- C. Mock-up to be reviewed and approved by architect before proceeding with air barrier work. Mock-up may remain as part of the Work.
- D. Test mock-up for air and water infiltration to conform with Quality Control, in accordance with ASTM E 783 and ASTM E1105.

1.08 PRE-INSTALLATION CONFERENCE

- A. Pre-installation conference shall convene prior to commencing of work of this section.
- B. Ensure all contractors responsible for creating a continuous plane of air tightness are present.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Refer to current Product MSDS for proper storage and handling.
- B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- C. Store role materials on end in original packaging. Protect rolls from direct sunlight until ready for use.
- D. Store air barrier membranes, adhesives and primers at temperatures of 40°F and rising.
- E. Keep solvent away from open flame or excessive heat.
- F. Wasted Management and Disposal.
 - 1. Separate and recycle all waste materials.

1.10 COORDINATION

- A. Ensure continuity of the air seal throughout the scope of this section.

1.11 ALTERNATES

- A. The Contractor shall consult the "Bid Proposal Form" and read all alternates and assure himself 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 shall include all such applicable alternates in his proposal.
- B. Alternate submission to include:
 - 1. Evidence that alternate materials meet or exceed performance characteristics of Product requirements as well as documentation from an approved independent testing laboratory certifying the air leakage rates and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Building Code of New York State Energy Code and in accordance with ASTM E2178.
 - 2. Copies of the manufacturer's current ISO certification.
 - 3. Ten (10) references clearly indicating the membrane manufacturer has successfully completed projects of similar scope and nature for a minimum of ten (10) years.

4. Manufacturer's complete set of details for air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.

1.12 WARRANTY

- A. Provide manufacturer's standard 10-year material warranty.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Air/vapor barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

1. Acceptable Manufacturer:

Henry Company
999 N Sepulveda Blvd, Suite 800
El Segundo, CA 90245
(800) 598-7663
www.Henry.com

- B. Manufacturer's Standard Products indicated within this section are to establish a level of quality. Equivalency is permitted in accordance with General Municipal Law.

2.02 MEMBRANES (BASIS-OF-DESIGN)

- A. Primary sheet air/vapor barrier membrane shall be Blueskin® SA manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film. For application temperatures down to 10 degrees F use Blueskin® SA LT. Membrane shall have the following physical properties:

1. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,
2. Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft² to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331,
3. Vapor permeance: 0.03 perms to ASTM E96 (Desiccant Method),
4. Vapor permeance: 0.08 perms to ASTM E96 (Wet Cup Method),
5. Membrane Thickness: 0.0394 inches (40 mils),
6. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M,
7. Elongation: 200% to ASTM D412-modified,
8. Meets CAN/CGSB-51-33 Type I Water Vapor Permeance requirements.

- B. Alternate self-adhering membrane for all window and window sill flashings, door openings, inside and outside corners and other transitions shall be HE200 AM Metal Clad manufactured by Henry; a SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic

aluminum film that many sealants adhere well to. Membrane shall have the following physical:

1. Peel Adhesion to Primed Steel 15.0 to ASTM D 1000
 2. Vapor Permeance: < 0.014 perms to ASTM E 96
 3. Membrane Thickness: 0.0443 inches (45 mils)
 4. Low temperature flexibility: -15 degrees F to ASTM D146 min
 5. Elongation: 40% to ASTM D412-modified min
- C. Liquid-applied flashing alternate to self-adhered flashing membranes for all window, door, MEP penetrations, inside/outside and dissimilar material connections shall be Air-Bloc LF manufactured by Henry; a moisture-curing single component STPe liquid-applied flashing compatible with a variety of substrates and all Henry liquid and self-adhered air barrier membranes. Liquid-flashing shall have the following physical properties:
1. Elongation: minimum 250% minimum to ASTM D412,
 2. Tensile Strength: 132% psi minimum to ASTM D412,
 3. Nail Sealability: Pass to AAMA 711,
 4. VOC Content: 25 g/L max,
 5. Solids Content by Volume: 95%,
 6. Moisture Absorption: .1% to ASTM D570
- D. Through-wall flashing membrane (Self-Adhering) shall be Blueskin® TWF manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a yellow engineered thermoplastic film. Membrane shall have the following physical properties:
1. Membrane Thickness: 0.0394 inches (40 mils),
 2. Film Thickness: 4.0 mils,
 3. Flow (ASTM D5147): Pass @ 212 degrees F,
 4. Puncture Resistance: 134 lbf to ASTM E 154,
 5. Tensile Strength (film): 5000 psi minimum ASTM D 882,
 6. Tear Resistance: 45lbs.-MD, 17lbs.-CD to ASTM D1004,
 7. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

2.03 PRIMER

- A. Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac™ Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting. Primer shall have 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 degrees F
- B. Adhesive for self-adhering membranes at all temperatures shall be Blueskin® Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:
1. Color: Blue,
 2. Weight: 6 lbs/gal,
 3. Solids by weight: 35%,
 4. Drying time (initial set): 30 minutes
- C. Adhesive with low VOC content for self-adhering membranes at all temperatures shall be Blueskin® LVC Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:
1. Color: Blue,
 2. VOC: <240 g/L,
 3. Solids by weight: 40%,
 4. Drying time (initial set): 30 minutes

2.04 PENETRATION AND TERMINATION SEALANT

- A. Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
1. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
 2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A,
 3. Complies with ASTM C 920, Type S, Grade NS, Class 25,
 4. Elongation: 450 – 550%,
 5. Remains flexible with aging,
 6. Seals construction joints up to 1 inch wide

2.05 INSULATION ADHESIVE

- A. Insulation adhesive shall be Air-Bloc 21 Insulation Adhesive manufactured by Henry; a synthetic, trowel applied, rubber based adhesive, having the following physical properties:
1. Compatibility: With air barrier membrane, substrate and insulation,
 2. Air leakage: 0.0026 CFM/ft² @ 2.1 lbs/ft² to ASTM E283,
 3. Water vapor permeance: 0.03 perms to ASTM E96,
 4. Long term flexibility: CGSB 71-GP-24M.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify architect in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.

- C. Where curing compounds are used they must be clear resin based without oil, wax or pigments.
- D. Do not proceed with application of air barrier membrane when rain is expected within 24 hours.
- E. Condition materials to room temperature prior to application to facilitate handling.

3.02 SURFACE PREPARATION

- A. Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.
- B. New concrete should be cured for a minimum of 14 days and must be dry before air/vapor barrier membranes are applied.
- C. Ensure all preparatory Work is complete prior to applying primary air/vapor barrier membrane.
- D. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.
- E. Apply primer at rate recommended by manufacturer to all areas to receive self-adhering sheet air/vapor barrier membrane and or through-wall flashing membrane as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.03 INSTALLTION OF AIR BARRIER SYSTEM

A. INSIDE AND OUTSIDE CORNERS

- 1. Seal inside and outside corners of sheathing boards with a strip of self-adhering air/vapor barrier membrane extending a minimum of 3 inches on either side of the corner detail.
 - a. Prime surfaces as per manufacturers' instructions and allow to dry.
 - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
 - c. Roll all laps and membrane with a counter top roller to ensure seal.

B. TRANSITION AREAS

- 1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering air/vapor barrier membrane.
 - a. Prime surfaces as per manufacturers' instructions and allow to dry.
 - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
 - c. Ensure minimum 2 inch overlap at all end and side laps of membrane.
 - d. Roll all laps and membrane with a counter top roller to ensure seal.

C. WINDOWS AND ROUGH OPENINGS

1. Wrap rough openings with self-adhered air/vapor barrier membrane as detailed.
 - a. Prime surfaces as per manufacturers' instructions and allow to dry.
 - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
 - c. Roll all laps and membrane with a counter top roller to ensure seal.

D. LIQUID-APPLIED FLASHING OPTION – (when approved by the Architect)

1. Use for door and window openings, MEP penetrations and dissimilar material connections.
 - a. Apply liquid flashing to all material joints and tool smooth.
 - b. Apply liquid flashing in a serpentine fashion to the entire window opening and tool smooth to a minimum 25 mils wet film thickness. Spread material to cover the inside of rough openings and extend 4 inches onto adjacent surfaces. Create a slight positive slope towards the exterior of sill conditions by applying more material to the interior side of sills to create a taper towards the exterior while maintaining a minimum 25 mils wet film thickness.
 - c. Apply liquid flashing to MEP penetrations with a maximum of ½ inch annular space. Extend liquid flashing a minimum 4 inches onto penetrating item and surrounding surfaces to a minimum of 25 mils dry film thickness.
 - d. Apply liquid flashing to inside/outside corners and dissimilar material connections. Extend a minimum 4 inches onto adjacent surfaces a minimum of 4 inches and a minimum wet film thickness of 25 mils dry film thickness.
 - e. Apply fluid-applied membrane air barrier onto liquid flashing a minimum of 2 inches.

E. THROUGH-WALL FLASHING MEMBRANE

1. Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
 - a. Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
 - b. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
 - c. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
 - d. Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide end dam flashing as detailed.

F. PRIMARY AIR BARRIER

1. Apply self-adhering air/vapor barrier membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
 - a. Prime surfaces as per manufacturers' instructions and allow to dry.

- b. Align and position self-adhering air/vapor barrier membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
- c. Roll all laps and membrane with a counter top roller to ensure seal.
- d. At the end of each days work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.04 FIELD QUALITY CONTROL

- A. Make notification when sections of Work are complete to allow review prior to covering air/vapor barrier system.

3.05 INSTALLATION OF INSULATION

- A. Coordinate with Ultra Wall Insulation and Air Barrier System Section 072113 for insulating materials.
- B. Apply insulation adhesive in a serpentine pattern over the air barrier membrane.
 - 1. Dab Method: Apply walnut-sized dabs of insulation adhesive spaced 6 inches on center to substrate. Apply insulation using sufficient hand pressure to compress dabs up to 2 inches in diameter.
 - 2. Bead Method: Apply ¼ inch beads 6 inches on center in a serpentine pattern.
- C. Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.

3.06 PROTECTION

- A. Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.
- C. Air/vapor barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 079200 – JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.
- B. Related Sections include the following:
 - 1. Section 042000 – Unit Masonry
 - 2. Various Division 07 Roofing Specifications
 - 3. Section 084113 – Aluminum Entrances and Storefronts
 - 4. Section 084413 – Glazed Aluminum Curtain Walls
 - 5. Section 085113 – Aluminum Windows
 - 6. Section 093013 – Ceramic Tile

1.02 WORK INCLUDED

- A. The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances, and materials and performing all operations in connection with the application of caulking complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.
 - 1. It is the intent of the caulking work under this Section to provide waterproof seals at all joints where shown on drawings.
- B. Joint sealants to be as per the exterior and interior joint sealant schedules at the end of this section.

1.03 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer
 - 2. ASTM C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - 3. ASTM C834 - Specification for Latex Sealants
 - 4. ASTM C 920 - Specification for Elastomeric Joint Sealants
 - 5. ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
 - 6. ASTM C 1193 - Guide for Use of Joint Sealants
 - 7. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants
 - 8. ASTM C 1311 - Specification for Solvent Release Sealants
 - 9. ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
 - 10. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - 11. ASTM D 624 - Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 12. ASTM D 2240 - Test Method for Rubber Property - Durometer Hardness
 - 13. ASTM E 283 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - 14. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

- B. NSF International (NSF):
 - 1. Standard 51: Food Equipment Materials
- C. Sealant, Waterproofing, and Restoration Institute (SWRI):
 - 1. SWRI Validation Program

1.04 SUBMISSIONS

- A. Submissions shall be in accordance with Section 013300 - Submittal Procedures, and as modified below.
- B. Manufacturer's Data, Sealants and Caulking:
 - 1. Submit three copies of manufacturer's specifications, recommendations, and installation instructions for each type of sealant, caulking compound, and associated miscellaneous material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
- C. Samples, Sealants and Caulking:
 - 1. Submit three 12" long samples of manufacturer's standard colors for each type of sealant or caulking compound for selection by Architect.
 - a. Install sample between two strips of material similar to or representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths. Samples will be reviewed by Architect for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- D. Guarantee, Sealants:
 - 1. Submit three copies of written guarantee agreeing to repair or replace sealants which fail to perform as air tight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability, or appear to deteriorate in any other manner not clearly specified as in inherent quality of the material by submitted manufacturer's data. Provide guarantee in conformance with the requirements of the Contractor's Guarantee within Specification Section 017000, signed by the installer and Contractor.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced Installer equipped and trained for application of joint sealants required for this Project with record of successful completion of projects of similar scope.
- B. Single Source Responsibility: Provide glazing sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit [four] samples of each material that will be in contact with or affect joint sealants. Test sealants with substrate materials using ASTM C794 or manufacturer's standard test methods to determine requirements for joint preparation, including cleaning and priming. Test sealants with related materials to verify compatibility.
- D. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint

substrates using ASTM C1193 Method A or method recommended by manufacturer. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written report to Architect.

- E. Mockups: Provide joint sealant application within mockups required in other sections identical to specified joint sealants and installation methods.

1.06 WARRANTY

- A. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 - 1. Warranty Period: As per the Contractor's Guarantee within Specification Section 017000.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
 - 1. Warranty Period for Silicone Sealants: 20 years date of Substantial Completion.
- C. Warranty Conditions: Special warranties exclude deterioration or failure of joint sealants in normal use due to structural movement resulting in stresses on joint sealants exceeding sealant manufacturer's written specifications, joint substrate deterioration, mechanical damage, or normal accumulation of dirt or other contaminants.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Provide joint sealant products manufactured by The Dow Chemical Company, Midland MI; (877) SEALANT ((877) 732-5268); email: construction@dow.com; dow.com/construction; or Architect approved equivalent.

2.02 MATERIALS, GENERAL

- A. VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- B. Low-Emitting Sealants for Interior Applications: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, with joint substrates, and with materials in close proximity under use conditions, as demonstrated by sealant manufacturer by testing and related experience.
- D. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each liquid-applied joint sealant.

- E. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C 1248 as non-staining on porous joint substrates indicated for Project.
- F. Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600.

2.03 LIQUID JOINT SEALANTS

- A. Joint Sealant #1 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T, NT; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 790 Silicone Building Sealant.
 - 2. Hardness, ASTM C 661: 15 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 26 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, granite, limestone, and brick.
 - 5. Color: As selected by Architect from manufacturer's full line of not less than 10 colors.
- B. Joint Sealant #2 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 756 SMS Building Sealant.
 - 2. Hardness, ASTM C 661: 35 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 60 g/L maximum.
 - 4. Staining, ASTM C 1248: None on white marble.
 - 5. Color: As selected by Architect from manufacturer's full line of not less than 8 colors.
- C. Joint Sealant #3 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, Use NT, G, M and A; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 791 Silicone Weatherproofing Sealant.
 - 2. Hardness, ASTM C 661: 34 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 30 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, granite, limestone, and brick.
 - 5. Color: As selected by Architect from manufacturer's full line of not less than 6 colors.
- D. Joint Sealant #4 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT, G, A, and O; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 795 Silicone Building Sealant.
 - 2. Hardness, ASTM C 661: 35 - 45 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 32 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, granite, limestone, and brick.
 - 5. Color: As selected by Architect from manufacturer's full line of not less than 10 colors.
- E. Joint Sealant #5 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT; SWRI validation.
 - 1. Basis of Design Product: DOWSIL™ 995 Silicone Structural Sealant.
 - 2. Hardness, ASTM D 2240: 35 - 45 durometer Shore A.
 - 3. Volatile Organic Compound (VOC) Content: 34 g/L maximum.
 - 4. Ultimate Tensile, ASTM C 1135: 160 psi (1.1 MPa), at 21 day cure (TA Joint).
 - 5. Color: As selected by Architect from manufacturer's full line of not less than 3 colors.
- F. Joint Sealant #6 – Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT; SWRI validation.

1. Basis of Design Product: DOWSIL™ 758 Silicone Weather Barrier Sealant.
 2. Hardness, ASTM D 2240: 45 durometer Shore A.
 3. Volatile Organic Compound (VOC) Content: 61 g/L maximum.
 4. Color: White.
- G. Joint Sealant #7 – Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Basis of Design Product: DOWSIL™ 999A Silicone Building & Glazing Sealant.
 2. Hardness, ASTM D 2240: 25 durometer Shore A minimum.
 3. Volatile Organic Compound (VOC) Content: 36 g/L maximum.
 4. Ultimate Tensile, ASTM D 412: 325 psi (1.2 MPA) at 21 day cure (Dumbbell).
 5. Color: As selected by Architect from manufacturer's full line of not less than 6 colors.
- H. Joint Sealant #8 – Mildew-Resistant, Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Basis of Design Product: DOWSIL™ 786 Silicone Sealant.
 2. Hardness, ASTM D 2240: 25 durometer Shore A.
 3. Volatile Organic Compound (VOC) Content: 36 g/L maximum.
 4. NSF Standard 51 and FDA Regulation No. 21 CFR 177.2600 compliant.
 5. Color: As selected by Architect from manufacturer's standard colors.
- I. Latex Joint Sealant: Siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
- J. Butyl-Rubber-Based Joint Sealant: ASTM C 1311.

2.04 PRE-FORM JOINT SEALANTS

- A. Preformed Silicone Elastomer Extrusion: Highly flexible low-modulus flashing and transition material for bonding to substrates with silicone sealant. SWRI validation.
1. Basis of Design Product: DOWSIL™ 123 Silicone Seal.
 2. Surface: Smooth matte, Textured or Grooved to facilitate bending.
 3. Bonding Sealant: Manufacturer's recommended neutral-curing silicone.
 4. Hardness, ASTM D 2240: 25 durometer Shore A, minimum.
 5. Color: As selected by Architect from manufacturer's full line.
- B. Preformed Silicone Elastomer Custom Two- and Three- Dimension Extrusion: Highly flexible flashing and transition material for bonding to substrates with silicone sealant.
1. Basis of Design Product: DOWSIL™ 123 Silicone Seal Custom Design H. C.
 2. Formulation: General Purpose or High Tear.
 3. Shape: Multi-dimensional as indicated on drawings and approved shop drawings and as required to fit and functionally seal specific application and prevent air and water penetration
 4. Bonding Sealant: Manufacturer's recommended neutral-curing silicone.
 5. Color: As selected by Architect from manufacturer's full line.

2.05 WEATHER BARRIER TRANSITIONS

- A. Silicone Elastomer Weather Barrier Transition: Highly flexible clear flashing and transition strip and pre-molded corners for bonding with silicone sealant to weather barrier substrates and to adjacent curtain wall, storefront, and window frames and other transition substrates.
1. Basis of Design Product: DOWSIL™ 123 Silicone Transition Strip (STS).
 2. Hardness, ASTM D 2240: 50 - 60 durometer Shore A.

3. Color: Translucent
4. Air Infiltration, ASTM E 283: Maximum 0.025 cfm/sq. ft. (0.127 L/s per sq. m) at 6.24 lbf/sq. ft. (300 Pa).
5. Water Penetration under Static Pressure, ASTM E 331: None at 15 lbf/sq. ft. (720 Pa)
6. Movement Capability: Not less than plus 200, minus 75 percent.
7. Tensile Strength, ASTM D 412: Not less than 800 psi (5.5 MPa).
8. Tear Strength, ASTM D 624: Not less than 200 psi (16 kN/m).
9. Elongation, ASTM D 412: Not less than 400 percent.
10. Bonding Sealant: Manufacturer's recommended neutral-curing silicone.

2.06 ACCESSORIES

- A. Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- B. Premolded Joints for Floors and Paving:
 1. Rescor Expansion Joint (W. R. Meadows) or approved equivalent, 1/2-inch thick or as shown; leave 1/2-inch clear space at top to receive sealant.
- C. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
 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.
- D. Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back of joint.
- E. Primer: As recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Proceed with joint sealant work once conditions meet sealant manufacturer's recommendations.

3.02 PREPARATION

- A. Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer.

1. Remove laitance, form-release agents, dust, and other contaminants.
2. Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.

3.03 SEALANT APPLICATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- C. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
- D. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 1. Install bond breaker tape over substrates when sealant backings are not used.
- E. Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 2. Using tooling agents approved by sealant manufacturer for application.
- F. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 1. Remove masking tape immediately after tooling joint without disturbing seal.
 2. Remove excess sealant from surfaces while still uncured.

3.04 PREFORMED JOINT SEALANT APPLICATION

- A. Preparation: Prepare surfaces in accordance with sealant manufacturer's written instructions. Perform field adhesion testing to determine need for application of primer. Clean surfaces to dust free, and perform solvent wipe where recommended. Mask edges of surface to be treated.
- B. Application: Apply bead of recommended liquid joint sealant to each side of joint in bead size recommended by manufacturer. Press extrusion into sealant using roller to ensure uniform and complete contact. Lap vertical and horizontal joints as indicated in manufacturer's instructions. Trim preformed joint sealant. Remove masking tape and excess sealant.

3.05 WEATHER BARRIER TRANSITION APPLICATION

- A. Preparation: Prepare field of weather barrier surface and surface of adjacent substrate in accordance with sealant manufacturer's written instructions. Perform field adhesion testing to determine need for application of primer. Clean surfaces to dust free, and perform solvent wipe where recommended.

- B. Application: Apply bead of recommended liquid joint sealant to each side of joint in bead size recommended by manufacturer. Press transition extrusion into sealant using roller to ensure uniform and complete contact. Lap vertical and horizontal joints as indicated in manufacturer's instructions. Trim transition material. Remove excess sealant.

3.06 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A.
 - 1. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet of joint length thereafter or 1 test per each floor per building elevation, minimum.
 - 2. For sealant applied between dissimilar materials, test both sides of joint.
- B. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- C. Submit report of field adhesion testing to Architect indicating tests, locations, dates, results, and remedial actions taken.

3.07 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Exterior construction joints in cast-in-place concrete.
 - 1. Joint Sealant #1: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- B. Exterior movement joints in concrete unit masonry.
 - 1. Joint Sealant #4: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- C. Exterior movement joints in brick masonry.
 - 1. Joint Sealant #4: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- D. Exterior movement joints in stone masonry.
 - 1. Joint Sealant #2: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- E. Exterior joints within exterior insulation finish systems (EIFS).
 - 1. Joint Sealant #1: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- F. Exterior exposed joints in metal panel cladding systems.
 - 1. Joint Sealant #2: Single-component neutral-curing non-staining silicone sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- G. Exterior concealed watertight joints in cladding systems.

1. Joint Sealant #3: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- H. Exterior joints between different materials listed above.
1. Joint Sealant #4: Single-component neutral-curing non-staining silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
 3. Multiple colors required to match several conditions.
- I. Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, and louvers.
1. Joint Sealant #4: Single-component neutral-curing non-staining silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
 3. Multiple colors required to match several conditions.
- J. Exterior joints within aluminum storefront framing, curtain walls, and window systems.
1. Joint Sealant #4: Single-component neutral-curing non-staining silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- K. Exterior joints within structural glazing and protective glass sealant.
1. Joint Sealant #5: Single-component, nonsag, neutral-curing silicone sealant.
- L. All other exterior non-traffic joints.
1. Joint Sealant #1: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- M. Exterior horizontal traffic and traffic isolation joints.
1. Joint Sealant #1: Single-component pourable silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.

3.08 INTERIOR JOINT-SEALANT SCHEDULE

- A. Interior movement joints in exterior concrete and unit masonry.
1. Joint Sealant #4: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- B. Interior perimeter joints of exterior frames.
1. Joint Sealant #3: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- C. Interior movement joints in interior unit masonry.
1. Joint Sealant #4: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.
- D. Interior perimeter joints of interior frames.
1. Joint Sealant #3: Single-component neutral-curing silicone sealant.
 2. Color: As selected by Architect from manufacturer's full range.

- E. Interior sanitary joints between plumbing fixtures and food preparation fixtures and casework and adjacent walls, floors, and counters.
 - 1. Joint Sealant #8: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.
 - 2. Color: As selected by Architect from manufacturer's full range to match multiple conditions.
- F. Interior traffic joints in floor and between floor and wall construction.
 - 1. Joint Sealant #1: Single-component, nonsag, neutral-curing silicone joint sealant.
 - 2. Color: As selected by Architect from manufacturer's full range.
- G. Interior non-moving joints between interior painted surfaces and adjacent materials.
 - 1. Joint Sealant: Siliconized acrylic latex.
 - 2. Color: White; paintable.
- H. Interior concealed sealants at thresholds and sills.
 - 1. Joint Sealant: Butyl-rubber-based joint sealant.
- I. Interior exposed and non-exposed acoustical applications.
 - 1. Joint Sealant: Acoustical sealant specified in Section 079219 Acoustical Joint Sealants.

END OF SECTION

DIVISION 08 – OPENINGS

081113 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.02 SECTION INCLUDES

- A. Standard and custom hollow metal doors and frames as indicated and scheduled on drawings.
- B. Steel sidelight, borrowed lite and transom frames.
- C. Acoustical Rated Doors
- D. Louvers installed in hollow metal doors.
- E. Light frames and glazing installed in hollow metal doors.
- F. Factory finishing hollow metal doors and frames.
- G. Items specified elsewhere:
 - 1. Finish hardware is specified elsewhere in Division 8.
 - 2. Building in of anchors and grouting of frames in masonry is specified in Division 04.

1.03 RELATED SECTIONS

- A. Section 042000 – Unit Masonry
- B. Section 081416 – Flush Wood Doors
- C. Section 081433 – Stile and Rail Doors
- D. Section 087100 – Door Hardware
- E. Section 088000 – Glazing
- F. Section 088813 – Fire Rated Glazing
- G. Section 088853 – Security Glazing
- H. Section 099000 – Painting
- I. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.
- J. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access control system.

1.04 REFERENCES

- A. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- E. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
- F. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- G. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

- I. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
- J. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
- K. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- L. ASTM E 413 - Classification for Rating Sound Insulation.
- M. ANSI/ASA S12.60 – Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools
- N. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.
- O. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
- P. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
- Q. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
- R. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- T. NFRC 102 – Procedure for Measuring the Steady State Thermal Transmittance of Fenestration Systems.
- U. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.
- V. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
- W. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.05 SUBMISSIONS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 - 1. Elevations of each door design.
 - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of anchorages, joints, field splices, and connections.
 - 6. Details of accessories.
 - 7. Details of moldings, removable stops, and glazing.
 - 8. Details of conduit and preparations for power, signal, and control systems
 - 9. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
 - 10. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- D. 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.
- E. 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.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from an SDI Certified manufacturer. www.steeldoor.org/sdicertified.php
- B. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- C. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to UL10C or NFPA 252 at positive pressure (neutral pressure at 40" above sill).
 - 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 Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with UL 1784 and NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- F. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
 - 1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements.
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.29, R-Value 3.4, including insulated door, thermal-break frame and threshold.
 - 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements.
 - a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
- G. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor

to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. 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.
- D. Store doors and frames at building site under cover. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately.
 - 2. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.08 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.09 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers: Products shall be manufactured by a member of the Steel Door Institute or an architect approved equivalent. Steel Door Institute Members are as follows:
 - 1. Steel Doors and Frames, (General):
 - a. Curries.

- b. Ceco Door.
- c. Deansteel Manufacturing Co.
- d. DCI Hollow Metal.
- e. Hollow Metal Xpress.
- f. Mesker Door, Inc.
- g. MPI.
- h. Pioneer Industries, Inc.
- i. Premier Steel Doors and Frames.
- j. Republic Doors & Frames.
- k. Security Metal Products Corp.
- l. Steelcraft.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. 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.
- E. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.
- F. Finish: Provide prefinish doors unless otherwise indicated, provide manufacturer's electrostatic paint finish. All other doors to be finished as described in Division 09 - Section 099000.

2.03 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
- B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, and ANSI/SDI A250.4 for physical performance level.
 - 1. Design: Flush panel.
 - 2. Core Construction: Foamed in place polyurethane and steel reinforced core with no stiffener face welds.
 - a. Provide 18 gauge steel vertical reinforcements 6 inches apart and welded in place. Foamed in place polyurethane core is chemically bonded to all interior surfaces. No face welding is permitted.
 - b. Thermal properties to rate at a fully operable minimum U-Factor 0.29 and R-Value 3.4, including insulated door, Mercury thermal-break frame and threshold.
 - 3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16

- gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
 5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
 4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Simulated Woodgrain Embossed Steel Doors: Similar or equal to GrainTech Series as manufactured by Steelcraft, a division of Allegion, PLC, 11819 N. Pennsylvania Street, Carmel, IN 46032; tel. (888) 925-2171. Where so noted in door schedule, provide CE Series embossed steel panel doors featuring deep-embossed panels that create the appearance of wood grained doors; 16 gauge hollow metal door units, in 1-3/4" thickness in sizes as indicated on the doors schedules. All doors shall comply with 1.06 "Quality Assurance" of this specification section, similar to standard steel doors. All Grain-Tech doors shall carry a minimum fire rating of 1 hour, unless otherwise indicated on door schedules.
- E. 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.
- F. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- G. 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.

- H. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- I. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
- J. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.
- K. Apply finish coat to doors indicated as prefinished by electrostatically spraying and baking, to produce a paint thickness of 1.25 mils.

2.04 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
 - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
 - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
- E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.05 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.06 LOUVERS

- A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated:
 - 1. Blade Type: Vision proof inverted V or inverted Y.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 - 1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.07 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lights where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lights each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lights in Doors and Loose Stops for Glazed Lights in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.
- E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
 - 1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.08 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.09 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lights: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Louvers: Factory cut openings in door and install louvers into prepared openings where indicated.
4. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
 9. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
 - a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
 - b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
 - c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
 - d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
 10. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 11. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - c. Three anchors per jamb up to 60 inches high.
 - d. Four anchors per jamb from 60 to 90 inches high.
 - e. Five anchors per jamb from 90 to 96 inches high.
 - f. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - g. Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 12. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
 13. Frame Undercoating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water-based frame undercoating or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware;

include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250 specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Remove weld slag and spatter from exposed surfaces. All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces. On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer. Primer shall be fully cured prior to shipment.
- B. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.
- C. Factory Pre-Finished: Factory apply electrostatic paint finish to doors and frames in accordance with ANSI A250.3 test procedure acceptance criteria for steel doors and frames with factory applied finished coatings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified. Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Grout shall be mixed to provide a 4 inch (102 mm) maximum slump consistency, hand troweled into place. Grout mixed to a thin "pumpable" consistency shall not be used.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Fire-Rated Doors: Install doors in accordance with NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-

inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

- D. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- E. 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 08 – OPENINGS

SECTION 083600 – SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

1.01 GENERAL

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.02 SECTION INCLUDES

- 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. Insulated sectional overhead doors in locations indicated on drawings.
 - 2. All electric operators, controls, hardware, operating hardware, tracks, support, weatherstripping (exterior door), 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 26 - Electrical.

1.03 RELATED SECTIONS

- A. Section 033000 – Cast-in-Place Concrete - Prepared opening in concrete. Execution requirements for placement of anchors in concrete wall construction.
- B. Section 042000 – Unit Masonry - Prepared opening in masonry. Execution requirements for placement of anchors in masonry wall construction.
- C. Section 055000 – Metal Fabrications - Steel frame and supports.
- D. Section 061000 – Rough Carpentry - Rough wood framing and blocking for door opening.
- E. Section 079200 – Joint Sealants - Perimeter sealant and backup materials.
- F. Section 087100 – Door Hardware - Cylinder locks.
- G. Section 099000 – Painting - Field painting.
- H. Division 26 – Conduit from electric circuit to door operator and from door operator to control station, Power to disconnect.

1.04 REFERENCES

- A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.05 DESIGN / PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code. Refer to Drawings for required wind loading.
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.
- D. Wiring Connections: Requirements for electrical characteristics.
 - 1. 115 volts, single phase, 60 Hz, unless otherwise indicated on the Drawings; coordinate with Electrical contractor.

1.06 SUBMITTALS

- A. Submissions shall be in accordance with Section 013300 – Submittal Procedures and as modified below.
- B. Product Data: Manufacturer's data sheets on each product to be used, including.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, warm, ventilated weathertight location.

1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental

conditions outside manufacturer's absolute limits.

1.10 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.11 WARRANTY

- A. Warranty: Manufacturer's limited door and operators System warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Overhead Door Corporation, 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com, or Architect approved equal.

2.02 INSULATED SECTIONAL OVERHEAD DOORS

- A. Insulated Steel Sectional Overhead Doors: 592 Series Thermacore Insulated Steel Doors by Overhead Door Corporation. Units shall have the following characteristics.
 - 1. Door Assembly: Metal/foam/metal sandwich panel construction, with PVC thermal break and weather-tight ship-lap design meeting joints.
 - a. Panel Thickness: 2 inches.
 - b. Exterior Surface: Ribbed, textured.
 - c. Exterior Steel: .015 inch, hot-dipped galvanized.
 - d. End Stiles: 16 gauge with thermal break.
 - e. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable. Sized with a minimum 7 to 1 safety factor.
 - 1) High cycle spring: 25,000 cycles.
 - f. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
 - g. Thermal Values: R-value of 17.50; U-value of 0.057.
 - h. Air Infiltration: 0.08 cfm at 15 mph; 0.08 cfm at 25 mph.
 - i. Pass-Door: (provide when indicated on the Drawings)
 - 1) Provide with optional pass door.
 - j. Partial Glazing of Steel Panels: (provide when indicated on the Drawings)
 - 1) 1/2 inch Low E Insulated glazing
 - 2. Finish and Color:
 - a. Two coat baked-on polyester.
 - 1) Interior color, white.
 - 2) Exterior color, as selected by Architect.
 - 3. Windload Design: Provide to meet the Design/Performance requirements specified on the Drawings.

4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
5. Lock:
 - a. Keyed lock with interlock switch for automatic operator.
 - b. Locking mechanism designed to maintain security for exterior while permitting break out when impacted from the inside.
6. Weatherstripping:
 - a. EPDM bulb-type strip at bottom section.
 - b. Flexible Jamb seals.
 - c. Flexible Header seal.
7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
 - a. Size: 3 inch.
 - b. Type: Standard lift standard, provide low headroom when required.
8. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
 - a. Entrapment Protection: Required for momentary contact, includes radio control operation.
 - 1) Photoelectric sensors monitored to meet UL 325/2010.
 - b. Operator Controls:
 - 1) Push-button and key operated control stations with open, close, and stop buttons.
 - 2) Flush mounting.
 - 3) Both interior and exterior location.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.
- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 CLEANING AND ADJUSTING

- A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- B. Clean doors, frames and glass.
- C. Remove temporary labels and visible markings.

3.05 PROTECTION

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

DIVISION 08 – OPENINGS

SECTION 085113 – ALUMINUM WINDOWS

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 aluminum windows as indicated on the drawings and specified herein. Window shapes and accessories as specified and detailed shall establish the type of units and materials to be used to provide the functional performance and aesthetic requirements desired. Details indicate the required depth and profile. Work shall include, but not necessarily be limited to, the following:
1. Preparation of all rough openings as required to permit proper installation of new aluminum windows and panel systems as shown on drawings and described in the specifications. Note: Remove all sash intact and complete.
 2. Removal of existing sash or other existing materials or portions thereof which are required to be removed or altered to permit proper installation of new aluminum windows and panel systems as shown on drawings and described in the specifications.
 3. Furnish and install new factory glazed, thermally broken aluminum windows and panels as specified herein, together with all necessary mullion covers, mullions, receptors, filler plates, panning, trim, sheet or plate extrusions for trim, muntins, operating hardware, screens and all other accessories specified herein and/or shown or noted on the drawings, or as required, including anchors, clips, shims, fasteners, drilling, taping and all other activities necessary for the proper installation of the work of this section.
 4. Provide .063 extruded aluminum exterior window sills (finish to match window frame specified herein) for all new aluminum windows, except as noted otherwise on the drawings.
 5. All window hardware including balances, locks, keepers, poles, hangers, etc.
 6. Insulated metal panels and frames as required, or where indicated on drawings.
 7. Provide window screens where indicated on drawings.
 8. Provide transition membranes at perimeter of window rough openings as indicated on drawings.
 9. Insulation against contact of aluminum surfaces with dissimilar metals.
 10. Finish on all exposed aluminum surfaces.
 11. Installation of new windows, panels, etc. including anchors, clips, shims, blocking, fasteners, drilling, tapping, and all other things necessary for the proper installation of work under this section.
 12. Glass and glazing. (Provide insulated glass or insulated panel at all assemblies as indicated on drawings or specified herein).
 13. Installation of treated wood blocking, fillers and nailers as required for complete and secure installations.

14. Caulking and sealing of all metal to metal and metal to masonry.
15. Adjustment and servicing of window sash and hardware and replacement of broken or defective parts.
16. Cleaning of aluminum and glazing surfaces.
17. Maintenance, operation and protection.
18. Extra materials as specified or required.
19. Adjustment and servicing of window sash and hardware and replacement of broken or defective parts.
20. Verification of all openings and conditions.
21. Supply and loading of all required containers for storage of all materials and debris, and the legal disposal of all such materials.

B. Related Work Described Elsewhere:

1. Section 061000 – Rough Carpentry
2. Section 062000 – Finish Carpentry
3. Section 072113 – Ultra Wall Insulation and Air Barrier System
4. Section 072713 – Self-Adhered Non-Permeable Air Barrier Membrane
5. Section 079200 – Joint Sealants
6. Section 084113 – Aluminum Entrances and Storefronts
7. Section 088000 – Glazing
8. Section 122400 – Manual Operated Roller Shades

C. Related Documents: Drawings and General Provisions of Contract, including, General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.02 QUALITY ASSURANCE

A. Standards: Comply with the provisions of the standards listed below and the applicable standards listed in Section 014219 (including all revisions of contract to date):

1. Performance class designations according to American Architectural Manufacturers Association (AAMA) Window & Door Manufacturers Association (WDMA) and the Canadian Standards Association (CSA) AAMA/WDMA/CSA 101/I.S.2/A440.
 - a. AW: Architectural
2. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440.
3. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
4. Minimum Test Size: Smallest size permitted for performance class (gateway test size) or as specified elsewhere in this section, whichever is more stringent. Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class. Downsized test reports will not be considered acceptable.
5. American Society for Testing and Materials (ASTM):

- a. E283: Test for rate of air leakage through exterior windows, curtain walls, and doors.
- b. E330: Test for structural performance of exterior windows, curtain walls, and doors by Uniform State Air Pressure Difference.
- c. E331: Test for water penetration of exterior windows, curtain walls, and doors by Uniform Static Air Pressure Difference.
- d. E547: Test for water penetration of exterior windows, curtain walls, and doors by Cyclic Static Air Pressure Differential.
- e. E1996: Glazed opening protection for wind-borne debris shall meet the requirements of the Large Missile Test of ASTM E1996 and ASTM E 1886. Provide glazed windows capable of resisting the large missile impact from windborne debris, based upon pass/fail criteria as determined by testing glazed windows identical to those sizes specified.

(Note: This is required ONLY for new construction projects whose locations (as indicated) fall within one mile of the coastal mean high water line - any water area experiencing tidal change.)

- 6. Provide Test Reports from an AAMA approved test laboratory certifying the performance as specified herein. Test reports shall be no more than 4 years old. Test reports based on downsized test units will not be accepted.
 - 7. Test reports shall be accompanied by an AAMA Notice of Product Certification stating that the tested window meets or exceeds the referenced criteria for the AAMA/WDMA/CSA 101/I.S.2/A440.
 - 8. Wind Loads: Provide windows, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of the 2020 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.
 - 9. Fenestration Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440, "Standard/Specification for Windows, Doors, and Unit Skylights" for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
 - 10. Flat Glass Marketing Association (FGMA): "Glazing Manual".
 - 11. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.
- B. Product Requirements: For maximum performance, windows for this project must meet both the testing requirements as contained herein and the minimum material requirements specified. Windows that carry the applicable AAMA rating but do not meet the material thicknesses, depths, etc. shall not be acceptable for use on this project.
 - C. Qualifications of Manufacturer: Provide aluminum windows produced by a single manufacturer regularly engaged in the manufacture of units similar to those required and with a history of successful production acceptable to the Architect.
 - D. Qualifications of Installers: An installer acceptable to aluminum window manufacturer for installation of units required for this Project shall be provided. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements of the manufacturer's recommended methods of installation needed for proper performance of the work of this section.
 - E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum

windows and are based on the specific system indicated. Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- F. Preinstallation Conference: If requested, conduct conference at project site to review methods and procedures related to aluminum windows including, but not limited to, the following:
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components.
 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.
- G. Manufacturer's Certification: Prior to start of installation of the work of this section, secure visits to the job site by a representative of the manufacturer who shall inspect and certify that:
1. The openings in which the work of this section will be installed are all in condition suitable for installation.
 2. The materials to be installed comply in all respects with the requirements of this section of these specifications.
 3. The materials will be installed in complete accordance with the manufacturer's specifications.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
1. Horizontal sliding windows. (Test size 99" x 79")
 2. Fixed sash windows. (Test size 60" x 99")
 3. Projected sash windows. (Test size 60" x 144")
 4. Casement sash windows. (Test size 36" x 60")
 5. Single/Double hung windows. (Test size 60" x 99")
 6. Fixed insulating panels.
 7. Glass and glazing of aluminum windows; refer to Item 2.02G herein and Specification Section 088000.
 8. Caulking between aluminum windows and other materials (interior and exterior).
- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units of the minimum test size specified herein that pass AAMA/WDMA/CSA 101/I.S.2/A440, Uniform Load Structural and Uniform Load Deflection Tests:
1. Horizontal Sliding Windows:
 - a. Uniform Load Structural Test: 105 psf (positive and negative).

- b. Uniform Load Deflection Test: 70 psf (positive and negative).
 - 2. Fixed Insulated Glazed Windows:
 - a. Uniform Load Structural Test: 225 psf (positive and negative).
 - b. Uniform Load Deflection Test: 150 psf (positive and negative).
 - 3. Projected Insulated Glazed Windows:
 - a. Uniform Load Structural Test: 150 psf (positive and negative).
 - b. Uniform Load Deflection Test: 100 psf (positive and negative).
 - 4. Casement Insulated Glazed Windows:
 - a. Uniform Load Structural Test: 210 psf outswing: 150 psf inswing (positive and negative).
 - b. Uniform Load Deflection Test: 140 psf outswing: 100 psf inswing (positive and negative).
 - 5. Double Hung Insulated Glazed Windows:
 - a. Uniform Load Structural Test: 150 psf (positive and negative).
 - b. Uniform Load Deflection Test: 100 psf (positive and negative).
 - 6. Single Hung Insulated Glazed Windows:
 - a. Uniform Load Structural Test: 165 psf (positive and negative).
 - b. Uniform Load Deflection Test: 110 psf (positive and negative).
- C. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 1. Performance Class and Grade:
 - a. Horizontal Sliding Windows: AW-PG70
 - b. Fixed windows: AW-PG150
 - c. Projected windows: AW-PG100
 - d. Casement windows: AW-PG140 outswing; AW-PG100 inswing
 - e. Double hung windows: AW-PG100
 - f. Single hung windows: AW-PG110
- D. Condensation-Resistance Factor (CRF): Provide aluminum windows tested with insulating glass for thermal performance according to AAMA 1503:
 - 1. Horizontal Sliding Windows: Showing a minimum CRF of 57.
 - 2. Fixed Windows: Showing a minimum CRF of 62.
 - 3. Projected Windows: Showing a minimum CRF of 56.
 - 4. Casement Windows: Showing a minimum CRF of 56.
 - 5. Double Hung Windows: Showing a minimum CRF of 50.
 - 6. Single Hung Windows: Showing a minimum CRF of 60.
- E. Thermal Transmittance: Provide aluminum windows with whole-window U-factor and SHGC maximums indicated when simulated in accordance with NFRC 100 and NFRC 200 at model sizes shown below and glazed with 1" Argon filled sputter coat Low-E (#2) insulated glass using a warm edge spacer:
 - 1. Horizontally Sliding Windows: (72" x 48")

- a. U-Factor: 0.427 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.29.
2. Fixed Windows: (47" x 59")
- a. U-Factor: 0.32 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.33.
3. Projected Windows: (48" x 72" - Fixed/Projected)
- a. U-Factor: 0.38 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.30.
4. Casement Windows: (36" x 60")
- a. U-Factor: 0.40 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.28.
5. Double Hung Windows: (48" x 72")
- a. U-Factor: 0.38 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.28.
6. Single Hung Windows: (48" x 72")
- a. U-Factor: 0.38 Btu/sq. ft. x h x deg F or less.
 - b. SHGC: 0.30.

Note: The thermal resistance ("U") factor for all insulated glazed window units shall meet or exceed the U values for window units as mandated by the latest version of International Energy Conservation Code adopted by New York State.

F. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440, Air Infiltration Test:

- 1. Horizontal Sliding Windows:
 - a. Maximum Rate: 0.20 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- 2. Fixed Windows:
 - a. Maximum Rate: <0.01 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- 3. Projected Windows:
 - a. Maximum Rate: <0.01 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- 4. Casement Windows:
 - a. Maximum Rate: <0.01 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- 5. Double Hung Windows:

- a. Maximum Rate: 0.19 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- 6. Single Hung Windows:
 - a. Maximum Rate: 0.24 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- G. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test:
 - 1. Horizontal Sliding Windows:
 - a. Test Pressure: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft.
 - 2. Fixed Windows:
 - a. Test Pressure: 20 percent of positive design pressure, but not more than 25 lbf/sq. ft.
 - 3. Projected Windows:
 - a. Test Pressure: 20 percent of positive design pressure, but not less than 20 lbf/sq. ft.
 - 4. Casement Windows:
 - a. Test Pressure: The lesser of 20 percent of positive design pressure or 25 lbf/sq. ft.
 - 5. Double Hung Windows:
 - a. Test Pressure: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft.
 - 6. Single Hung Windows:
 - a. Test Pressure: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft.
- H. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.
- I. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/WDMA/CSA 101/I.S.2/A440.
- J. Operating Force and Auxiliary (Durability) Tests: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for operating window types indicated.
- K. All test reports shall be furnished showing compliance to the above performance specifications. Test reports shall not be older than 4 years.

1.04 PROJECT CONDITIONS

- A. Field Measurements: Check actual window openings in construction work by accurate field measurement before fabrication of custom window units. Show recorded measurements on final shop drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the

work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. General Contractor shall coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

2. Coordinate fabrication with construction progress to avoid delay.

1.05 SUBMISSIONS

- A. General: Before proceeding with the manufacture of windows, the Contractor shall submit complete shop drawings with installation details for the Architect's review and approval. These drawings shall also show window elevations, details of window sections, collateral materials, details of anchorage and associated hardware. Submissions shall be in accordance with Section 013300 – Submittal Procedures, and as modified below.
- B. Product Data:
 1. Submit manufacturer's product data, include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
 2. Maintenance Manual: Submit three copies of bound maintenance manual for aluminum windows, including manufacturer's product literature on all components and manufacturer's instructions for cleaning, repair, and general maintenance of all components.
- C. Shop Drawings: Submit shop drawings prepared by window manufacturer for the assembly and erection of the entire window system. Coordinate the submittal of shop drawings for component parts (as specified in other sections) with this transmittal. Show anchorages and alignments not shown on shop drawings of the components. Clearly indicate on all shop drawings all deviations from the Architect's drawings. Include structural calculations required to show compliance with wind pressure loading requirements, deflection requirements, and movements in the work. Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
 1. Mullion details, including reinforcement and stiffeners.
 2. Joinery details.
 3. Weather-stripping details.
 4. Thermal-break details.
 5. Glazing details
- D. Samples:
 1. Submit three (3) samples of each required aluminum finish on 12-inch long extrusions or 6-inch square sheets. Where normal color and texture variations are to be expected, include two (2) or more units in each sample to shown the range of such variations. Samples will be reviewed by Architect for color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.
 2. Submit three (3) insulated panel samples comprised and labeled of the specified components and thickness.
- E. Submit three (3) insulated glass samples of each type required for the project comprised and labeled of the specified components and thickness.
 1. Additional samples, if and as directed by the Architect, to show fabrication techniques, workmanship of component parts and design hardware, and other exposed auxiliary items.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Windows and accessories shall be handled in compliance with AAMA Curtain Wall Manual No. 10, "*Care and Handling of Architectural Aluminum from Shop to Site.*"
- B. The Contractor shall be responsible for protecting the windows and their finish from damage by the elements, construction activities, and other hazards before, during, and after installation.

1.07 WARRANTY

- A. Submit three (3) copies of written warrantee, signed by the Contractor and Manufacturer, agreeing to replace window work which fails in manufacturing, materials or workmanship within ten (10) years of the date of acceptance.
 - 1. Failure of materials or workmanship shall include, but not be limited to:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, or air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of metals or other materials beyond that which is normal.
 - e. Deterioration of finish or metal in excess of normal weathering
 - f. Failure of insulating glass.
 - g. Defects in accessories, weatherstripping, and other components of the work
 - 2. If a defect is found and brought to the attention of the manufacturer, the defect will be corrected at no cost to the Owner. A copy of the manufacturer's warranty shall be provided as a submittal document. Warranty shall not be pro-rated, and the manufacturer shall certify further that replacement parts shall be available for the life of the warranty.
- B. Balances: Class 6, Ten years from date of Substantial Completion.
- C. Pigmented Organic Coating Warranty: The successful bidder shall certify in writing that the pigmented organic coating on all windows and systems furnished meet the requirements of AAMA 2605 specification for Kynar-based pigmented organic coating and the coating is fully warranted against chipping, peeling, cracking, or blistering for a period of fifteen (15) years and five (5) years for AAMA 2603 from date of installation.
- D. Insulated Glass shall be guaranteed against failure for a period of 10 Years from the date of installation.
- E. Insulated metal panel shall be warranted by the panel manufacturer for a period of twenty-five (25) years. Panel Finish (Kynar resin-based) shall be guaranteed for a period of twenty (20) years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Design is based on use of aluminum window products as manufactured by Architectural Window Manufacturing Corp. 359 Veterans Boulevard, Rutherford, New Jersey, 07070, and the terminology used may include reference to that manufacturer's specific products. Such references shall be construed only as establishing the performance rating, quality of materials and workmanship to be used under this Section and shall not, in any way, be construed as limiting competition.

Bidder's Note: Proprietary assemblies or system components which are the exclusive product or patent of one particular company will not exclude a bidder from proposing alternate products,

assemblies or system components, provided that all required parameters and submissions required of this specification are met and/or exceeded. Operation of units shall not be altered from that as described. Determination of equality shall be the sole decision of the Architect, whose determination shall be deemed final. Manufacturer will have been engaged in aluminum window manufacturing for a minimum of fifteen (15) years.

Similar manufacturers include, but are not limited to:

1. Traco Window Corp., a division of the Kawneer Company, Inc. 71 Progress Avenue, Cranberry Township, PA, 16066, ph. (800) 837-7002.
- B. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.
- C. Window Types:
1. Horizontal Slider Thermally Broken Window:
 - a. Architectural Window Manufacturing Corp. Series 6700i Horizontal Sliding Double Slide Window
 - b. TRACO/Kawneer OptiQ AA 5450 Series Horizontal Sliding Window
 2. Fixed Thermally Broken Window:
 - a. Architectural Window Manufacturing Corp. Series 7700i Fixed Window
 - b. TRACO/Kawneer OptiQ AA 5450 Series Fixed Window
 3. Projected/ Casement Outswing Thermally Broken Window:
 - a. Architectural Window Manufacturing Corp. Series 3042i Projected/Casement Window
 - b. TRACO/Kawneer OptiQ AA 4325 Series Projected/ Casement Window
 4. Double Hung Thermally Broken Window:
 - a. Architectural Window Manufacturing Corp. Series 4700i Double Hung
 - b. TRACO/Kawneer OptiQ AA 5450 Series Double Hung Side Load Window
 5. Single Hung Thermally Broken Window:
 - a. Architectural Window Manufacturing Corp. Series 4750i Single Hung
 - b. TRACO/Kawneer OptiQ AA 5450 Series Single Hung Side Load Window
- D. All windows within this project are to be built and supplied by a single manufacturer.
- E. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect. Subject to compliance with all material, construction and performance requirements outlined in these specifications. Proof of equivalency is the responsibility of the contractor.
- F. Substitutions: Requests for substitutions must demonstrate that the product seeking approval meets or exceeds the design and performance specifications of the named products.

2.02 MATERIALS - All window components shall be AAMA certified materials.

- A. Aluminum Extrusions:

1. All frame and sash sections shall be accurately extruded aluminum shapes produced from commercial alloy 6063-T6 and shall be free from defects impairing strength and/or durability. Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, not less than 16,000-psi (110-MPa) minimum yield strength, and not less than 0.080-inch (1.6-mm) thickness at any location for the main frame and sash members, except the frame sill which shall be a minimum of 0.125-inch.
2. Thermal break: Provide window units with an integrally concealed low conductance structural and mechanical thermal barrier, located between exterior materials and window members exposed on the exterior in a manner that eliminates direct metal to metal contact. The thermal barrier shall be INSULBAR or equal, and consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
3. Frame, sash, mullion, and sill members shall be of such design and structural strength to satisfy the intended purpose and to meet the applicable AAMA performance requirements. Sill frame shall be constructed of tubular shapes formed from single and continuous extrusions and shall include an aluminum closed weep system to prevent accumulation of water in sill. Products using poured and debridged polyurethane thermal breaks shall not be acceptable.
4. Gaskets: All corner joints of the master frame shall have neoprene compression gaskets to ensure a weather-tight seal.
5. No extruded plastics shall be allowed in the frame or sash members.
6. Exterior and interior frame sill shall have a minimum slope of five (5) degrees.
7. Muntins: Unless otherwise indicated, all muntins for all operational and fixed window units shall be 3/8" deep extruded profile aluminum, frame-mounted and applied to the unit exterior. Muntin colors shall be homogeneous. Pressure-applied muntins shall not be permitted. Windows with exterior applied muntins must utilize integral exterior beveled glazing legs. Products using glazed-in muntin bases will not be acceptable.

B. Fasteners:

1. All screws, nuts, washers, bolts, rivets, and other fastening devices incorporated in the product shall be of sufficient strength and quality to perform their designated function.
2. Fasteners shall be made from aluminum, non-magnetic stainless steel, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.
3. Locate all fasteners so as not to disturb the thermal break construction of windows.
4. All fasteners must be concealed except where unavoidable for application of hardware.
5. For application of hardware, where required, use non-magnetic stainless steel phillips machine screws.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

D. Hardware:

1. Hardware shall be of aluminum, stainless steel, or other corrosion resistant materials

compatible with aluminum.

2. Provide one (1) aluminum window operating pole and hanger for each room where new pole operated double-hung and/or project-in windows are installed.
3. Operating sash to have anti-take out (dormitory type) hardware for sash removal by authorized personnel only.

E. Compression-Type Weather Stripping:

1. All sash shall be double weather-stripped using silicone-treated pile with a polypropylene center fin conforming to AAMA 701.2. Provide compressible weather stripping designed for permanently resilient sealing between adjoining window frames and/or perimeter sub-frame conditions under bumper or wiper action and for complete concealment when aluminum window is closed. Weather stripping will be completely sealed when aluminum window is closed and installation is complete.
 - a. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/A440.

F. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

1. Double hung and horizontal sliders shall be secured in double rows of extruded ports on sash perimeters. Rigid PVC in one side of vertical stiles and piles, conforming to AAMA 701/702-04, with polypropylene center fin in remaining locations. Projected, secured in extruded ports, double rows of EPDM gasket on vent perimeters.
 - a. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

G. Glass and Glazing:

1. All lites to be an "insulated glass" system, factory-glazed consisting of:
 - a. **Standard Glazing:** Outboard Pane = 1/4" tinted tempered glass with Vitro Solarban 70 coating #2 surface and 1/2" desicant-filled warm edge spacer, with Argon filled void. Inboard Pane = 1/4" tempered glazing, unless otherwise noted within the documents. (Provide obscure glazing at inboard pane at all toilet rooms, locker rooms and where indicated on drawings) Total Thickness: 1"

Or

- b. **Impact Glazing:** Glazed opening protection for wind-borne debris shall meet the requirements of the Large Missile Test of ASTM E1996 and ASTM E 1886. (Note: This is required ONLY for new construction projects whose locations (as indicated) fall within one mile of the coastal mean high-water line - any water area experiencing tidal change.):

Outboard Pane = 11/32" tinted annealed laminated glass with .090 PVB interlayer between and 1/2" desicant-filled warm edge spacer, with Argon filled void. Inboard Pane = 1/4" tempered glazing with PPG Solarban 70 Coating on #5 surface, unless otherwise noted within the documents. (Provide white laminated glazing at outboard pane at all toilet rooms, locker rooms and where indicated on drawings) Total Thickness: 1"

2. All windows shall be factory glazed with hermetically sealed insulating glass units with a dual seal of polyisobutylene and silicone. Glass is to be separated by a desicant - filled warm edge

spacer with the void containing Argon Gas. Glass must be set into a continuous bed of silicone sealant and held in place with removable extruded aluminum snap-in beads. Wrap around (marine) glazing, which requires the removal and disassembling of the sash for re-glazing will not be acceptable. Units must be IGCC certified for a CBA rating level.

3. All glass is to be set on 1/4"- inch setting blocks.
4. All glass or panels glazed into window framing shall be bed in structural silicone sealant or receive a perimeter cap bead of silicone sealant between the glazing leg and glass or panel surface. Sealant shall be factory applied.

H. Screens:

1. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Locate screens on outside of window.
2. Screens are to be provided at kitchen areas (food preparation areas), at all administrative areas, at all classroom and instructional locations (excluding rescue windows), and all other operable window locations.
3. Screens shall be provided of manufacturer's standard approved design. Screens are intended to provide reasonable insect control and are not for the purpose to provide security or for the retention of objects or persons from the interior. Screen frame shall match adjacent window frame color and finish.
4. Screening shall be of material compatible with aluminum and conform to USDC CS 138-55, GSA FS RR-W-365, USDC CS 248-64, or GSA FS L-S-125B.
5. Full screens shall consist of 18 x 16 charcoal anodized aluminum mesh secured by vinyl spline to a nominal 5/16" x 1 1/4" x .050 extruded tubular aluminum frame. Frame color and finish to match window system exterior.
6. Screens shall be re-meshable, removable from the interior, and held in place with spring-loaded plungers.

I. Other Materials:

1. Metal Insulated Panels: Insulated metal panels with window frames shall be fabricated with an outer and inner .032 thick, smooth aluminum skin, the outer skin laminated to asbestos-free mineral fiber reinforced cement board, minimum 3/16" thick, and the inner skin laminated to 1/2" thick Type 'C' Firecode Gypsum Board to provide a 15 minute interior flame spread rating in accordance with ASTM E-119 and ASTM E-84. The inner core shall be rigid isocyanurate. (Insulation must have a flame spread rating of 0.25 in accordance with ASTM E-84, fuel contribution of less than 100, and smoke developed less than 450.) Total panel thickness shall be 2" or thickness as shown on drawings. Panels shall be manufactured by 'Mapes Industries', or as approved equal by the Architect. Aluminum skins shall receive a fluorpon finish (Kynar 500), both exterior and interior faces in colors as selected by the Architect from manufacture's standard.
2. Sealant: Unless otherwise indicated for sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement. Provide sealant complying with AAMA 800-92.
3. Access Panels: Frames for access panels to be hollow extruded sections, with minimum wall

thickness of 0.062 inches, and shall be miter-cut and assembled with stainless steel screws for ease of repair. Tamper-resistant security fastening shall be installed at the bottom of each panel to securely attach panels to sash. For safety purposes, access panels shall be encased within channels at the top and bottom to prevent the panel from falling out, even if the security fastening is removed.

4. Rescue Labels: Windows designated on drawings as “Rescue” or “Egress” windows shall meet all applicable codes and shall include a conforming label. Refer to Contract Drawings for additional information.
5. Room number labels shall be provided as noted on the drawings.

2.03 MANUFACTURED UNITS

A. Horizontal Double Sliding Windows: (single slide products will not be acceptable)

1. Dimensions: Minimum .080" wall thickness in all frame, head, and sash extrusions; sill shall be .125" minimum wall thickness high performance sill; not less than 4-1/4" frame and 1-3/4" sash depth; unit height and width as shown on drawings. Sill frame to incorporate a closed weep flap system to allow water out, but prevent air from infiltrating in.
2. Frame Components mechanically fastened. Sash vertical members shall telescope into the sash horizontals and be mechanically fastened. Tubular sash extrusions shall have each corner mitered, reinforced with extruded aluminum corner key, hydraulically crimped, and “cold-welded” with epoxy adhesive.
 - a. Mechanical fasteners, welded components, and hardware items shall be located so as to not disturb or bridge the thermal break construction of windows. Thermal barriers shall align at all frame and sash corners. All screws, nuts, washers, bolts, rivets and other fastening devices incorporated in the product shall be of sufficient strength and quality to perform their designated function. Fasteners shall be made from aluminum, non-magnetic stainless steel, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
3. Glazing: “Wet glazed” with a silicone back bead compound to be GE SCS-2511 or equal. All lites (both sash and fixed) of the horizontal slider shall be inside glazed. Refer to Item 2.02G herein and specification 088000.
4. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing between adjoining window frames and/or perimeter subframe conditions. Weather stripping will be completely concealed when aluminum window is closed and installation is complete.
 - a. Weather-stripping Material: Manufacturer’s standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/440, similar or equal to *Schlegel “Q-Lon”*.
5. Hardware for Horizontal Sliding Windows: Provide the following operating hardware:
 - a. General: Provide manufacturer’s standard hardware, fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close and securely lock aluminum windows and sized to accommodate sash and ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals.
 - b. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent

sash in direction indicated and operated from the inside only.

- c. Sash Rollers: Two tandem Delrin self-lubricating roller assemblies with stainless steel ball-bearing rollers. Sash rollers must be height adjustable with sash in place. Products requiring sash removal to adjust roller height will not be accepted. There shall be a minimum of two (2) rollers per sash.
- d. Removable Lift-Out Sash: Design windows whereby both sash operate for ventilation and are removable for cleaning and maintenance, and provide with hardware to permit removal of sash from inside for cleaning.
- e. Sill Cap/Track: Extruded-aluminum integral raised track of thickness dimensions, and profile indicated; designed to comply with performance requirements indicated and allow for drainage into the tank and to the exterior through concealed weeps with hinged covers. Raised track must be covered with a stainless steel cap.
- f. Roller Assemblies: Low-friction design.
- g. Sash Lock: Spring-loaded black zinc die cast plunger lock with black anodized aluminum keeper on meeting rails or Spring-loaded, aluminum snap-type lock at end jamb of exterior sash at jamb. Max. lock height shall be 54" a.f.f.
- h. Limit Device: Continuous extruded aluminum sash stop limit device with rubber bumper; for each operable sash; mounted at window sill (excludes rescue windows). Limit dimension to be determined by Architect.
- i. Water control, tubular designed sill with removable cover for maintenance, separate and offset weep slots for each track, concealed exterior weep and hinged covers to allow water to drain by gravity and resist wind-driven water.

B. Fixed Windows:

1. Dimensions: Minimum .080" wall thickness in all main frame head and jambs; sill shall be .080" minimum wall thickness; sash extrusions to have minimum wall thickness of .080"; not less than 4-1/4" frame and sash depth; unit height and width as shown on drawings.
2. Frame Components mechanically fastened. Sash vertical members shall telescope into the sash horizontals and be mechanically fastened.
 - a. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and sash corners.
3. Glazing: "Wet glazed" with snap-in aluminum extruded glazing bead and PVC bulb; glass set in continuous bead of silicone back bead compound. Refer to Item 2.02G herein and specification 088000.
4. Provide *Schlegel "Fin seal"* or equal.

C. Projected Windows:

1. Dimensions: Minimum 0.080" wall thickness in all frame head and sash extrusions and not less than 4-1/4" minimum frame depth and 3-1/2" minimum sash depth; unit height and width as shown on drawings.
2. Frame Components mechanically fastened. Tubular sash extrusions with each corner mitered,

reinforced with extruded aluminum corner key, hydraulically crimped, and "cold-welded" with epoxy adhesive.

- a. Mechanical fasteners, welded components, and hardware items designed to avoid bridging thermal barriers. Thermal barriers shall align at all frame and sash corners.
 - b. Neoprene weatherstripping, minimum 2 rows, installed in dovetail grooves in sash extrusion of each sash.
3. Glazing: "Wet glazed" with snap-in aluminum extruded glazing bead and PVC bulb interior side; exterior glass set in continuous bead of silicone back bead compound, GE SCS-2511, or equal. Refer to Item 2.02G herein and specification 088000.
4. Hardware for Projected Windows:
- a. Hinge: Concealed stainless steel four-bar friction hinge with adjustable-slide friction shoe; two per ventilator.
 - b. Lock: Cam-action locking handle and keeper (two per ventilator over 42" wide), and spring-loaded catch (with pole ring for gymnasium, kitchen and auditorium windows 72" above the finished floor) and keeper, white bronze with US25D, brushed finish.
 - c. Limit Device: Integral adjustable stainless steel, stop (two per ventilator).
 - d. Operating Arms: 4-bar stainless steel arms, similar to "*Anderberg Series 301*".
5. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; 1 pole operator and pole hanger per room that has operable window hardware more than 72 inches (1800 mm) above floor.

D. Casement Windows:

1. Dimensions: Minimum 0.080" wall thickness in all frame head and sash extrusions and not less than 4-1/4" minimum frame depth and 3-1/2" minimum sash depth; unit height and width as shown on drawings.
2. Frame Components shall be mortised and tendon. Tubular sash extrusions with each corner mitered, reinforced with extruded aluminum corner key, hydraulically crimped, and "cold-welded" with epoxy adhesive.
 - a. Mechanical fasteners, welded components, and hardware items designed to avoid bridging thermal barriers. Thermal barriers shall align at all frame and sash corners.
 - b. Neoprene weather-stripping, minimum two rows, installed in dovetail grooves in sash extrusion of each sash.
3. Glazing: "Wet glazed" with snap in aluminum extruded glazing bead and PVC bulb interior side. Exterior glass set in continuous bead of silicone backbed compound, GE SCS-2511 or equal. Refer to Item 2.02G herein and specification 088000.
4. Hardware for Casement Windows:
 - a. Hinge: Aluminum butt hinges painted to match the windows; three per ventilator (four over 60" tall).

- b. Lock: One cam-action, white bronze locking handle and keeper (two per ventilator over 42" tall, white bronze with US25D brushed finish. Rescue windows or those where hardware exceeds 72" a.f.f. shall utilize a standard color multi-point with concealed locking points (plus one aluminum pull handle at outswing).
 - c. Stay Arm: One 90 degrees stainless steel stay arm at windows not utilizing limit devices.
 - d. Limit Device: Two stainless steel limit arm with key release (Architect to specify clear opening). Cannot be used at rescue windows.
- E. Double/Single Hung Windows:
1. Dimensions: Minimum frame and sash extrusions shall have a minimum wall thickness of 0.080". Frame sill members shall have a minimum wall thickness of 0.125". Frame depth shall be 4 1/4" minimum frame depth; 1 3/4" minimum sash depth. Unit height and width as shown on drawings.
 2. Frame Components shall be mechanically fastened. Sash horizontal members shall telescope into the sash verticals and be mechanically fastened.
 - a. Mechanical fasteners, welded components, and hardware items designed to avoid bridging thermal barriers. Thermal barriers shall align at all frame and sash corners.
 3. Glazing: "Wet glazed" with snap in aluminum extruded glazing bead and PVC bulb interior side. Exterior glass set in continuous bead of silicone backbed compound, GE SCS-2511 or equal. Refer to Item 2.02G herein and specification 088000.
 4. Hardware for Double/Single Hung Windows:
 - a. Counterbalancing Mechanism: Comply with AAMA 902.
 - 1) Sash Balance: Class 6, concealed Ultralift Extreme spring type capable of lifting 80% of sash weight, of size and capacity to hold sash stationary at any open position.
 - b. Removable Lift-out Sash: Design windows and provide with hardware to permit removal of sash from inside for cleaning. Units with tilt-in sash will not be acceptable.
 - c. Handle: Continuous, integral lift rail on bottom rail of lower sash and pull-down rail on top rail of upper sash.
 - d. Lower Sash Lock: Spring-loaded, snap-type white bronze aluminum lock on bottom rail of lower sash (two if window is greater than 48" wide).
 - e. Upper Sash Lock: Pole-operated snap type white bronze lock on top rail of upper sash.
 - f. Limit Device: Continuous approved extruded aluminum sash stop limit device with rubber bumper; for each operable sash located at jamb; two per sash.
 - g. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; 1 pole operator and pole hanger per room that has operable window hardware more than 72 inches above floor.
 5. Weatherstrip: All primary weatherstrip shall be *Schlegel "Finseal"* or equal.
 6. Water control, frame and sill with two weep slots to allow water to drain by gravity and resist

wind-driven water, sash weep holes at bottom of both sash for drainage.

- F. Typical for All Windows: Thermal break thermal barriers shall provide a continuous, uninterrupted thermal break around the entire perimeter of the sash and frame, regardless of the operation type.

2.04 FABRICATION

- A. General: Provide manufacturer's standard fabrication and accessories which comply with indicated standards and produces units which are reglazable without dismantling of sash framing, except to extent more specific or more stringent requirements are indicated. Include complete system for assembly of components and anchorage of window units and prepare complete preglazing at factory.
- B. Sizes and Profiles: Approximate sizes for window units and profile requirements are indicated on the drawings. All sharp milled edges shall be deburred and made smooth prior to finishing. All corner joints shall be joined neatly and sealed with neoprene die-cut compression gaskets in a manner to provide a weathertight connection.
- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), low-conductance polyamide thermal strut thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
 2. No thermal short circuits shall occur between the exterior and interior.
 3. The thermal barrier shall be Insulbar® or equal, and shall consist of two (2) glass reinforced polyamid nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions. Struts shall be a minimum of 34 mm at frames and 24 mm at sash for maximum thermal performance.
 4. Poured and debridged urethane thermal barriers shall not be permitted.
- D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- F. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units. When units occur that are joined by integral mullions, independent mullions, or by a combination of frame members, the resulting members shall be capable of withstanding the design pressure. Evidence of compliance may be by mathematical calculations.
- G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch- thick extruded aluminum. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- H. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.

- I. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.
- J. Muntins: Where shown on drawings, muntins shall be 3/8" deep profiled extruded aluminum applied to the exterior of nominal 1" deep insulating glass. Roll formed muntins shall not be acceptable. Exterior applied muntins, where applicable, must be pinned to an integral bevel on the frame or sash. Products using applied bevels will not be accepted
- K. All frame and sash members are to be continuous extrusions. The window head is to be miter cut and fastened to jambs with 1/8" thick corner keys and 4 cadmium plated or stainless steel screws into integral screw ports. Frame jambs are to be angle cut to match the sill slope and fastened with 4 cadmium plated or stainless steel screws into integral screw ports.
- L. The frame sill shall slope 10 degrees to the exterior and contain integral offset weep holes that allow gravity water drainage and resistance to wind driven water and/or air. Provide high performance sill as needed to meet window performance requirements.
- M. Each operating sash shall be removable from the interior for cleaning by raising the sash 1" and pulling lower portion to the exterior.
- N. All frame joints shall be hairline and be factory sealed with a sealant conforming to AAMA 800-07.

2.05 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Exterior of Window:
 - 1. The exterior finish shall be: Superior Performance Organic Finish AA-C12C40R1x. Prepare, pretreat and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers written instructions. Fluoropolymer Two-Coat System: Manufacturers standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70% polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - 2. Optional exterior finish shall be: Superior Performance Organic Finish AA-C12C40R1x. Prepare, pretreat and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers written instructions. Fluoropolymer Two-Coat System: Manufacturers standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat (Sun Storm with mica or metal flake) containing not less than 70% polyvinylidene fluoride resin by weight; complying with AAMA 2605.
- D. Interior of Window:
 - 1. The interior finish shall be: Baked Enamel Finish AA-C12C42R1x. Apply baked enamel complying with paint manufacturers written instructions for cleaning, conversion coating and painting. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603.
- E. Colors: As selected by Architect from manufacturers standard colors or custom color as indicated

on the drawings. Exterior color may be different from interior color.

2.06 ACCESSORIES

- A. Casing (Panning):
 - 1. Provide 0.08 inch minimum wall thickness extruded aluminum to cover exterior casings. Aluminum sections shall be of one piece design to lock around the entire window frame for a water-tight connection. Contoured profiles of casing covers shall be as shown on the drawings.
 - 2. The casing covers shall be assembled using stainless steel screws into integral screw ports, with joints back-sealed.
 - 3. Flanged frame, brake metal, exposed fastenings and other alternatives will not be acceptable as a substitution for the specified casing cover system.
- B. Exterior Mullion Covers: Exterior mullion covers shall be extruded aluminum shapes. The wall thickness shall be no less than 0.062 inches.
- C. Receptors and Sub-Sills:
 - 1. Where indicated on the drawings, extruded aluminum receptors with a minimum wall thickness of 0.94 inches shall be provided at all heads and jambs of the window openings. The base section of the receptor must be secured to the surrounding conditions. The snap-in portion of the receptor must be designed to not require any fastenings.
 - 2. Where indicated on the drawings, extruded aluminum subsills with minimum wall thickness of 0.094 inches shall be provided. Subsills must be designed to be able to drain any water that enters the window system by way of weep slots with hinged covers. All subsills are required to have end dams and must be sealed watertight.
- D. Interior Trim: Interior trim, closures and angles shall be as shown on the drawings and of aluminum extruded shapes. Minimum thickness for all interior trim is .062 inches.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Openings shall be verified by Contractor and/or General Contractor to be within allowable tolerances, plumb, level, clean, providing a solid anchoring surface, and in accordance with approved shop drawings. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation. Unsatisfactory conditions shall be corrected prior to installation.
- C. For window replacement projects, existing windows shall not be removed until the new replacement windows are available and ready for immediate installation. Openings shall not be left uncovered at the end of the working day, during wind driven precipitation, or very cold weather. Existing window removal and replacement with new windows for any individual room shall be done within the same day.
- D. Perform all other operations that are necessary to prepare openings for proper installation and

operation of new window sills.

- E. For projects which contain hazardous window materials identified by the pre-construction test results: Contractor shall note well that this contract calls for the complete removal of all existing window sashes in a complete and intact condition. Should any existing sash fragment or break prior to disposal, the Contractor shall immediately stop all work and contact the Owner's on-call Project Manager for review and direction.

3.02 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, approved shop drawings, and all pertinent regulations and codes. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. All window and related window components shall be installed in accordance with the requirements of the Owner and the approved shop drawings of the manufacturer. All installations shall be by the window manufacturer, or their approved representative, using mechanics skilled and experienced in the erection of aluminum window units.
- C. Set units plumb, level, and true to line, (relative to building structure) without warp or rack of frames, sash, or panels or impeding thermal movement. Anchor securely in place to structural support to prevent distortion or misalignment. The maximum variation from plumb and level shall not exceed 1/8" (plus or minus) in ten (10) feet.
- D. Fiberglass insulation shall be compressed between new window frame and existing construction or between frame and new blocking as applicable. Approved insulation materials (R-19 or better) shall be installed in the frame cavity on the interior portion of the window frame. Area adjacent to the exterior of the window frame shall remain un-insulated. The window installer shall use caution in the insulation operation to avoid overlapping insulation materials across the thermal break connector, thus bridging the two separated frame members.
- E. Aluminum shall be insulated from direct contact with steel, masonry, concrete, or non-compatible materials by bituminous paint, zinc chromate primer, or other suitable insulating material.
- F. Exterior joints between windows and surrounding construction shall be sealed per specifications and approved shop drawings.
- G. Joint Sealant Application:
 - 1. Joints and surfaces to receive sealants shall be dry, clean, and free from loose material, efflorescence, or mortar leaching. Sealants shall not be applied when temperature is below sealant manufacturer's recommendations.
 - 2. A Grade "A" type caulking compound from *Pecora*, *Tremco*, *Vulkem* or equal, as approved by the Architect, shall be applied per the installation drawings and details at all points where the aluminum master frame and/or panning intersects the masonry or other exterior wall finish. The caulking material shall be applied in a manner which insures a continuous air and water tight perimeter seal. Color to match the color of the aluminum windows, unless specified otherwise by the Architect.
 - 3. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- H. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

- I. Exposed Fastener Concealment: Note: No exposed fasteners shall be allowed at any aluminum assemblies. The Contractor shall supply and install all concealment panning as required to fully enclose any exposed fasteners which may be a result of the system installations. The panning enclosures shall be of identical material in both composition and appearance, as the aluminum systems specified herein, in order to provide a seamless, and professional installation.

3.03 DISPOSAL AND CARTING

- A. Existing windows and all other materials removed as a part of the requirements of this Contract shall be removed from the site and become the property of the Contractor upon their removals. The Contractor shall promptly remove and legally dispose of said materials at no additional cost to the Owner.
- B. Comply with all applicable laws, rules and regulations as they pertain to the legal disposal of waste materials of the type produced by the work of this Section.

3.04 FIELD QUALITY CONTROL

- A. Air infiltration tests conducted per ASTM E 783-81, and water resistance test conducted per AAMA 501.3, shall be performed to AAMA standards. Field test shall be performed by an AAMA-accredited, certified architectural testing laboratory in accordance with AAMA 502-90 standards, and conducted with the window manufacturer representative present. The Architect shall randomly select one pair of adjacent windows to be tested. The cost for only the initial test to be borne by the Owner; any additional testing required or corrective measures for non-conforming work shall be the responsibility of the window Contractor.
- B. If a test specimen should fail any aspect of the field test, the test specimen shall be repaired or replaced and re-tested. At the Architect's discretion, up to three (3) additional windows may be tested. Subsequent to testing, all window units shall be repaired or replaced in the same manner as the test specimen(s) to assure compliance with project performance specifications.
- C. The cost of re-testing and all subsequent repairs shall be borne by the window manufacturer and the window Contractor.

3.05 ADJUSTING, CLEANING AND PROTECTION

- A. After installation, the erector shall remove all sealants, caulking and other misplaced materials from all surfaces, including adjacent work. The window frame and glass shall be cleaned thoroughly with materials and methods recommended by the window and glass manufacturers, and shall not cause any defacement of the work. All hardware and moving parts shall be completely lubricated.
- B. Frames and balances shall be adjusted, if necessary, after installation to insure smooth and weather-tight operation.
- C. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- D. Manufacturer shall clean all glass and aluminum prior to shipment.
- E. Lubricate hardware and moving parts.
- F. Clean aluminum surfaces and remove excess sealant.
- G. Remove all debris caused by the work of this section.
- H. Upon completion of cleaning efforts, leave windows in closed position.

- I. Protection of newly installed windows and/or final cleaning of glass and aluminum to remove any accumulations that may have occurred during the construction period is to be the responsibility of the General Contractor or Owner.
- J. Comply with manufacturer's written recommendations for final cleaning and maintenance.

3.06 MAINTENANCE AND OPERATION INSTRUCTIONS

- A. The Contractor shall instruct the Owner's maintenance staff on the care, maintenance, and operation of the installed window system including, but not limited to: cleaning and replacement of glazing, periodic lubrication of hardware, and balance adjustment.

END OF SECTION

DIVISION 08 – OPENINGS

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Section 061000 – Rough Carpentry
2. Section 062000 – Finish Carpentry
3. Section 079200 – Joint Sealants for sealant requirements applicable to threshold installation specified in this section.
4. Section 081113 – Hollow Metal Doors and Frames
5. Section 081416 – Flush Wood Doors
6. Section 081433 – Stile and Rail Doors
7. Section 084113 – Aluminum Entrances and Storefronts
8. Section 084114 – Aluminum Security Framed Entrances and Storefronts
9. Section 084123 – Fire Rated Aluminum Framed Entrances and Storefronts
10. Section 087113 – Automatic Door Operator
11. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
12. Division 26 “Electrical” sections for connections to electrical power system and for low-voltage wiring.
13. Division 28 “Electronic Safety and Security” sections for coordination with other components of electronic access control system and fire alarm system.

1.02 SUMMARY

A. UL, LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

E. New York State Education Department Manual of Planning Standards

1. Section S110

1.03 SUBMITTALS

D. General:

1. Submit in accordance with Conditions of Contract and Section 013300 – Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
 - b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

E. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
 4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
 5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- F. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

G. Closeout Submittals:

3. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

H. Inspection and Testing:

4. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. fire door assemblies, in compliance with NFPA 80.
 - b. required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Mortise: 3 years
 - b) Cylindrical: 10 years
 - c) Falcon: 10 years
 - 2) Exit Devices
 - a) 3 years
 - 3) Closers
 - a) 25 years
 - 4) Automatic Operators
 - a) 2 years
 - b. Electrical Warranty

- 1) Locks
 - a) 1 year
- 2) Exit Devices
 - a) 1 year
- 3) Closers
 - a) 2 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with the Instructions to Bidders.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fabrication
 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.
 1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
 2. Use materials which match materials of adjacent modified areas.
 3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

- C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- D. Cable and Connectors:
 - 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
 - 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
 - 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

- A. Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
 - 2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. McKinney TB series
 - c. Best FBB series
- B. Requirements:
 - 1. Provide hinges conforming to ANSI/BHMA A156.1.
 - 2. Provide five knuckle, ball bearing hinges.
 - 3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
 - 4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 - 5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 - 6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
 - 7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
 - 8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
 - 9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins

- b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

- 1. Scheduled Manufacturer:
 - a. Ives
- 2. Acceptable Manufacturers:
 - a. Select
 - b. Roton
 - c. ABH

B. Requirements:

- 1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
- 2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
- 3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
- 4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
- 5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
- 6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
- 7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

- 1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10
- 2. Acceptable Manufacturers and Products:
 - a. ABH PT1000
 - b. Securitron CEPT-10
 - c. Security Door Controls PTM

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLOOR CLOSERS

A. Manufacturers:

3. Scheduled Manufacturer:

- a. Dormakaba

4. Acceptable Manufacturers:

- b. Jackson
- c. Rixson

B. Requirements:

1. Provide floor closers complete with ball-bearing top pivot, floor plates, intermediate pivots and cement boxes unless indicated otherwise.
2. Provide one intermediate pivot for single-acting doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide floor closers with adjustable swing speed, latch speed, back-check, and built in positive stop at specified degree of opening.
4. Spring Power: Continuously adjustable over full range of closer sizes, with reduced opening force for physically handicapped.
5. Hydraulic Regulation: By tamper-proof, non-critical valves. Provide separate adjustment for latch speed, general speed, and backcheck.
6. Provide appropriate model where floor closers are specified at fire rated openings.
7. Provide lead-lined model where floor closers are specified at lead-lined doors.
8. Provide pivots with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer, then provide recommended power transfer device and appropriate quantity of pivots.
9. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.07 PIVOT SETS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

2. Acceptable Manufacturers:

- a. Dormakaba
- b. Rixson
- c. ABH

B. Requirements:

1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide appropriate model where pivot sets are scheduled at fire rated openings.
4. Provide lead-lined model where pivot sets are specified at lead-lined doors.
5. Provide pivots with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer, then provide recommended power transfer device and appropriate quantity of pivots.
6. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.08 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Rockwood
 - b. DCI
 - c. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.09 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Rockwood
 - b. DCI
 - c. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.

2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.10 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
 - a. Accurate 9000/9100 series
 - b. Sargent 8200 series
 - c. Best 45H series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
 - b. Lever Design: Schlage see hardware groups.

2.11 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
2. Acceptable Manufacturers and Products:
 - a. Sargent 11-Line
 - b. Corbin-Russwin CL3100 series
 - c. Best 9K series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
 - b. Lever Design: Schlage Rhodes.

2.12 DEADLOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage L400 series
2. Acceptable Manufacturers and Products:
 - a. Best 38H series
 - b. Sargent 4870 series

B. Requirements:

1. Provide mortise deadlock series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide deadlocks with standard 2-3/4 inches (70 mm) backset. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
4. Provide manufacturer’s standard strike.

2.13 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series
2. Acceptable Manufacturers and Products:
 - a. Precision APEX 2000 series
 - b. Sargent 19-43-GL-80 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
17. Special Options:
 - a. **SI**: Provide dogging indicators for visible indication of dogging status.
 - b. **QM**: Rim Exit Devices: provide devices with damper-controlled re-latching to reduce operational noise. Where lever trim is specified, provide damper controlled lever return.
 - c. **CVC**: Concealed Vertical Cable Exit Devices: provide cable-actuated concealed vertical latch system in two-point for non-rated or fire rated wood doors up to a 90 minute rating and less bottom latch (LBL) configuration for non-rated or fire rated wood doors up to 20 minute rating. Vertical rods not permitted.
 - 1) Cable: Stainless steel with abrasive resistant coating. Conduit and core wire ends snap into latch and center slides without use of tools.
 - 2) Wood Door Prep: Maximum 1 inch x 1.1875 inch x 3.875 inches top latch pocket and 1 inch x 1.1875 inch x 5 inches bottom latch pocket which does not require the use of a metal wrap or edge for non-rated or fire rated wood doors up to a 45 minute rating.
 - 3) Latchbolts and Blocking Cams: Manufactured from sintered metal low carbon copper-infiltrated steel, with molybdenum disulfide low friction coating.

- 4) Top Latchbolt: Minimum 0.38 inch (10 mm) and greater than 90^{-degree} engagement with strike to prevent door and frame separation under high static load.
- 5) Bottom Latchbolt: Minimum of 0.44-inch (11 mm) engagement with strike.
- 6) Product Cycle Life: 1,000,000 cycles.
- 7) Latch Operation: Top and bottom latch operate independently of each other. Top latch fully engages top strike even when bottom latch is compromised. Separate trigger mechanisms not permitted.
- 8) Latch release does not require separate trigger mechanism.
- 9) Cable and latching system characteristics:
 - a) Installed independently of exit device installation, and capable of functioning on door prior to device and trim installation.
 - b) Connected to exit device at single point in steel and aluminum doors, and two points for top and bottom latches in wood doors.
 - c) Bottom latch height adjusted, from single point for steel and aluminum doors and two points for wood doors, after system is installed and connected to exit device, while door is hanging
 - d) Bottom latch position altered up and down minimum of 2 inches (51 mm) in steel and aluminum doors without additional adjustment. Bottom latch deadlocks in every adjustment position in wood doors.
 - e) Top and bottom latches in steel and aluminum doors and top latch in wood doors may be removed while door is hanging.

2.14 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 6000 Series.
2. Acceptable Manufacturers and Products:
 - a. Folger Adam 300 Series
 - b. HES 1006 Series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.15 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series
2. Acceptable Manufacturers and Products:
 - a. Precision ELR series
 - b. Sargent 3500 series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.
 - b. Class 2 Rated power limited output.
 - c. Universal 120-240 VAC input.
 - d. Low voltage DC, regulated and filtered.
 - e. Polarized connector for distribution boards.
 - f. Fused primary input.
 - g. AC input and DC output monitoring circuit w/LED indicators.
 - h. Cover mounted AC Input indication.
 - i. Tested and certified to meet UL294.
 - j. NEMA 1 enclosure.
 - k. Hinged cover w/lock down screws.
 - l. High voltage protective cover.

2.16 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Match Existing
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide permanent or interchangeable cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2.17 KEYING

A. Scheduled System:

1. New factory registered system:
 - a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

OR

2. Existing factory registered system:
 - b. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

OR

3. Existing non-factory registered system:

- c. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact information by Owner.

B. Requirements:

1. Construction Keying:

- a. Replaceable Construction Cores. (OPTION: if using temporary construction cores in IC core cylinder in either F/S or S/F.)
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:

- a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
- b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
- c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
- d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Change (Day) Keys: 3 per cylinder/core.
 - 2) (OPTION for interchangeable cores) Permanent Control Keys: 3.

3) Master Keys: 6.

2.18 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Telkee
2. Acceptable Manufacturers:
 - a. HPC
 - b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.19 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4010/4110/4020 series
2. Acceptable Manufacturers and Products:
 - b. Corbin-Russwin DC8000 series
 - c. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.

7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.20 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series
2. Acceptable Manufacturers and Products:
 - a. Norton 7500 series
 - b. Sargent 351 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.21 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4600 series
2. Acceptable Manufacturers and Products:
 - a. Norton 6000 series
 - b. Besam Power Swing

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide wireless actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
9. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
10. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.22 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives.
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.23 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Size plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.24 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. Rixson
 - b. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.25 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.26 THRESHOLDS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Pemko
2. Acceptable Manufacturers:

- a. No Substitute

B. Requirements:

- 3. Provide thresholds as specified and per architectural details. Match finish of other items.
- 4. For Level floor use 2548A
- 5. For 3/8" offset use 200A x 228 A
- 6. For 1/2" offset use R.50.SMRAK
- 7. For 3/4" offset use R.75.SMRAK
- 8. Over 3/4" offset use R.VARI/AK

2.27 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

2. Acceptable Manufacturers:

- a. Rockwood
- b. Trimco

B. Requirements:

- 1. Provide "push-in" type silencers for hollow metal or wood frames.
- 2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
- 3. Omit where gasketing is specified.

2.28 ROLLER LATCHES

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

2. Acceptable Manufacturers:

- a. Rockwood
- b. Trimco

B. Requirements:

- 1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
- 2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

2.29 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. LCN
- 2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent
- B. Requirements:
 - 1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.20 FINISHES

- A. Finish: BHMA 626/652 (US26D); except:
 - 1. Hinges at Exterior Doors: BHMA 630 (US32D)
 - 2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
 - 3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
 - 4. Protection Plates: BHMA 630 (US32D)
 - 5. Overhead Stops and Holders: BHMA 630 (US32D)
 - 6. Door Closers: Powder Coat to Match
 - 7. Wall Stops: BHMA 630 (US32D)
 - 8. Latch Protectors: BHMA 630 (US32D)
 - 9. Weatherstripping: Clear Anodized Aluminum
 - 10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing doors and frames for new hardware being installed.

3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Construction Cores Lock Cylinders:
 1. Install construction cores to secure building and areas during construction period.
 2. Replace construction cores with permanent cores as indicated in keying section.
 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 1. Conduit, junction boxes and wire pulls.
 2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.

5. Connections to panel interface modules, controllers, and gateways.
 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 - L. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
 - M. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
 - N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
 - O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
 - P. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
 - Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - S. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes during the final adjustment of hardware.
- D. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by a representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore to proper function of doors and hardware. Consult with and instruct the Owner's personnel in recommended additions to the

maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials, or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

86226 X-54911 Version 1

HARDWARE SET NO. 01 - SINGLE CLASSROOM SECURITY - MORTISE

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CLASSROOM SECURITY W/ INSIDE INDICATOR	L9071L 06N IS-LOC CHANGE LEVER TO MATCH EXISTING	630	SCH
2	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM	626	
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HARDWARE SET NO. 01A - SINGLE CLASSROOM SECURITY - CYLINDRICAL

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	CLASSROOM SECURITY W/ INSIDE INDICATOR	ND78 RHO IS-CRS CHANGE LEVER TO MATCH EXISTING		626	SCH
2	EA	INTERCHANGABLE CORE	TO MATCH EXISTING SYSTEM		626	
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 02 - SINGLE EXIT LOCKDOWN

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-2SI-06 CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 03 - PAIR EXITS LOCKDOWN - ASSEMBLY - NO MULLION

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBRAFL-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-2SI-LBRAFL-06-499F CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 03A - PAIR EXITS LOCKDOWN - ASSEMBLY - NO MULLION - MAG HOLD OPEN

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBRAFL-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-2SI-LBRAFL-06-499F CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	MAGNET	SEM7830 12V/24V/120V PROVIDE EXTENSIONS AS REQUIRED		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 04 - PAIR EXITS LOCKDOWN - ASSEMBLY - REMOVABLE MULLION

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954		689	VON
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	FIRE EXIT HARDWARE	98-L-F-2SI-06 CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM FOR MULLION		626	
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 04A - PAIR EXITS LOCKDOWN - ASSEMBLY - REMOVABLE MULLION - MAG HOLD OPEN

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954		689	VON
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	FIRE EXIT HARDWARE	98-L-F-2SI-06 CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM FOR MULLION		626	
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	MAGNET	SEM7830 12V/24V/120V PROVIDE EXTENSIONS AS REQUIRED		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 05 - PAIR CORRIDOR - NON-LOCKING

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBRAFL-06-499F CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 05A - PAIR CORRIDOR - NON-LOCKING - MAG HOLD OPEN

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBRAFL-06-499F CHANGE LEVER TO MATCH EXISTING		630	VON
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS TKTX		630	IVE
2	EA	MAGNET	SEM7830 12V/24V/120V PROVIDE EXTENSIONS AS REQUIRED		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 06 - SINGLE OCCUPANCY TOILET WITH INDICATOR

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	PRIVACY LOCK	L9040 06N L583-363 ODS-OCC CHANGE LEVER TO MATCH EXISTING		630	SCH
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM		689	LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 07 - GANG TOILET - MORTISE

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	CLASSROOM LOCK	L9070L 06N CHANGE LEVER TO MATCH EXISTING		630	SCH
2	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM		689	LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 07A - GANG TOILET - CYLINDRICAL

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	CLASSROOM LOCK	ND70 RHO CHANGE LEVER TO MATCH EXISTING		626	SCH
2	EA	INTERCHANGABLE CORE	TO MATCH EXISTING SYSTEM		626	
1	EA	SURFACE CLOSER	4040XP MOUNT CLOSER INSIDE CLASSROOM		689	LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

HARDWARE SET NO. 08 - GANG TOILET - MORTISE - AUTO OPERATOR

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CLASSROOM LOCK	L9070L 06N	630	SCH
			CHANGE LEVER TO MATCH EXISTING		
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM	626	
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURF. AUTO OPERATOR	4631 WMS 120 VAC USE 4642 WHEN PUSH SIDE MOUNT IS NEEDED	689	LCN
1	EA	ACTUATOR, TOUCH	8310-853TWP	630	LCN
1	EA	RECEIVER	8310-865		LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS OMIT AT CLASSROOM DOORS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER
1	EA	WIRE HARNESS	CON-6W FROM ELECTRIC STRIKE		SCH

HARDWARE SET NO. 08A - GANG TOILET CLYINDRICAL - AUTO OPERATOR

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CLASSROOM LOCK	ND70 RHO	626	SCH
			CHANGE LEVER TO MATCH EXISTING		
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM	626	
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURF. AUTO OPERATOR	4631 WMS 120 VAC USE 4642 WHEN PUSH SIDE MOUNT IS NEEDED	689	LCN
1	EA	ACTUATOR, TOUCH	8310-853TWP	630	LCN
1	EA	RECEIVER	8310-865		LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS OMIT AT CLASSROOM DOORS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER
1	EA	WIRE HARNESS	CON-6W FROM ELECTRIC STRIKE		SCH

HARDWARE SET NO. 09 - SINGLE FRP EXTERIOR

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
1	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	FLUSH PULL	BY DOOR MANUFACTURER			
1	EA	SURFACE CLOSER	4040XP HCUSH		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

HARDWARE SET NO. 09A - SINGLE FRP EXTERIOR - ELECTRIC STRIKE

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
1	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC		630	VON
1	EA	FLUSH PULL	BY DOOR MANUFACTURER			
1	EA	SURFACE CLOSER	4040XP HCUSH		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			
1	EA	WIRE HARNESS	CON-6W			SCH
			FROM ELECTRIC STRIKE			
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			
1	EA	CREDENTIAL READER/DOOR RELEASE	BY SECURITY CONTRACTOR			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

HARDWARE SET NO. 10 - PAIR FRP EXTERIOR

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	REMOVABLE MULLION	KR4954		689	VON
1	EA	PANIC HARDWARE	CD-98-EO		630	VON
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
3	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
2	EA	FLUSH PULL	BY DOOR MANUFACTURER			
2	EA	SURFACE CLOSER	4040XP HCUSH		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

HARDWARE SET NO. 10A - PAIR FRP EXTERIOR - ELECTRIC STRIKE

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		628	IVE
1	EA	REMOVABLE MULLION	KR4854		689	VON
1	EA	PANIC HARDWARE	CD-98-EO		630	VON
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
3	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC		630	VON
2	EA	FLUSH PULL	BY DOOR MANUFACTURER			
2	EA	SURFACE CLOSER	4040XP HCUSH		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			
2	EA	WIRE HARNESS	CON-50 FOR USE INSIDE MULLION			SCH
2	EA	WIRE HARNESS	CON-6W FROM ELECTRIC STRIKE			SCH
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			
1	EA	CREDENTIAL READER/DOOR RELEASE	BY SECURITY CONTRACTOR			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

HARDWARE SET NO. 11 - SINGLE ALUMINUM EXTEROR - ELECTRIC STRIKE

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112XY		628	IVE
1	EA	PANIC HARDWARE	CD-35A-NL-OP-388		626	VON
1	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC		630	VON
1	EA	FLUSH PULL	BY DOOR MANUFACTURER			
1	EA	OH STOP & HOLDER	90H		630	GLY
1	EA	SURFACE CLOSER	4021		689	LCN
1	EA	FLUSH CEILNG MTG PLATE	4020-18G SRT		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			
1	EA	WIRE HARNESS	CON-6W FROM ELECTRIC STRIKE			SCH
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			
1	EA	CREDENTIAL READER/DOOR RELEASE	BY SECURITY CONTRACTOR			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

HARDWARE SET NO. 12 - PAIR ALUMINUM EXTERIOR - ELECTRIC STRIKE

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112XY		628	IVE
1	EA	REMOVABLE MULLION	KR4854		689	VON
1	EA	PANIC HARDWARE	CD-35A-EO		626	VON
1	EA	PANIC HARDWARE	CD-35A-NL-OP-388		626	VON
2	EA	RIM CYLINDER	TO MATCH EXISTING SYSTEM		626	
3	EA	MORTISE CYLINDER	TO MATCH EXISTING SYSTEM		626	
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC		630	VON
2	EA	FLUSH PULL	BY DOOR MANUFACTURER			
2	EA	OH STOP & HOLDER	90H		630	GLY
2	EA	SURFACE CLOSER	4021		689	LCN
2	EA	FLUSH CEILING MTG PLATE	4020-18G SRT		689	LCN
1	EA	PERIMETER GASKETING	BY DOOR MANUFACTURER			
1	EA	THRESHOLD	SEE BELOW			
2	EA	WIRE HARNESS	CON-50 FOR USE INSIDE MULLION			SCH
1	EA	WIRE HARNESS	CON-6W FROM ELECTRIC STRIKE			SCH
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			
1	EA	CREDENTIAL READER/DOOR RELEASE	BY SECURITY CONTRACTOR			

NOTE:

FOR LEVEL FLOOR USE: 2548A

FOR 3/8" OFFSET USE: 200A X 228A

FOR 1/2" OFFSET USE: R.50.SMRAK

FOR 3/4" OFFSET USE: R.75.SMRAK

OVER 3/4" OFFSET USE: R.VARI/AK

FOR DOOR REPLACEMENT PROJECTS THE FOLLOWING WORK SCOPE SHALL BE INCLUDED:

EXISTING FRAME:

NOTE: CONTRACTOR TO FILL/PATCH ANY OLD HARDWARE PREPARATIONS IN EXISTING FRAME THAT WILL BE NO LONGER USED WITH NEW DOOR/HARDWARE. CONTRACTOR IS RESPONSIBLE FOR ANY NEW MORTISES/HARDWARE PREPARATION TO EXISTING FRAME TO ACCOMMODATE NEW DOOR AND HARDWARE.

EXISTING DOOR AND FRAME:

NOTE: CONTRACTOR TO FILL/PATCH ANY OLD HARDWARE PREPARATIONS IN EXISTING DOOR AND FRAME THAT WILL NO LONGER BE USED WITH NEW HARDWARE. CONTRACTOR IS RESPONSIBLE FOR ANY MODIFICATIONS TO DOOR AND/OR FRAME AS REQUIRED TO MOUNT NEW DOOR HARDWARE, INCLUDING MORTISES, REINFORCEMENTS AND ALL PREPARATION OF THE EXISTING MATERIAL.

END OF SECTION

DIVISION 08 – OPENINGS

SECTION 088000 – 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. Glass and glazing units for the following products and applications, and glazing requirements referenced by other sections:
 - 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.
- 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.
- C. Related Documents:
 - 1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- D. Related Sections include the following:
 - 1. Section 072100 – Building Insulation
 - 2. Section 079200 – Joint Sealants
 - 3. Section 081113 – Hollow Metal Doors and Frames
 - 4. Section 081416 – Flush Wood Doors
 - 5. Section 081433 – Stile and Rail Doors
 - 6. Section 084113 – Aluminum Entrances and Storefront
 - 7. Section 084413 – Glazed Aluminum Curtain Walls
 - 8. Section 085113 – Aluminum Windows
 - 9. Section 085200 – Ultimate Double Hung Wood Windows
- E. Insulated metal panels glazed into exterior aluminum window frames are specified in Section 085113 – Aluminum Windows.

1.02 REFERENCE STANDARDS

- A. American National Standards Institute:

1. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- B. ASCE 7 - "Minimum Design Loads for Buildings and Other Structures".
- C. American Architectural Manufacturers Association:
1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants.
- D. Code of Federal Regulations:
1. 16FR 1201 – Safety Standards for Architectural Glazing Materials.
- E. American Society for Testing and Materials (ASTM):
1. ASTM C 162 – Standard Terminology of Glass and Glass Products.
 2. ASTM C 509 – Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
 3. ASTM C 864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 4. ASTM C 920 – Standard Specification for Elastomeric Joint Sealants.
 5. ASTM C 1036 – Standard Specification for Flat Glass.
 6. ASTM C 1048 – Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 7. ASTM C 1087 – Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
 8. ASTM C 1115 – Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
 9. ASTM C 1172 – Standard Specification for Laminated Architectural Flat Glass.
 10. ASTM C 1281 – Standard Specification for Preformed Tape Sealants for Glazing Applications.
 11. ASTM C 1330 – Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 12. ASTM C 1376 – Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
 13. ASTM E 774 – Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units.
 14. ASTM E 1300 – Standard Practice for Determining Load Resistance of Glass in Buildings.
 15. ASTM E 2189 – Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
 16. ASTM E 2190 – Standard Specification for Insulating Glass Unit Performance and Evaluation.
 17. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction & Materials.
- F. Glass Association of North America (GANA):
1. Glazing Manual.
 2. Laminated Glass Design Guide.
 3. Engineering Standards Manual.
- G. The Insulating Glass Manufacturers Alliance (IGMA):
1. IGMA TB-3001 - Sloped Glazing Guidelines.
 2. IGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.
- H. 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.

I. 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.

J. 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.

K. Safety Glazing Certifications Council (SGCC):

1. SGCC – Certified Products Directory for Safety Glazing Material Used in Buildings.

L. Associated Laboratories, Inc. (ALI):

1. ALI – Certified Products Directory – Fenestration Products.

M. 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 013300 – Submittal Procedures 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. 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.

- E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.
- F. Qualification Data: For installers.
- G. Product Test Reports: For each of the following types of glazing products.
 - 1. Tinted float glass.
 - 2. Coated float glass.
 - 3. Insulating glass.
- H. Shop Drawings: Prior to placement of glass order or glass fabrication, the Contractor shall submit 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.
- I. Warranties: Special warranties specified in this Section.

1.04 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or other specified gas.
- D. Sealed Insulating Glass Unit Surface Designations:
 - 1. Surface 1: Exterior surface of outer glass lite.
 - 2. Surface 2: Interspace surface of outer glass lite.
 - 3. Surface 3: Interspace surface of inner glass lite.
 - 4. Surface 4: Interior surface of inner glass lite.
- 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.
 - 1. For glass sputter-coated with solar-control low-e coatings, obtain glass products in fabricated units from a manufacturer/fabricator certified by the primary glass manufacturer.

- 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. Single Source Responsibility: Obtain materials from one source for each type of glass and glazing.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. FGIA Publication for Insulating Glass: SFGIA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
 - 2. NGA Publications: "Laminated Glazing Reference Manual"; "Glazing Manual."
 - 3. AAMA: "Sloped Glazing Guidelines."
 - 4. FGIA: "Guidelines for Sloped Glazing."
- F. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Certification Council.
 - 2. Associated Laboratories, Inc.
 - 3. Fenestration and Glazing Industry Alliance.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 for Category I and II glazing products and, Fenestration and Glazing Industry Alliance ANSI Z97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Lites more than 9 sq ft (0.84 sq m) in area are required to be Category II materials.
 - 3. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf (0.84 sq m) in area, provide glazing products that comply with Category II materials, and for lites 9 sf (0.84 sq m) or less in area, provide glazing products that comply with Category I or II materials.
- H. 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.
- I. 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.

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 designations 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 2020 International Building Code or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.5, "Method 2 - Analytical Procedure," whichever are more stringent. Refer to drawings for Wind Design Data.
 - b. Specified Design Snow Loads: As indicated on Drawings, but not less than snow loads

applicable to Project as required by ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 7.0, "Snow Loads."

- c. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical.
 - 1) Wind Load Duration: Short duration, as defined in ASTM E 1300 or 60 seconds or less.
 - d. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical.
 - 1) Wind Load Duration: Short duration, as defined in ASTM E 1300 or 60 seconds or less.
 - 2) Snow Load Duration: Long Duration, as defined in ASTM E 1300 or 30 days.
 - e. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
 - 1) For monolithic-glass lites heat treated to resist wind loads.
 - 2) For insulating glass.
 - f. 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. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
 - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
 - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. per h per degree F.
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Delivery:
 - 1. Delivered materials shall match the approved samples.

2. Each panel of glass shall be factory labeled. Deliver glass with manufacturer's labels intact.
3. Packaged materials shall be delivered in the original unopened labeled containers of the manufacturer, clearly marked with their name and brand.

C. Storage and Handling:

1. Store glass in designated areas, while awaiting installation, in a dry, well-ventilated location at a constant temperature maintained above dew point away from traffic 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.
4. 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.

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. Manufacturer's Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator in which the coated glass manufacturer agrees to replace coated glass units that deteriorates during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.

1. Warranty Period: Five years from date of Substantial Completion.

- B. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.

1. Warranty Period: Five years from date of Substantial Completion.

- C. Manufacturer's Warranty on Laminated Glass: Manufacturer's standard form in which the laminated glass manufacturer agrees to replace laminated glass units that deteriorate during normal use within the specified warranty period. Deterioration of laminated glass is defined as defects, such as discoloration, edge separation, or blemishes exceeding those allowed by ASTM C 1172 that are not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.

1. Warranty Period: Five years from date of Substantial Completion.

- D. Installer's Warranty: Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing

products due to faulty installation, within 2 years of date of manufacture.

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, Glass Technology Center, 400 Guys Run Rd., Cheswick, PA 15024, (855)-887-6457, Fax: (800) 367-2986.
Email: archservices@vitro.com, <http://www.vitroglazings.com>
 - b. Guardian Glass, Auburn Hills, MI.
 - c. AGC Inc., Kingsport, TN.
 - d. Custom Glass Co., Pittsburgh, PA.

2.02 MATERIALS

A. General:

1. All glass, whether specifically shown or specified, shall conform to manufacturer's standards as to maximum size for each type of glass.

B. Annealed Float Glass, General: ASTM C 1036, Type I, Quality-Q3, class indicated.

C. Heat-Treated Float Glass, Heat-Strengthened: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind HS, of class and condition indicated: where indicated, where needed to resist thermal stresses and where required to comply with performance requirements.

D. Heat-Treated Float Glass, Fully Tempered: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind FT, of class and condition indicated: where safety glass is indicated. Safety glazing must comply with ANSI Z97.1 and CPSC 16CFR-1201.

E. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during primary glass product manufacture.

F. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process following primary glass product manufacture.

G. Coated Spandrel Float Glass: Float glass complying with ASTM C 1048, GANA 'Engineering Standards Manual' 89-1-6 Specification for Environmental Durability of Fully Tempered or Heat-Strengthened Spandrel Glass with Applied Opacifier and other requirements specified, with manufacturer's standard opacifier material on coated second surface of lites.

H. Laminated Glass: ASTM C 1172, with manufacturer's standard polyvinyl butyral or cured resin interlayer.

I. Insulating-Glass Units: 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.

2.03 FABRICATION OF GLAZING UNITS, GENERAL

- A. 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.

2.04 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, 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.

2.05 INSULATING GLASS UNITS

A. **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 conforming to ASTM E 2190, 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. Interspace Content: Air (10%) / Argon (90%) Mix 1/2" (12.7mm).
- c. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.
 - 1) Kind FT (Full Tempered)
 - 2) 1/4-inch thick glass.

- d. 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 conforming to ASTM E 2190, 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: "Solarcool" by Vitro Architectural Glass on second surface (2).

 - b. Interspace Content: Air (10%) / Argon (90%) Mix 1/2" (12.7mm).

 - c. 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" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the third surface (3).

 - d. Performance Requirements: (minimum requirements based on Solarbronze glass)
 - 1) Visible Light Transmittance: 17 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: 0.20 maximum.
 - 5) Solar Heat Gain Coefficient: 0.17 maximum.
 - 6) Outdoor Visible Light Reflectance: 14 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 conforming to ASTM E 2190, 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), provide coating on the third surface (3)

- when glazing is exposed to the inside.
- 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*ft²*°F) maximum.
 - 3) Summer daytime U-Factor: 0.21 (Btu/hr*ft²*°F) 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 conforming to ASTM E 2190, consisting of:
- a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect when required), 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.
 - 1) Laminate Outboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.
 - a) Kind FT (Full Tempered)
 - b) 1/4-inch thick glass.
 - 2) Interlayer: ASTM C1036, Type I, Class 1, Quality q3.
 - a) Type: PVB
 - b) Thickness: 0.015" (0.38mm)"
 - 3) Laminate Inboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.
 - a) Kind FT (Full Tempered)
 - b) 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*ft²*°F) maximum.
 - 3) Summer daytime U-Factor: 0.14 (Btu/hr*ft²*°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. **Acid-Etched Insulating Glass (Gyms and Vestibule):** 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 conforming to ASTM E 2190, consisting of:

- a. Outer Lite: ASTM C1036, Type I, Class 1, Quality q3.
 - 1) Kind FT (Full Tempered)
 - 2) 1/4-inch thick glass.
 - 3) Guardian Clear glass with SunGuard SN 68 Low-E coating on the second surface (2).
- b. Interspace Content: Air (10%) / Argon (90%) Mix 1/2" (12.7mm).
- c. Inside Lite: ASTM C1036, Type I, Class 1, Quality q3.
 - 1) Kind FT (Full Tempered)
 - 2) 1/4-inch thick glass.
 - 3) Guardian Clear glass SatinDeco acid etched on the third surface (3).
- d. Performance Requirements: (minimum requirements based on non-tinted clear glass)
 - 1) Visible Light Transmittance: 67 percent minimum.
 - 2) Winter Nighttime U-Factor: 0.24 (Btu/hr*ft²*°F) maximum.
 - 3) Summer daytime U-Factor: 0.21 (Btu/hr*ft²*°F) maximum.
 - 4) Shading Coefficient: 0.43 maximum.
 - 5) Solar Heat Gain Coefficient: 0.38 maximum.
 - 6) Outdoor Visible Light Reflectance: 12 percent maximum.

2.06 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. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

- C. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C 1281 and AAMA 800 for application.

D. Glazing Gaskets:

- 1. Dense Compression Gaskets: ASTM C 864, neoprene or EPDM, or ASTM C 1115, silicone or thermoplastic polyolefin rubber, as recommended by glazing product manufacturer for application, molded or extruded shape to fit glazing channel retaining slot; black color.
- 2. Soft Compression Gaskets: ASTM C 509, Type II, black, molded or extruded, neoprene, EPDM, silicone or thermoplastic polyolefin rubber, of profile and hardness required to maintain watertight seal.

- E. Setting Blocks: ASTM C 864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches, width of glazing rabbet space less 1/16 inch, height required for glazing method, pane weight, and pane area.

- F. Spacer Shims: ASTM C 864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches, one half height of glazing stop, thickness required for application, one face self-adhesive.

- G. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- H. Glazing Sealants: ASTM C 920, type recommended by glazing product manufacturer for application indicated, complying with requirements of Section 079200 – Joint Sealants, color as selected by Architect.
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.

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 EXAMINATION

- A. Verify that glazing channels are clean, free of burrs, irregularities, and debris and ready to accept glazing installation, and that weeps are unobstructed. Confirm that minimum required face and edge clearances will be maintained.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- C. Examine glazing units prior to setting. Reject units that display edge or face damage that may impede performance of unit or that will be visible when installed.

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 with recommended solvent and wipe dry. Remove coatings not firmly bonded to substrates.
4. Apply primers to joint surfaces to ensure adhesion of sealants, unless preconstruction sealant-substrate testing indicates no primer is required.

3.03 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.

3.04 GLAZING 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. 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.
- D. Do not attempt to cut, seam, nip, or abrade glass that is tempered, heat strengthened, or coated.
- E. 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.
- F. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- G. 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.
- H. Install glass and glazing materials in accordance with instructions of manufacturers and requirements of GANA Glazing Manual.
 1. Install setting blocks of proper sizes at quarter points of sill rabbet. Set blocks in thin course of heelbead compound / sealant, if any.
 2. 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.
 3. 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.

4. 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.
5. Ensure that glazing units are set with proper and consistent orientation of glass units toward interior and exterior.
6. Provide edge blocking where recommended.
7. Install sealants in accordance with requirements of Section 079200 – Joint Sealants.
8. 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.
9. 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:

<u>Glass Thickness</u>	<u>Face Clearance</u>	<u>Edge Clearance</u>	<u>Bite</u>
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

3.05 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.

3.06 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.

3.07 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.

3.08 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.

3.09 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.

3.10 CLEANING 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.
- H. Within 5 working days prior to inspection for Substantial Completion, clean all exposed glass surfaces using methods recommended by manufacturer. Remove glazing compounds from framing surfaces.

END OF SECTION

DIVISION 09 – FINISHES

SECTION 092900 – 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 01 - 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: Section 093013 – Porcelain and Glazed Ceramic Tile.

1.02 RELATED WORK

- A. Related work specified under other sections of the specifications:
 - 1. Section 054000 – Cold Metal Framing
 - 2. Section 061000 – Rough Carpentry
 - 3. Section 079200 – Joint Sealants
 - 4. Section 081113 – Hollow Metal Doors and Frames
 - 5. Section 081416 – Flush Wood Doors
 - 6. Section 093013 – Porcelain and Glazed Ceramic Tile: for cementitious backer units.
 - 7. Section 099000 – Painting
 - 8. Section 265100 – Interior 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 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
2. ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A645 – Standard for Nonstructural Framing Members.
4. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) by the Hot-Dipped Process.
5. ASTM C442 – Standard Specification for Gypsum Backing Board, Gypsum Coreboard and Gypsum Shaftliner Board.
6. ASTM C473 – Standard Test Methods for Physical Testing of Gypsum Panel Products.
7. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
8. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
9. ASTM C635 – Standard Specifications for Metal Suspension Systems.
10. ASTM C636 – Recommended Practice for Installation of Metal Suspension Systems.
11. ASTM C645 – Standard Specification for Non-Bearing (Axial) Steel Studs, Runners, (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
12. ASTM C665 – Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
13. ASTM C754 – Specification for Installation of Steel framing Members to Receive Screw-Attach Gypsum Boards.
14. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.
15. ASTM C955 – Standard Specification for Cold-Formed Steel Structural Framing Members.
16. ASTM C1002 – Steel Drill Screws for the Application of Gypsum Board.
17. ASTM C1047 – Accessories for Gypsum Wallboard and Gypsum Veneer Base.
18. ASTM C1178 – Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
19. ASTM C1278 – Standard Specification for Fiber-Reinforced Gypsum Panels.
20. ASTM C1396 – Standard Specification for Gypsum Board.
21. ASTM C1629, Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
22. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
23. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
24. ASTM E136 – Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750° C.
25. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
26. ASTM F1267 – Specification for Metal, Expanded, Steel.

B. Gypsum Association (GA):

1. GA-214 – Recommended Levels of Gypsum Board Finish.
2. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board.
3. GA-600 – Fire Resistance and Sound Control Design Manual.
4. GA-801 – Handling and Storage of Gypsum Panel Products.

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-1396.
 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 and GA-216.
- D. Maintain copies of 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 01.
- 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.
- H. 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. Comply with manufacturer's instructions, GA-216 and GA-801. Stack product flat on a level surface. As individual sheets are removed for installation, raise products carefully on edge and carry in a vertical position. Take care to avoid impact, undue flexing and damage to edges, ends and corners.
- B. 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.
- C. Remove all items delivered in broken, damaged, rusted or unlabeled condition from site immediately.
- D. 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° to 70° F for one week prior to attachment or joint treatment, and until joint treatment is complete and dry.
 - 2. Do not install gypsum board when ambient temperature is below 40°F.
- 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.

1.09 COORDINATION WITH OTHER WORK

A. General:

1. Coordinate with other work including mechanical and electrical work and partition systems. Installation of conduit and ductwork above suspension system shall be complete before installation of suspension system.

B. Protection:

1. Follow good safety and industrial hygiene practices during handling and installation of all products and systems, with personnel to take necessary precautions and wear appropriate personal protective equipment as needed. Read Material Safety Data Sheets and related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner and manufacturer will rely on contractor's performance in such regard.

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 on the drawings or noted below, 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 USG Corporation or approved equal. "Z" furring channels, 26 gauge hot dipped galvanized, 1-1/2" deep as manufactured by USG Corporation or approved equal.
4. Metal stud partitions with gypsum board/tile 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. USG Drywall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish.
 - 1. Main Tees: Fire-Rated Heavy-Duty classification 1.617" high x 144" long, integral reversible splice with knurled face. (DGLW-26 1-1/2" Face and 1.617" high)
 - a. Cross Members: Fire-Rated members with knurled face. Cross Tees: DGLW-424 cross tee 1-1/2" high x 48" long with 1-1/2" wide face; DGLW-224 Fire-Rated: 1-1/2" high x 24" long with 1-1/2" face.
 - 2. Quick release cross tee ends for positive locking and removability without tools.
 - 3. Accessory Cross Tees: Cross tees must have knurled faces and quick release cross tee ends for positive locking and removability without tools.
 - a. DGW-6026DM: 1.617" high x 5' long with a 1-1/2" face
 - b. DGW-7226DM: 1.617" high x 6' long with a 1-1/2" face
 - c. DGW-8426DM: 1.617" high x 7' long with a 1-1/2" face
 - d. DGW-9626DM: 1.617" high x 8' long with a 1-1/2" face
 - 4. Wall Moldings: Single web with knurled face
 - a. DGWM-24: 1-1/2" x 1" x 144" long wall molding
 - b. DGCM-27: 144" x 1-5/8" x 1" x 1" channel molding
 - c. DGLC-12: 144" x 1-3/4" x 1" x 1" index channel molding
 - 5. Accessories
 - a. DGSC-180: Splice Clip
 - b. DGTC-90: Transition Clip
 - c. DGWC: Wall Attachment Clip
 - d. DGSP-180: Splice Plate

- e. DGHUB: Dome Hub
 - f. CMAC-1: Close Mount Attachment Clip
6. Wire: Hanger Wire 12 ga., galvanized or as noted on drawings
- B. USG Drywall Wall-to-Wall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish for use in corridors and short span applications.
- 1. Main Tees: Fire-Rated Heavy Duty classification 1.617" high x 6', 8', 10', 12', 14' or Custom long, integral reversible splice with 1-1/2" knurled face.
 - 2. Wall Moldings: Single web with knurled face, 1-1/2" x 1" x 12' long, DGWM24
 - 3. Wall Channel: Single web with knurled face, 1-5/8" x 1" x 12' long, DGCM27
 - 4. Locking Wall Channel: Single web with knurled face, 1-3/4" x 1" x 12' long, DGLC-12
- C. Grid Suspension Assemblies: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL or architect approved equal.

2.04 MANUFACTURERS – GYPSUM BOARD

- A. Subject to compliance with requirements, provide products by one of the following:
- 1. USG Corporation
 - 2. Gold Bond Building Products
 - 3. Lafarge
 - 4. Georgia-Pacific Co.
- B. Limitations:
- 1. Do not expose to sustained temperatures exceeding 125° 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.
- C. 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.

D. 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.

2.05 GYPSUM PANEL PRODUCTS

TYPE I – ABUSE - MOISTURE - AND MOLD-RESISTANT TYPE X GYPSUM PANEL

To be used at all rated and non-rated interior gypsum board partitions and rated ceiling assemblies.

- A. ASTM C1396, Standard Specification for Gypsum Board, for 5/8 in., Type X and water-resistant gypsum wallboard.
- B. Basis of Design: Subject to compliance with project requirements, the design is based on the following: United States Gypsum Company, USG Sheetrock® Brand Mold Tough® AR Firecode® X Panels.
 1. UL Type Designation: "AR".
 2. ASTM E136 Noncombustibility.
 3. Meets the following ASTM E84 Surface-Burning Characteristics.
 - a. Flame Spread: 15
 - b. Smoke Developed: 5
 - c. Class A
 4. Meets the following ASTM C473, Standard Test Methods for Physical Testing of Gypsum Panels Products.
 - a. Core Hardness
 - 1) Field - Not less than 11 lbf
 - 2) End - Not less than 11 lbf
 - 3) Edge - Not less than 11 lbf
 - b. Flexural Strength
 - 1) Parallel - Not less than 46 lbf
 - 2) Perpendicular - Not less than 147 lbf
 - c. Nail Pull Resistance - Not less than 87 lbf
 - d. Humidified Deflection - Not greater than 5/8 in.
 - e. Average Water Absorption - Not greater than 5% by weight after two-hour immersion
 5. ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber. Meets ASTM C1396 specifications.
 6. Thickness: 5/8 in.
 7. Length: 8-12 ft.

8. Width: 4 ft.
 9. Weight: 2.8 lb./sq. ft.
 10. Edge: Tapered
- C. ASTM C1629, Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
1. Abrasion Resistance per ASTM D4977: Level 2
 2. Indentation Resistance per ASTM D5240: Level 1
 3. Soft-Body Impact Resistance per ASTM C1629: Level 2
 4. Hard-Body Impact Resistance per ASTM C1629: Level 1

TYPE IA – HIGH – ABUSE – MOISTURE - AND MOLD-RESISTANT TYPE X GYPSUM PANEL

To be used at all rated and non-rated interior gypsum board partitions requiring High Impact wall Assemblies as noted on the Drawings.

- A. ASTM C1396, Standard Specification for Gypsum Board, for 5/8 in., Type X and water-resistant gypsum wallboard.
- B. Basis of Design: Subject to compliance with project requirements, the design is based on the following: United States Gypsum Company, USG Sheetrock® Brand Mold Tough® VHI Firecode® X Panels.
 1. UL Type Designation: “AR”.
 2. ASTM E136 Noncombustibility.
 3. Meets the following ASTM E84 Surface-Burning Characteristics.
 - a. Flame Spread: 15
 - b. Smoke Developed: 5
 - c. Class A
 4. Meets the following ASTM C473, Standard Test Methods for Physical Testing of Gypsum Panels Products.
 - a. Core Hardness
 - 1) Field - Not less than 11 lbf
 - 2) End - Not less than 11 lbf
 - 3) Edge - Not less than 11 lbf
 - b. Flexural Strength
 - 1) Parallel - Not less than 46 lbf
 - 2) Perpendicular - Not less than 147 lbf
 - c. Nail Pull Resistance - Not less than 87 lbf
 - d. Humidified Deflection - Not greater than 5/8 in.
 - e. Average Water Absorption - Not greater than 5% by weight after two-hour immersion
 5. ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber. Meets ASTM C1396 specifications.
 6. Thickness: 5/8 in.

7. Length: 8-12 ft.
 8. Width: 4 ft.
 9. Weight: 2.8 lb./sq. ft.
 10. Edge: Tapered
- C. ASTM C1629, Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
1. Abrasion Resistance per ASTM D4977: Level 2
 2. Indentation Resistance per ASTM D5240: Level 2
 3. Soft-Body Impact Resistance per ASTM C1629: Level 3
 4. Hard-Body Impact Resistance per ASTM C1629: Level 3

TYPE II – GLASS-MAT TILE BACKERBOARD

To be used at all wall surfaces scheduled to receive wall tile finishes.

- A. ASTM C1178, Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel, for 5/8" in., Glass-Mat Tile Backerboard.
1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Durock™ Glass-Mat Tile Backerboard.
 - a. Thickness: 5/8 inch.
 - b. Board Length: 8 feet.
 - c. Board Width: 48 inches.
 - d. Mold Resistance: ASTM D 3273, score of 10.
 2. Fastener Requirements: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and application.
 - a. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: DUROCK Tile Backer Screws 1-5/8 inch.
 - b. Wood Screws: DUROCK Tile Backer Screws for wood framing 1-5/8 inch.
 3. Panel Installation Requirements:
 - a. Install backerboard with ends and edges closely abutted but not forced together. Stagger end joints in successive courses.
 - b. For flooring applications over a wood-based substrate, laminate USG Durock™ Glass-Mat Tile Backerboard to subfloor using Type 1 organic adhesive or latex-modified thin-set mortar suitable for bonding cement board. Fasten to subfloor with 1-1/4" USG Durock™ Brand Tile Backer Screws for wood framing (or equivalent) spaced 8" o.c. in both directions with perimeter fasteners at least 3/8" and less than 5/8" from ends and edges. Drive screws so bottoms of heads are flush with panel surface to ensure firm panel contact with subfloor. Do not overdrive fasteners. Prefill joints with tilesetting mortar or adhesive and then immediately embed USG Durock™ Brand Tile Backer Tape and level joints.
 - c. For wall application, fasten USG Durock™ Glass-Mat Tile Backerboard to framing with

specified fasteners. Drive fasteners into field of panels first, working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. Space fasteners maximum 8" o.c. for walls, 6" o.c. for ceilings, with perimeter fasteners at least 3/8" and less than 5/8" from ends and edges. Drive screws so bottoms of heads are flush with panel surface. Do not overdrive fasteners. Approved fasteners include: USG Durock™ Tile Backer Screws for steel framing (or equivalent), 1-5/8" for 14- to 20-gauge steel framing; USG Durock™ Tile Backer Screws for wood framing (or equivalent), 1-5/8" for wood framing. Prefill joints and then immediately embed USG Durock™ Tile Backer Tape and level joints. Maintain 1/4" gap between USG Durock™ Glass-Mat Tile Backerboard and tub surround.

- d. Panels should be cut to size with a knife and straight edge. A power saw should be used only if it is equipped with a dust-collection device. Installer should wear NIOSH/MSHA-approved dust mask.
 - e. If waterproofing is required, treat joints and fastener penetrations with USG Durock™ Brand Waterproofing Membrane or equivalent ANSI A118.10 waterproofing membrane. Refer to the current USG Durock™ Brand Waterproofing Membrane submittal sheet (CB595) or waterproofing membrane manufacturer's installation recommendations. For technical assistance, call USG Technical Service at 800 874-4968.
 - f. In areas where standing water could occur on horizontal surfaces, such as shower benches or niches, waterproofing is required with USG Durock™ Waterproofing Membrane or equivalent ANSI A118.10 waterproofing membrane. Refer to the current USG Durock™ Brand Waterproofing Membrane submittal sheet (CB595) or waterproofing membrane manufacturer's installation recommendations.
4. Application Limitations:
- a. Tile must be applied on the gray-coated side of panel. Panels are designed for interior use only and should not be used around fireplaces or areas where prolonged exposure to heat exceeds 125°F (52°C) or for exterior applications. Use framing or furring when applying over concrete or masonry block. Install vapor retarders suitable for bonding tiles on the face of the panels.
 - b. For wall applications, maximum stud spacing: 16" o.c. (24" o.c. for cavity shaft wall assembly). Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile and thin brick. Maximum fastener spacing: 8" o.c. for wood and steel framing; 6" o.c. for ceiling applications.
 - c. Floor applications, maximum joist spacing 24" o.c. The subfloor system should be designed with a maximum deflection limit of L/360 for the span. Some finish materials may require a more rigid subassembly (such as large format tile and natural stone products). In these cases, follow the manufacturer's minimum requirements. The subfloor shall be APA Span-Rated Plywood or OSB with an Exposure 1 classification or better with tongue and groove or back blocked at the unsupported edges.
 - d. Ceiling maximum dead load 7.5 psf.
 - e. Steel framing must be 20-gauge equivalent or heavier.
 - f. Consult manufacturers information on finishing limitations.
 - 1) Do not use drywall screws or drywall nails.
 - 2) Do not use drywall joint tape.
 - 3) Do not use with vinyl flooring or over a concrete subfloor.

- g. USG Durock™ Glass-Mat Tile Backerboard is not designed for use as a structural panel.
- h. Panels should not be used in select wet areas including commercial saunas or steam rooms, gang showers, or shower pan bases.
- i. Waterproofing membrane must be used over USG Durock™ Glass-Mat Tile Backerboard in select wet areas including indoor hot tub decks, shower benches and niches, tiled wall and ceiling applications in indoor pool areas, and tiled wall and ceiling applications in residential steam rooms, per ANSI A118.10.

TYPE III – MOISTURE- AND MOLD-RESISTANT TYPE X GYPSUM SHAFTLINER PANEL

To be used at all rated and non-rated interior gypsum board shaft wall and area separation wall systems.

- A. ASTM C1396, Standard Specification for Gypsum Board, for 1 in., Type X and water-resistant shaftliner board.
- B. Basis of Design: Subject to compliance with project requirements, the design is based on the following: United States Gypsum Company, USG Sheetrock® Brand Mold Tough® Gypsum Liner Panels.
 - 1. UL Type Designation: “SLX”.
 - 2. ASTM E136 Noncombustibility.
 - 3. Meets the following ASTM E84 Surface-Burning Characteristics.
 - a. Flame Spread: 20
 - b. Smoke Developed: 0
 - c. Class A
 - 4. Meets the following ASTM C473, Standard Test Methods for Physical Testing of Gypsum Panels Products.
 - a. Core Hardness
 - 1) Field - Not less than 11 lbf
 - 2) End - Not less than 11 lbf
 - 3) Edge - Not less than 11 lbf
 - b. Flexural Strength
 - 1) Parallel - Not less than 77 lbf
 - 2) Perpendicular - Not less than 228 lbf
 - c. Nail Pull Resistance - (Not Required)
 - d. Humidified Deflection - (Not Required)
 - e. Average Water Absorption - Not greater than 5% by weight after two-hour immersion
 - 5. ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber. Meets ASTM C1396 specifications.
 - 6. Thickness: 1 in.
 - 7. Length: 8 ft., 10 ft. 12 ft.
 - 8. Width: 2 ft.

9. Weight: 4.0 lb./sq. ft.
10. Edge: Double-beveled

TYPE IV – LIGHTWEIGHT MOISTURE - AND MOLD-RESISTANT GYPSUM PANEL

To be used at all non-rated ceilings and soffits.

- A. ASTM C1396, Standard Specification for Gypsum Board, for 1/2 in., water-resistant gypsum wallboard.
- B. Basis of Design: Subject to compliance with project requirements, the design is based on the following: United States Gypsum Company, USG Sheetrock® Brand UltraLight Panels Mold Tough®.
 1. UL Type Designation: Not applicable
 2. ASTM E136 Noncombustibility.
 3. Meets the following ASTM E84 Surface-Burning Characteristics.
 - a. Flame Spread: 15
 - b. Smoke Developed: 0
 - c. Class A
 4. Meets the following ASTM C473, Standard Test Methods for Physical Testing of Gypsum Panels Products.
 - a. Core Hardness
 - 1) Field - Not less than 11 lbf
 - 2) End - Not less than 11 lbf
 - 3) Edge - Not less than 11 lbf
 - b. Flexural Strength
 - 1) Parallel - Not less than 36 lbf
 - 2) Perpendicular - Not less than 107 lbf
 - c. Nail Pull Resistance - Not less than 77 lbf
 - d. Humidified Deflection - Not greater than 1-1/4 in.
 - e. Average Water Absorption - Not greater than 5% by weight after two-hour immersion
 5. ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber. Meets ASTM C1396 specifications.
 6. Thickness: 1/2 in.
 7. Length: 8-12 ft.
 8. Width: 4 ft.
 9. Weight: 1.35 lb./sq. ft.
 10. Edge: Tapered

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 013563 "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 *USG Corporation* 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 099000.
- 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 *Pittcon*

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 1/4-inch holes staggered 1/2-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 *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.

3.05 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.

3.06 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.

3.07 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.

3.08 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.

3.09 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.

3.10 INSTALLATION – SUSPENDED CEILING GRID SYSTEM

A. General Installation Requirements:

1. Standard reference: Install grid members in accordance with ASTM C636, CISCA installation standards, and other applicable references.
2. Manufacturer's reference: Install in accordance with manufacturer's current printed recommendations.
3. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.
4. Install in accordance with reference standards and manufacturer's instructions and as required to comply with seismic requirements.

B. Flat Ceiling Applications

1. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
2. Space main tee members a maximum span of 48" on center (or as specified by the UL Fire Resistance Directory)
3. Space cross tees recommended 16" o.c. (5/8" SHEETROCK Brand gypsum Board or 5/8" FIBEROCK Interior panels can span 24" o.c. Check USG AC3095, for maximum allowable spacing based on wind load) (or as specified by the UL Fire Resistance Directory) Install extra cross tees where butt joints occur, 8" from each side of the butt joint.
4. Install compression struts per manufacturer's specifications and spacing, in accordance with wind load if applicable. Adjust main and cross tee spacing as necessary for loading conditions. (See AC3095, USG)
5. Install fiber glass insulation in plenum, resting on top of main tees and cross members, as indicated on the drawings.
6. Do not install insulation within 3" of light fixtures unless fixtures are approved for use with insulation.
7. Limit insulation thickness so that combined weight of supported panels and insulation on grid

main tees does not exceed 16 plf.

8. Attach SHEETROCK gypsum Board or FIBEROCK Interior panels to the suspension system main runners, cross tees, and cross channels with 1-1/4" bugle head screws – single layer of board spaced 16" o.c. – SHEETROCK gypsum Board and 8" o.c.- FIBEROCK in the field and at the perimeter of the panels, locate 3/8" in from panel edges. Hold panels in firm contact with framing while driving fasteners. Drive fastener heads flush with, or slightly below surface.
9. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.
10. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
11. Finish boards as described to achieve 'Level of Finish' specified.

C. Corridor (Wall-to-Wall) Applications

1. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
 - a. Note:
 - If using 1/2" single layer of drywall no hangers are required for spans up to 7'-0" (L/240 uniform load, single span design).
 - If using 5/8" single layer of drywall no hangers are required for spans up to 6'-0" (L/240 uniform load, single span design).
 - If using 1/2" single layer of drywall for spans over 7'-0" to 14'-0" one hanger at mid span per each main is required (L/240 uniform load, single span design).
 - If using 5/8" single layer of drywall for spans over 6'-0" to 12'-0" one hanger at mid span per each main is required (L/240 uniform load, single span design).
 - If using 5/8" single layer of drywall for spans over 12'-0" to 14'-0" two hangers at 1/3 point per each main is required (L/240 uniform load, single span design).

2. Space main tee members as required by span and design load

a. Note:

Maximum load (lbs/sf)	Unsupported span	Main tee spacing
18	4'-0"	16" o.c.
12	4'-0"	24" o.c.
9.2	5'-0"	16" o.c.
6.1	5'-0"	24" o.c.
5.3	6'-0"	16" o.c.
3.6	6'-0"	24" o.c.
3.4	7'-0"	16" o.c.

3. Attach SHEETROCK gypsum board and FIBEROCK interior panels to the suspension system main runners, cross tees, and cross channels with 1-1/4" bugle head screws – single layer of board spaced 16" o.c. – SHEETROCK gypsum Board and 8" o.c.- FIBEROCK in the field and at the perimeter of the panels, locate 3/8" in from panel edges. Hold panels in firm contact with framing while driving fasteners. Drive fastener heads flush with, or slightly below surface.
4. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.

5. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
6. Finish boards as described to achieve 'Level of Finish' specified.

D. Curved, vaults, or dome applications

1. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.
2. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 12 sq. ft.

- a. Note: Curved surfaces can be achieved with the attachment of panels, however, in order to achieve the best application, plaster is recommended. Due to the width of the grid flange (greater than 3/4") STRUCTO-BASE gypsum basecoat plaster should be used to reduce cracking. If other gypsum plasters or portland plaster are being used then it is recommended to secure narrow flanged framing members or offset the metal lath to reduce cracking due to reduced mechanical key at framing/lath intersection. Total weight of ceiling membrane plus overlaid insulation and surface finish material (e.g. ceramic tile) supported by the grid assembly should not exceed 4.0 psf. If the load exceeds 4.0 psf, then spacing of the hanger wires and/or main tees must be reduced (see sample calculation below). For guidance the following are design weights:

1/2" SHEETROCK Exterior Gypsum Ceiling Board	2.0 psf
5/8" SHEETROCK Exterior Gypsum Ceiling Board	2.5 psf
1/2" FIBEROCK Sheathing	2.2 psf
5/8" FIBEROCK Sheathing	3.0 psf

- b. If main tee hanger wires are at 4' o.c., the mains' load capacity is: 4 FT * 4 psf = 16 #/LF. By reducing the hanger wires to 3' o.c., the mains can carry 32 #/LF. By reducing the hanger wires to 2' o.c., the mains can carry 64 #/LF.

3/4" of plaster wet would be about 8.75 #/SF + 5/8" FIBEROCK Sheathing at 3 #/SF for about 12 #/SF.

Mains are at 4 ft centers with 4' hangers; this load would be 12 #/SF * 4 FT = 48 #/LF. If the Mains are at 2 ft centers with 4' hangers; this load would be 12 #/SF * 2 FT = 24 #/LF.

Therefore, there are two options:

- 1) Space the main tees at 4' o.c. with the 12 ga. hanger wire at 24" o.c. and within 8" from any wall, cross tees at 16" o.c. with hanger wire support at midspan and/or within 8" from any wall.
 - 2) Space the main tees at 2' o.c. with the 12 ga. hanger wire at 36" o.c. and within 8" from any wall, cross tees at 16" o.c.
3. Space main and cross tee members so the maximum span of metal lath is (16") (12")
 4. Secure self-furring metal lath to tee members with screws spaced 6" o.c. max., applied at lath dimples. Lap metal lath ends and edges and secure with 18 gauge tie wire spaced 6-inches o.c.

5. Mix STRUCTO-BASE Gypsum Plaster with sand in proportions of 2 cu. ft. of sand per 100 lbs. of plaster for scratch and brown coats. Apply plaster to metal lath to a thickness of 5/8" (min.) Measured from the face of the lath.
6. Select a plaster mix for the finish coat to provide a smooth trowel or sand float (textured) finish. (Reference SA 920)
7. Use template(s) to insure uniform and even curvature of the finished surface.

3.11 FURRING FOR FIRE RATINGS

- A. Install furring for fire resistance ratings in accordance with appropriate UL requirements and/or Design Numbers indicated.

3.12 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.

3.13 WALLBOARD INSTALLATION - GENERAL

- A. Unless otherwise specified, methods of installation shall be in accordance with the requirements of the Gypsum Association (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 screwdriver 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 *Owens Corning* or approved equal.

3.14 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.

3.15 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.
- C. Install vertical control joints in gypsum sheathing to relieve stress caused by movement in accordance with ASTM C840-08, Section 20.3.1-20.3.5
1. Control joints shall be installed where a partition, wall or ceiling traverse a construction joint (expansion, seismic or building control element) in the base building structure.
 2. Control joints shall be installed where a wall or partition runs in an uninterrupted straight plan exceeding 30 linear feet.
 3. Control joints in interior ceilings with perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 50 feet and total area between control joints does not exceed 2,500 sq. ft.
 4. Control joints in interior ceilings without perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 sq. ft.
 5. Control joints in interior ceilings with perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 sq. ft.
 6. Control joint or intermediate blocking shall be installed where ceiling framing members change direction.
 7. Where control joints occur in an acoustical or fire rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8" Type X gypsum board, mineral fiber, or other tested equivalent.

3.16 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.

3.17 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.

3.18 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 – Provide at Flat or Eggshell Painted walls or ceilings.
 - 2. Level 5 – Provide at Gloss, Semi-Gloss, Enamel, Special Wallcoverings, or where severe lighting conditions occur.
- 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.
- H. 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.
- I. 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.

3.19 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.

3.20 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.

3.21 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8" in 10 feet, in any direction.

3.22 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.

3.23 INSPECTION

- A. Wall surface, when prepared for painting, shall be inspected and approved by the Architect before proceeding further.

END OF SECTION

DIVISION 09 – FINISHES

SECTION 096519 – RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.

1.02 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 033000 – Cast-in-Place Concrete
- C. Section 035413 – Self-Leveling Gypsum Underlayment
- D. Section 035416 – Self-Leveling Cementitious Underlayment
- E. Section 061000 – Rough Carpentry
- F. Section 090561.13 – Moisture Vapor Emission Control

1.03 REFERENCES

- A. ASTM International:
 - 1. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 3. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 4. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - 5. ASTM F 1066 Standard Specification for Vinyl Composition Tile
 - 6. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
 - 7. ASTM F 1700 Standard Specification for Solid Vinyl Tile
 - 8. ASTM F 1861 Standard Specification for Resilient Wall Base
 - 9. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - 10. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 - 2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials
 - 3. NFPA 255 Standard Test Method of Test of Surface Burning Characteristics of Building Materials

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide flooring which has been manufactured, fabricated, and installed to performance criteria certified by manufacturer without defects, damage, or failure.
- B. Administrative Requirements

1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
 2. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e., moisture tests, bond test, pH test, etc).
- C. Test Installations/Mock-ups: (Only if indicated on the Drawings) Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.
1. Mock-Up Size: 4' x 4'.
 2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 3. Incorporation: Mock-up may be incorporated into the final construction with Owner's approval.
- D. Sequencing and Scheduling
1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
 2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.05 SUBMITTALS

- A. Submittals shall be in accordance with Section 013300 – Submittal Procedures 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: (Digital Sample Cards only)
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 in which selections are included in the CD package, no physical samples are required. Provide digital color cards only for verification of selections.
- D. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.

E. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Section 017000 – Contract Closeout. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.

F. Replacement Material:

1. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
2. 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.

1.06 QUALITY ASSURANCE

- A. Select an installer who is experienced and competent in the installation of Armstrong resilient vinyl composition tile flooring and the use of Armstrong Flooring subfloor preparation products.
1. Engage installers certified as Armstrong Commercial Flooring Certified Installers.
 2. Confirm installer's certification by requesting their credentials.
- B. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less
- C. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1.07 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 materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives, and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.
- D. Unless otherwise indicated, store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Armstrong, but not less than 55 deg F or more than 85 deg F.
- E. All products should be inspected for dye lot, style, color, size, quality and shipping damage prior to installation and should not be installed if any irregularities are observed. Inspect the cartons to be

sure all colors are the same shade.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Temperatures provided for installation and initial finishing shall be maintained at levels in accordance with manufacturer's requirements.
- C. Maintain ambient temperatures within range recommended by Armstrong, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- D. Maintain the ambient relative humidity between 40% and 60% during installation.
- E. Until Substantial Completion, maintain ambient temperatures within range recommended by Armstrong, but not less than 55 deg F or more than 85 deg F.

1.09 PROJECT CONDITIONS

- A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65° F and a maximum temperature of 100° F for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55° F in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to product installation recommendations for a complete guide on project conditions.

1.10 LIMITED WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited Warranty Period: 5 years for VCT, 20 years for LVT Flooring.
- C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
- D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories.
 - 1. Armstrong Flooring Inc.,
1770 Hempstead Road, Lancaster, PA 17605
www.armstrongflooring.com/commercial, or equivalent.

2.02 RESILIENT TILE FLOORING MATERIALS

- A. Provide Vinyl Composition Tile: Standard Excelon® Imperial® Texture Tile Flooring or Premium Excelon® Crown Texture™ manufactured by Armstrong Flooring, Inc or equivalent.
1. Description: Tile composed of polyvinyl chloride resin, plasticizers, fillers, stabilizers and pigments with colors and texture dispersed uniformly throughout its entire thickness.
 2. Vinyl composition tile shall conform to the requirements of ASTM F 1066, "Standard Specification Vinyl Composition Floor Tile", Class 2, through-pattern.
 3. Pattern and Color: 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.
 4. Size: 12 in. x 12 in. unless otherwise shown
 5. Thickness: 1/8 in.
 6. 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.
 7. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.
 8. Test data:
 - a. Heat Stability - (ASTM F1514): $\Delta E < 8$
 - b. Size/Squareness - (ASTM F2055): Passes
 - c. Deflection - (ASTM F1304): Passes
 - d. Chemical Resistance - (ASTM F925): Passes
 - e. Static Load Resistance - (ASTM F970): 2000 psi, < 0.005 inches
 - f. Residual Indentation - (ASTM F1914): Passes
 - g. Slip Resistance - (ASTM D2047): ≥ 0.5 SCOF
 - h. Dimensional Stability - (ASTM F2199): Passes
 - i. Impact Resistance - (ASTM F1265): Passes
 - j. Flammability - (ASTM E648 Critical Radiant Flux): Class 1 (≥ 0.45 W/cm²)
 - k. Smoke Density - (ASTM E662): ≤ 450
 - l. Limited Commercial Warranty: 5 years
 9. Other Manufacturers offering products complying with these requirements include:
 - a. Mannington Commercial; Calhoun, GA.
- B. Provide Duo™, Exchange™ or Natural Creations™ Luxury Vinyl Tile (LVT) Flooring manufactured by Armstrong Flooring Inc., or equivalent.
1. Description: A layered construction consisting of a tough, clear, rigid vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a diamond-infused UV-cured

polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.

2. Reference specification - ASTM F 1700, "Standard Specification for Solid Vinyl Tile", Class III, Type B – Embossed Surface. Meets requirements for size, squareness, thickness, thickness of wear layer, residual indentation, resistance to chemicals, resistance to light and resistance to heat.
3. Pattern and Color: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's current full range of industry 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 within. Include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.
4. Size: 6" x 36", unless otherwise shown
5. Wear layer thickness: 0.020 in. (0.5 mm)
6. Thickness: 0.100 in. (2.5 mm)
7. 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.
8. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.
9. Test data:
 - a. Heat Stability - (ASTM F1514): $\Delta E < 8$ avg., max
 - b. Chemical Resistance - (ASTM F925): Passes
 - c. Static Load Resistance - (ASTM F970): 2000 psi, < 0.005 inches
 - d. Residual Indentation - (ASTM F1914): Passes
 - e. Slip Resistance - (ASTM D2047): ≥ 0.5 SCOF
 - f. Flammability - (ASTM E648 Critical Radiant Flux): Class 1 (≥ 0.45 W/cm²)
 - g. Smoke Density - (ASTM E662): ≤ 450
 - h. Limited Commercial Warranty: 20 years
10. Other Manufacturers offering products complying with these requirements include:
 - a. American Biltrite Flooring, Sherbrooke, QC.
 - b. Polyflor Ltd., Manchester, UK.

2.03 ACCESSORIES

- A. Manufacturer: Roppe Corporation, 1602 N Union St., Fostoria, OH 44830. P: (800) 537 – 9527, or equivalent.
- B. Rubber Wall Base:
 1. Product Name: Pinnacle

2. Material Specification: ASTM F1861, Type TS – rubber, vulcanized thermoset; Group 1 – solid, (homogenous); Style B – Cove except as may be detailed in finish floor plans or as selected by the Architect.
3. Material Height: 4” high unless otherwise noted on Drawings.
4. Material Thickness: ASTM F386, 1/8” (3.2 mm)
5. Material Length: 120’ length.
6. Limited Warranty: 1 Year, Manufacturing only. Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
7. Material & Composition: 100% vulcanized homogenous rubber compound comprised of a premium blend & SBR rubber materials.
8. Color: As may be detailed in the finish floor plans or as selected by Architect from the manufacturer’s full range of colors including premium colors. 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 Premium Colors or equal.
9. 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.
10. Corners: Provide inside and outside corners where noted.
11. Test data:
 - a. Surface Burning: ASTM E84/NFPA 255 - Class B
 - b. Flammability/Critical Radiant Flux: ASTM E648 / NFPA 253 - Class 1 (>0.45 Watts per sq. cm.), .082 W/cm²
 - c. Smoke Density: ASTM E662/NFPA 258 - Passes (<450), 157 (flaming) - 197 (non-flaming)
 - d. Substrate Preparation: Per ASTM F710 and Roppe Technical Data Sheet

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 Johnsonite by Armstrong, ColorMatch colors or equal or luxury vinyl tile moldings to match specified pattern by moldingsonline.com.

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 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.
- B. Ensure substrate meets the requirements of ASTM F710, Roppe Technical Data Sheets and Excelsior Technical Data Sheets.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e., moisture tests, bond test, pH test, etc.).
- B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates regarding conditions existing at the time of installation.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.
 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.

3.03 PREPARATION

- A. Prepare substrates according to Armstrong written instructions to ensure proper adhesion of Resilient Flooring.
1. Prepare concrete substrates in accordance with ASTM F 710.
 - a. Concrete floors must be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitence, mold, mildew, and other foreign materials that may affect dissipation rate of moisture from the concrete, discoloration or adhesive bonding.
 - b. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
 2. Moisture Testing: Perform moisture testing as recommended by manufacturer. Proceed with installation only after substrates have been tested and meet the minimum requirements from the manufacturer in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride or ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - a. 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. 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.
 - b. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. A pH test for alkalinity must be conducted on the concrete floor prior to installation with results conforming to manufacturer requirements. If the test results are not within the acceptable range, then installation must not proceed until the problem has been corrected
 - c. VCT
 - 1) 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.
 - 2) Special Note: If MVER is greater than 5 lbs. but less than 8 lbs. consult manufacturer for special adhesive recommendations.
 - 3) Perform relative humidity test using in situ probes, ASTM F 2170. Results must not exceed 80%.
 - 4) Special Note: If MVER is greater than 80% but less than 90% consult manufacturer for special adhesive recommendations.
 - d. LVT
 - 1) ASTM F1869 and ASTM F2170 and pH testing is required when installing LVT. Testing should be performed in several areas including the perimeter of the room, at columns and wherever else moisture might occur. The maximum allowable moisture vapor emission rate (MVER) from the subfloor is 6.0 lbs. The maximum pH range is 9 or less. The In-Situ/RH requirement is not to exceed 75%. Three test results for the first 1,000 sq. ft. are required, with 1 test result for every 1,000 sq. ft. thereafter. The installer may alternate every 1,000 sq. ft. between RH and Calcium Chloride test sites after the first

1,000 sq. ft.

- B. Wood subfloors must have a minimum of 18" 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" or ½" APA approved underlayment plywood.
 - a. Use ¼" thick underlayment panels for boards with a face width of 3" or less.
 - b. Use ½" thick underlayment panels for boards with a face width wider than 3".
 - 3. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.
- C. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Fill all minor cracks in substrates using approved crack filler in accordance with manufacturer's printed instructions.
- E. Flash patch with products acceptable to the resilient flooring manufacturer. If condition requires self-leveling underlayment, refer to that specification in Division 03.
- F. Clean substrates of all dirt and loose particles before application of flooring materials.
- G. Provide additional underlayment and build up to abutting dissimilar flooring materials.
- H. Floor covering shall not be installed over expansion joints.
- I. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- J. Store and use adhesives in accordance with the manufacturer's printed instructions.
- K. Proceeding with installation constitutes acceptance of the substrate conditions.
- L. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.04 INSTALLATION

- A. Install flooring in strict accordance with the latest edition of Armstrong Flooring Guaranteed Installation Systems. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.10. Strictly adhere to manufacturer's written instructions and the following:
 - 1. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
 - 2. If required, install flooring on pan-type floor access covers. Maintain continuity of color and

pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

3. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
 4. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
 5. 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.
 6. 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.
 7. 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.
 8. Tile pattern when laid shall lie in an alternating direction as determined by the Architect.
 9. Install with Armstrong adhesive specified for the site conditions and follow adhesive label for proper use.
 10. Open enough cartons of floor tiles to cover each area, and mix tile to ensure shade variations do not occur within any one area.
 11. Roll the flooring in both directions using a 100 pound three-section roller.
 12. Vinyl Tile flooring must be welded. Note: It is recommended to heat weld seams to provide a more sterile and water tight seam.
 13. Armstrong Resilient Sheet Flooring may be flash coved.
 - a. Use Johnsonite CFS-00-A Cove Filler Strip.
 - b. Net fit flooring material into the appropriate Johnsonite cove cap.
- B. Rubber Base:
1. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths if practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
 2. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
 3. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
 4. Comply with Roppe's written instructions for installing rubber base.
 5. Use approved cove base adhesive and apply in accordance with manufacturer's printed instructions. Adhesive shall hold base tightly in contact.

6. Where necessary, patch and fill back-up material with underlayment material to provide continuous, uniform surface.
 7. Scribe base accurately; use specified preformed corners; butt joints between sections tightly.
 8. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is either indicated or required.
 9. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 10. Tightly adhere resilient wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 11. Do not stretch resilient base during installation.
- 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.

3.05 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.

3.06 CLEANING AND PROTECTION

- A. Perform initial and on-going maintenance according to the latest edition of the Maintenance Instructions for Vinyl Composition & Bio-Based Tile.
- B. Protect floors from rolling loads for 72 hours after installation by covering with hardboard or plywood. Protect the floor with un-dyed, untreated building paper until final inspection.
- C. 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.
- D. 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.

3.07 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 09 – FINISHES

SECTION 099000 – PAINTING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.02 DESCRIPTION

- A. Work included: Paint and finish all new and existing interior and exterior surfaces related to the proposed work area including surface preparations.
 - 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.
- C. Related Sections:
 - 1. Section 033000 – Cast-in-Place Concrete
 - 2. Section 042000 – Unit Masonry
 - 3. Section 051200 – Structural Steel Framing
 - 4. Section 052100 – Steel Joist Framing
 - 5. Section 053000 – Metal Decking
 - 6. Section 055000 – Metal Fabrications
 - 7. Section 055200 – Metal Railings
 - 8. Section 062000 – Finish Carpentry
 - 9. Section 081113 – Hollow Metal Doors and Frames
 - 10. Section 092900 – Gypsum Wall Board
 - 11. Section 260500 – Common Work Results for Electrical

1.04 REFERENCES

- A. Steel Structures Painting Council (SSPC):
 - 1. SSPC-SP 1 - Solvent Cleaning.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
 - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
 - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.

7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
- C. California Department of Public Health (CDPH):
1. CDPH v1.1-2010 and V1.2-2017
- D. LEEDv4 EQ Credit: Indoor Environmental Quality-Low Emitting Materials.

1.05 SUBMISSIONS

- A. General: Comply with requirements of Section 013300 – Submittal Procedures and as modified below.
- 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. Submit Product Data for each paint product type as required to demonstrate compliance with the specified requirements including the following:
 - a. Product characteristics.
 - b. Surface preparation instructions and recommendations.
 - c. Primer requirements and finish specification.
 - d. Storage and handling requirements and recommendations.
 - e. Application methods.
 - f. Cautions for storage, handling and installation.
 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. Verification 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/ sheen, 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).
- F. Only submit complying products based on project requirements (i.e. LEED). Paint application must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO).
- G. USGBC LEED V4 Submittals (when applicable):
1. MRc2 Environmental Product Declaration Product Language: Products shall be selected with a preference to products that have product-specific environmental product declaration

documentation.

2. EQc2 Low Emitting Materials: The VOC content of all adhesives, sealants, paints and coatings in this Section shall not exceed the VOC limits established in Division 01 Sustainable Design sections.

1.06 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.
- F. Do not paint prefinished items, concealed surfaces, and finished metal surfaces unless indicated.

1.07 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.

1.08 QUALITY ASSURANCE

- A. Standards: Comply with standards specified in the section and as listed in Section 014219.
- 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. A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
 2. 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.
 3. Provide adequate numbers of workman skilled in the necessary crafts and properly informed of the methods and materials to be used.
 4. 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 require
5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coating supplied under other sections.
6. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available and as specified herein.

E. Field Samples:

1. Before proceeding with paint application provide a mock-up for evaluation of surface preparation techniques and application workmanship, finish one complete surface of each color scheme required, clearly indicating selected colors, finish texture, materials, and workmanship.
 - a. Finish surfaces for verification of products, colors and sheens.
 - b. Finish area designated by Architect.
 - c. Provide samples that designate primer and finish coats.
 - d. Compatibility and Adhesion: Check after one week of drying and curing by testing in accordance with ASTM D3359; Adhesion by tape test. If coating system is incompatible, additional surface preparation up to and including complete removal may be required.
 - e. Do not proceed with remaining work until the Architect approves the mock-up.
2. Sample areas, when accepted by the Architect, shall serve as a minimum standard for work throughout the entire project.

1.09 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 use instructions.
8. Surface preparation.
9. VOC Content.
10. Environmental handling.
11. Color name and number.

B. Storage:

1. Provide proper storage to prevent damage to, and deterioration of, paint materials.
2. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing. 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.
3. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Handling:

1. Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

D. Protection:

1. Use all means necessary to protect the materials of this section before, during, and after installation. Protect the work and materials of other trades. Remove, clean, restore to original condition any spatter, runs, drips, spillage, overspray on other materials not intended to be painted.

E. 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.

1.10 JOB CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results, 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. Do not install products under environmental conditions outside manufacturer's recommended limits.
- 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.

1.11 EXTRA STOCK

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Amount: Upon completion of the work of this section, deliver to the Owner an extra stock equaling 1% of each color, type, and gloss of paint used on the work but not less than 1 gal (3.8 l) or 1 case, as appropriate.
- C. Packaging: Tightly seal each container and clearly label with the contents and location used.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Email: request info specifications@sherwin.com; Web: www.swspecs.com. Local representative: Anthony Spanevello, Architectural Account Executive | Tel: (516) 406-0612 | Email: Anthony.M.Spanevello@sherwin.com; or Architect approved equal.

2.02 PAINT MATERIALS

- A. Design is based on the use of paint products manufactured by Sherwin Williams. The materials of this 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 as specified or to match existing from manufacturer's full range of colors for each product indicated.
- E. Paints and Coatings:
 - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 - 2. For opaque finishes, follow manufactures product instructions for optimal color conformance.
- F. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- G. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- H. 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.
- I. 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. The VOC concentrations (in grams per liter) of the product shall comply with the U.S. EPA 40 CFR 59 Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. OTC as used in this Section refers to the Ozone Transmission Commission. OTC II has established the following VOC levels for Maryland, New York and Connecticut, United States. Products shall meet the following OTC II limits for VOC's when jobs are in these states.
 - a. Interior flat paints: 50 grams per liter or less, per gallon.
 - b. Interior enamels: 100 grams per liter or less, per gallon.
 - c. Interior stains: 250 grams per liter or less, per gallon.
 - d. Interior primers: 100 grams per liter or less, per gallon.
 - e. Rust preventive coatings: 250 grams per liter or less, per gallon.
 - f. Dry fog coatings: 150 grams per liter or less, per gallon.
 - g. Floor coatings: 100 grams per liter or less, per gallon.
 - h. Flats50 g/L
 - i. Non-Flats100 g/L
 - j. Primers Sealers and Undercoats100 g/L
 - k. Floor Coatings100 g/L
 - l. Concrete/masonry Sealer100 g/L
 - m. Rust Preventative Coatings250 g/L
 - n. Industrial Maintenance Coatings250 g/L

- o. Stains, Exterior 250 g/L
 - p. Wood Coating/Varnish/stain 275 g/L
 - q. Zinc Rich Primers 340
- J. 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.
- K. 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 EXAMINATION

- 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.
- B. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.02 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's requirements and application instructions as approved by the Architect. Clean each surface to be painted prior to applying paint or surface treatment.
 - 2. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 3. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
 - 4. Remove oil and grease 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.
 - 5. Remove all removable items, which are in place and are not scheduled to receive paint finish or provide surface-applied protection prior to surface preparation and painting operations.
 - 6. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
 - 7. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air,

surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.

8. Schedule the cleaning and painting in coordination with the Owner.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
- D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- E. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments.
- F. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
- G. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.
- H. Drywall - Exterior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.
- I. Drywall - Interior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
- J. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
- K. Plaster: Must be allowed to dry thoroughly for at least 30 days before painting unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the

surface is hard, rinse with clear water and allow to dry.

- L. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow. Coordinate with paint specified and manufacturers requirements for appropriate preparation to receive paint specified.
1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
 3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
 4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
 7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
 8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure

water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.
- M. Vinyl Siding, Architectural Plastics, EIFS and Fiberglass: Clean vinyl siding thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color unless the paint system features Sherwin-Williams VinylSafe technology. Painting with darker colors that are not Sherwin-Williams VinylSafe may cause siding to warp. Follow all painting guidelines of the vinyl manufacturer when painting. Only paint properly installed vinyl siding. Deviating from the manufacturer's painting guidelines may cause the warranty to be voided.
- N. Stucco: Must be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments such as Loxon.
- O. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.03 INSTALLATION

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. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- C. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- D. Apply coatings using methods recommended by manufacturer.

- E. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- F. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- G. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- H. Completed work shall match the approved samples for color, texture, and coverage. Remove, refinish, or repaint all work not in compliance with specified requirements.

3.04 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 CLEANING AND PROTECTION

- A. 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.
- B. Protect finished coatings from damage until completion of project.
- C. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.
- D. 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 for specific surfaces, exterior and interior are as defined below:

Exterior Work			
Surface	1st Coat	2nd Coat	3rd Coat
Hollow Metal Doors & Frames (Note 3 & 4)	B or *	A	A
Exposed Miscellaneous Metal or Structural Steel (Note 3 & 4)	T or *	I	I
Steel Handrails & Steel Lintels (Note 3 & 4)	T	I	I
Traffic Bearing Exterior Metals (Steel Ladders – Foot Traffic) (Note 3 & 4)	N	R	R
Aluminum (Note 4)	B	A	A
Wood, Visible Blocking, Plywood	C	D	D
Visible Metal Plaster accessories adjoining stucco	T	I	I
Concrete Block	E	F	F
Galvanized Metal (Note 4)	B	I	I
Concrete Walls	O	F	F
Visual Contrasting Stripe at Stair Tread Nosings, concrete, bluestone, masonry or steel (Note 1)	H	-	-
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	O	G	G
Concrete Floors, light to moderate duty, (Note 1) 1 st coat is a thin coat to prime	P	P	P
Concrete Floors, moderate to Heavy duty, no vehicular traffic (Note 1)	N	Q	Q
Concrete Floors (High Vehicle Traffic, Wet Environments) (Note 1)	N	U	R
Wood-Painted (Note 2 & 5)	C	G	G
Wood-Natural Finish (Note 5)	J	J	J
Wood-Stained Finish (Note 5)	V	S – 2 coats	J – 2 coats
Hollow Metal, Steel Handrails & Steel Stair Components (Note 3 & 4)	B or *	A	A
Exposed Structural Steel & Steel Joists (Note 3 & 4)	B or *	K or L	K or L
Galvanized Steel Floor or Roof Deck (Note 4)	B	K or L	K or L
Miscellaneous Metal (Note 3 & 4)	B or *	L	L
Steel Floor Deck (Diamond Plate etc.) (Note 3 & 4)	N	R	R
Galvanized Metal (Note 3 & 4)	B	A	A
Exposed Ductwork (Note 4)	B	K or L	K or 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, galvanized steel, aluminum and other non-ferrous metals the Contractor shall clean bare metal with an oil and grease emulsifier (SIMPLE GREEN Heavy-Duty & All-Purpose Degreaser or equal). 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 clean and remove/rinse in accordance with manufacturer's instructions.

Note 5: For Wood Flooring finishes see Wood Flooring Specification Section included elsewhere in Division 09 of the Project Manual.

3.07 KEY TO PAINTS

* Shop coat: See other section of Project Manual.

A	S-W Pro Industrial DTM Acrylic Semi-Gloss, B66W01151 or S-W Pro Industrial™ Waterbased Alkyd Urethane Enamel Semi-Gloss, B53-1150/2150 Series
B	S-W Pro Industrial Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series
C	S-W PrepRite® ProBlock® Interior-Exterior Latex Primer-Sealer, B51-600 Series
D	S-W A-100 Exterior Latex Low Sheen, A12W00151 or S-W SuperPaint Exterior Latex Low Lustre, A78-Series
E	S-W Pro Industrial Heavy Duty Block Filler (B42 Series)
F	S-W A-100 Exterior Latex Gloss, A08 Series or S-W SuperPaint Exterior Latex Gloss, A84-Series
G	S-W ProMar 200 Zero VOC Interior Latex Eg-Shel (B20-2600 Series) or Semi-Gloss (B31-2600 Series)
H	S-W Pro-Park™ Waterborne Traffic Marking Paint (B97 Series) with H&C® Sharkgrip® Slip Resistant Additive
I	S-W Pro Industrial Waterbased Alkyd Urethane Enamel Gloss (B53 Series)
J	Minwax Water-Based Polycrylic [for vertical applications only, no floors] or Minwax Oil-Modified Polyurethane (furniture, woodwork, cabinets, doors, hardwood floors)
K	S-W Pro Industrial™ Waterborne Acrylic Dryfall Flat (B42 Series)
L	S-W ProMar 200 Zero VOC Interior Latex Flat (B30-2600 Series)
M	S-W ProMar® 200 Zero V.O.C. Interior Latex Primer (B28 Series)
N	S-W Macropoxy 920 Pre-Prime (B58 Series)
O	S-W Loxon Concrete & Masonry Primer/Sealer (LX02 Series)
P	S-W Armorseal® Tread-Plex™ 100% Acrylic Water Based Floor Coating (B90 Series)
Q	S-W Armorseal® 8100 Water Based Epoxy Floor Coating Satin (B70-8160 Series)
R	S-W Hi-Solids Polyurethane 250 Aliphatic Polyurethane Semi-Gloss or Gloss (B65 Series)
S	Minwax Wood Finish, Water Based, Semi-Transparent, Color Stain
T	S-W Pro Industrial Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series
U	S-W Armorseal 650 SL/RC Self-Leveling/Recoatable Epoxy (B58 Series) or S-W High Performance Flooring System TBD (architect to confirm).
V	Minwax Water-Based Pre-Stain Wood Conditioner

END OF SECTION

DIVISION 10 – SPECIALTIES

SECTION 102813 – TOILET ACCESSORIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Cabinet-type toilet accessories.
 - 1. Roval Collection.
 - 2. Profile Collection.
 - 3. Traditional Collection.

- B. Toilet accessories.
 - 1. Grab bars.
 - 2. Electric hand dryers.
 - 3. Mirrors.
 - 4. Paper Towel Dispensers
 - 5. Soap Dispensers
 - 6. Toilet Tissue Dispensers
 - 7. Feminine hygiene vendors and disposals
 - 8. Baby changing stations.

1.02 RELATED SECTIONS

- A. Section 061000 – Rough Carpentry
- B. Section 092900 – Gypsum Wall Board
- C. Section 093013 – Ceramic Tile
- D. Section 102113 – Metal Toilet Compartments
- E. Section 102114 – Stainless-Steel Toilet Compartments
- F. Section 102119 – Plastic Toilet Compartments

1.03 REFERENCES

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- C. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- E. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless-Steel Tubing for General Service 2015a (Reapproved 2019).
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- H. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings 2018, with Editorial Revision (2021).
- I. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017.
- J. ASTM C1036 - Standard Specification for Flat Glass 2021.
- K. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

- L. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- M. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2004, with Editorial Revision (2016).
- N. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

- A. Submit under provisions of Section 013300 – Submittal Procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Shop Drawings:
 - 1. Plans: Locate each specified unit in project.
 - 2. Elevations: Indicate mounting height of each product.
 - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement, and materials required for installation of specified products.
- D. Verification Samples: Two sample chips of each specified color and finish.
- E. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
- F. Quality Assurance Submittals:
 - 1. Printed installation instructions for each specified product.
 - 2. Documentation of Manufacturer's Qualifications, specified in 1.06 of this Section.
- G. Closeout Submittals: Warranty, issued and executed by manufacturer, and countersigned by Contractor.
- H. All accessories to be type 304 stainless steel and be shown on technical data sheets as such.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum five years documented experience producing products specified.
- B. Source Limitations: To the greatest extent possible products shall be provided by a single manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Ship products in manufacturer's standard protective packaging with vinyl coating on exposed surfaces.
- B. Storage and Protection: Store products in manufacturer's protective packaging until installation.

1.08 WARRANTY

- A. Manufacturer's standard warranty against defects in product workmanship and materials.
- B. Manufacturer's 15-year warranty against silver spoilage of mirrors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: American Specialties, Inc.; 441 Saw Mill River Road, Yonkers NY 10701-4913. ASD. Tel: (914) 476-9000. Fax: (914) 476-0688. Email: info@americanspecialties.com. Web: <http://www.americanspecialties.com>
- B. Basis-of-Design Product: Subject to compliance with requirements, provide the electric Dyson Airblade V hand dryers manufactured by Dyson Inc., 1330 W. Fulton St., Floor 5, Chicago, IL 60607; 888-397-6622 www.dyson.com/Airblade or comparable product acceptable to the Architect.
- C. Requests for equivalency will be considered in accordance with provisions of Section 013300.

2.02 CABINET-TYPE TOILET ACCESSORIES (ROVAL COLLECTION)

- A. Basic Construction Requirements:
 - 1. Doors: Curved design, one piece Type 304, 18 gauge, 0.05 inch (1.27 mm) stainless steel.
 - 2. Cabinets: Type 304, 22 gauge, 0.0312 inch (0.79 mm) stainless steel, trimless; joints welded, sight-exposed welds finished to match sheet finish. Full access back panels.
 - 3. Hinges: Concealed, heavy-duty stainless steel multi-staked piano hinge, full length of cabinet.
 - 4. Locks: Two flush, rimless tumbler locks, keyed alike other toilet accessory locks, with one key for each lock.
 - 5. Exposed Finish: No.4 satin finish, unless noted otherwise.
- B. Feminine Hygiene Disposals: Roval Collection by ASI.
 - 1. Surface Mounted Sanitary Waste Receptacle: **ASI Model 20852**. Lid and cabinet are each drawn one piece construction. Lid is secured to the cabinet with a heavy-duty 9/64 in (3.6 mm) multi-staked concealed piano hinge.
- C. Feminine Hygiene Vendors: Roval Collection by ASI.
 - 1. Recessed Dual Sanitary Napkin and Tampon Dispenser: **ASI Model 04684**. Dispenses 15 napkins and 23 tampons. Door made of 18 ga type 304 satin finish stainless steel, with two flush tumbler locks. Universal coin mechanism is convertible for 25 cents, 50 cents or FREE (no coin) operation. Coin boxes have different lock and key than doors and collar for surface mounting. Provide and install **ASI Model 04684-9 Surface Mounting Adaptor Collar** with all units supplied.
- D. Mirrors: Roval Collection by ASI. (All mirrors to be tempered)
 - 1. Stainless Steel Mirror (Tempered Glass): **ASI Model 20650-B 1836**. The gently radius edges provide added strength and complement the curves of the ASI Roval Collection. Frame

fabricated of 18 ga type 304 stainless steel with satin finish and polished seamless mitered corners. 1/4 in (6.4 mm) thick tempered glass mirror.

2. Stainless Steel Mirror with Integral Shelf: **ASI Model 20655-B 1836**. The gently radius edges provide added strength and complement the curves of the ASI Roval Collection. Mirror frame and 6 in (152 mm) wide curved edge shelf are fabricated of 18 ga type 304 stainless steel with satin finish. Mirror frame has polished seamless mitered corners. 0.25 in (6.4 mm) thick tempered glass mirror.
3. Frameless Mirror: ASI Model 8287-A. Size and location as indicated on drawings. Frameless Mirror shall be fabricated of 1/4" [6.4] polished plate glass and shall comply with ASTM C 1503-01 and government specification No. DD-M-411-C and shall be warranted against silver spoilage for (15) years. Mirror shall be supplied as one piece up to 32 ft² (2.97 m²) and up to 96" x 48" [2438 x 1219] in W x H. Mirrors larger than 32 ft² (2.97 m²) or with linear W or H dim larger than 96" [2438] shall be supplied as multiple pieces.

2.03 CABINET-TYPE TOILET ACCESSORIES (PROFILE COLLECTION)

A. Basic Construction Requirements:

1. Doors: Type 304, 16 gauge, 0.0625 inch (1.59 mm) stainless steel, formed 15/16 inch (23.8 mm) return to wall, with vertical edges eased at 3/4 inch (19 mm) radius; welded corners.
2. Cabinets: Type 304, 20 gauge, 0.0375 inch (0.95 mm) stainless steel, formed 1 inch (25 mm) wide flat perimeter trim four sides; joints welded, sight-exposed welds finished to match sheet finish.
3. Hinges: Heavy-duty stainless steel multi-staked piano hinge, 3/16 inch (5 mm) diameter barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Flat rimless tumbler locks, keyed alike other toilet accessory locks, with two keys for each lock.
5. Cabinet and Door Finish: No.4 satin finish.

B. Toilet Tissue Dispensers/holders: Profile Collection by ASI.

1. Surface Mounted Dual Roll Toilet Tissue Dispenser: **ASI Model 20030**. 18g door, 22 gauge cabinet and flush mounted lock. Holds two rolls up to 5-1/4 in (135 mm) dia (1800 sheets). Top roll automatically drops in place when bottom roll done. Type 304 stainless cabinet and mechanism. Theft resistant spindles.

2.04 CABINET-TYPE TOILET ACCESSORIES (TRADITIONAL COLLECTION)

A. Basic Construction Requirements:

1. Doors: 22 ga stainless steel, double pan construction, with 1/4 in (6 mm) thick structural fiberboard core.
2. Cabinets: 22 ga stainless steel, formed perimeter trim with 1/4 in (6 mm) return to wall four sides; joints welded, sight-exposed welds finished to match sheet finish.
3. Hinges: Heavy-duty stainless steel multi-staked piano hinge, 3/16 inch (5 mm) diameter barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Flat rimless tumbler locks, keyed alike other toilet accessory locks, with two keys for

each lock.

5. Cabinet and Door Finish: No.4 satin finish.

B. Paper Towel Dispensers: Traditional Collection by ASI.

1. Paper Towel Dispenser: **ASI Model 0210**. Dispenses 400 C-fold or 525 multi-fold paper towels without adjustment or adapters. Fabricated of 22 ga stainless steel with Satin finish. Fitted with tumbler lock and heavy duty stainless steel piano hinge.
2. Surface mounted Roll Paper Towel Dispenser: **ASI Model 8522**. Unit dispenses pre-set lengths per cycle from 8 in or 9 in (205 or 230 mm) wide, 800 ft (244 m) long rolls with mechanical dispenser. Three pre-set dispensing lengths.

2.05 TOILET ACCESSORIES

A. Basic Construction Requirements:

1. Doors: 22 ga satin stainless steel, formed hems at sight-exposed edges.
2. Cabinets: 22 ga satin stainless, formed hems at sight-exposed edges; joints welded.
3. Hinges: Stainless steel piano hinge, 3/16 in (4.8 mm) dia barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Tumbler locks, keyed alike other toilet accessories, two keys for each lock.

B. Custodial Accessories: As manufactured by ASI.

1. Utility Shelf with Mop Holders and Rag Hooks: Type 304 satin stainless. Shelf is 8 in (200 mm) deep with 3/4 in (19 mm) return for rigidity. Mop holders are riveted to strip and rubber cam is ribbed for grasping. Rod and hooks for wet rags included.
 - a. **ASI Model 1315-4**: 4 mop holders/3 rag hooks, 36 in (915 mm) long.

C. Shower Curtain Rods: As manufactured by ASI.

1. Shower Curtain Hook: **ASI Model 1200-SHU**. Stainless steel hook for rods 1 in (25 mm) and 1-1/4 in (32 mm) dia.
2. Vinyl Shower Curtain: **ASI Model 1200-V**. Flame resistant, anti-bacterial, 8 ga vinyl fabric. Curtain shall be 6 in (150 mm) wider than opening up to 48 in (1220 mm) and 12 in (305 mm) wider than openings exceeding 48 in (1220 mm). Sizes and colors as scheduled or indicated on Drawings.
3. Extra Heavy-Duty Shower Curtain Rod: **ASI Model 1204**. Flanges 3 in (75 mm) dia, 20 ga type 304 satin stainless. 1-1/4 in (32 mm) dia rod, 18 ga type 304 satin stainless tubing. Available in lengths up to 96 in (2440 mm).
4. Folding Shower Seat (Handed): **ASI Model 8206**. Meets ADA Accessibility Guidelines and the needs of the physically disabled and elderly. Seat is 1/2 in (13 mm) thick, one piece solid phenolic, ivory colored. Frame, support legs, flanges, and bracket are type 304 satin finish stainless steel. Features a reversible self-locking mechanism. Seat measures 33 in (840 mm) wide and projects 22-7/8 in (580 mm) from wall.

D. Soap Dispensers: As manufactured by ASI.

1. Horizontal Surface Mounted Soap Dispenser: **ASI Model 9343**. All-purpose valve dispenses liquid, lotion and detergent-type soaps. It has a tamper-resistant refill window with concealed fastening and vandal-resistant hinged filler-top. Capacity: 48 fl. oz. (1.4 L).

E. Towel and Clothes Hooks: Single As Manufactured by ASI.

1. Single Robe Hook: **ASI Model 7308**. Extends 2-5/16 in from wall or door. Suitable for robes, clothing or small bags. Robe Hook shall be type 304 stainless steel alloy 18-8. Wall flange shall lock to wall bracket with stainless steel M5 hex socket set screw concealed on bottom perimeter of flange. Post shall be 22 gauge tubing with formed 18 gauge threaded bracket welded inside end. Hook shall be solid pin. Flange shall be 1/16" (1.5) thick with 3/32" (2.3) thick sides and heavy reinforcement ribs. Post shall be bolted to flange with concealed and locked M6 (Ø1/4") screw. All exposed surfaces shall have satin finish. Wall bracket shall be 18 gauge with embossed ribs for added strength and shall have two (2) mounting slots to accommodate M4 pan head screws (provided) and allow slight installation alignment adjustment. Hex L-key (M2.5) is provided to lock set screw to secure unit to wall bracket

2.06 GRAB BARS

A. Grab Bars:

1. Size: Straight grab bar, lengths as indicated on Drawings.
2. Covers: Snap over flange to conceal screws; type 304 stainless steel, 22 ga, 3-3/16 in (81 mm) dia.
3. Concealed Mounting Flanges: 3-1/8 in (79 mm) O.D. dia with two screw holes and three locking dimples; 1/8 in (3 mm) thick, type 304 stainless steel.
4. Series: 3700 Series by ASI; 1-1/4 in (32 mm) dia handrail with snap-on flange covers.
 - a. Product: **ASI Model 3700-P Series**, with peened surface.

2.07 ELECTRIC HAND DRYERS

A. Electric Hand Dryers: The electric Dyson Airblade V Electric hand dryer [307174-01 (sprayed nickel LV)].

1. Provide at locations and in quantities as shown on the drawings. If not shown in the drawings, only paper towel dispensers are required.
2. Mounting: Surface mounted on ABS/PBT plastic backplate/mounting bracket; protrudes four inches from wall, no recessing required; ADA compliant.
3. Construction: Polycarbonate casing with anti-microbial [additive in paint]. Anti-microbially integrated external plastics and seals. Anti-tamper M4 exterior pin-hex screws. Water ingress protection to IP24.
4. Color Finish: [Sprayed nickel] finish.
5. Filtration: 99.97 percent particulate efficiency HEPA filter with anti-microbial coating.
6. Operation: Touch-free capacitive sensor activation.
 - a. Hand dry time: 12 seconds

- b. Airspeed at nozzle: 420 mph
 - c. Operating Airflow: up to 5.28 gal/sec.
 - d. Rated Operating Noise Power: 79 db(A)
7. Motor: Dyson Digital Motor (DDM), V4 switched reluctance brushless DC type; 92,000 rpm motor speed; less than 0.5 watt standby power consumption.
 8. Electrical Requirements: [110-127 V AC, 12 A. 1000 W] Dyson recommends 15 amp circuit.
 9. Operating Temperature Range: 0 – 40 degrees C.
 10. Standby Power Consumption: Less than 0.5 W.

2.08 NARCOTICS CABINETS: FOR NURSES OFFICE

- A. Narcotics Cabinets, **ASI Model 0547**, Stainless steel-Dual door with combination lock:
 1. Surface mounted security cabinet for controlled narcotic substances shall be type 304 alloy 18-8 stainless steel of double wall all welded construction.
 2. Cabinet shall be 22 gauge and doors shall be 18 gauge. All exposed surfaces shall have satin finish.
 3. Doors are attached to cabinet with welded on full length 3/16" diameter [Ø4.8] piano hinges. Outer door has all returns toward inside. Inner door has top & bottom returns turned in and latch edge turned out for enhanced security. Five (5) button combination tumbler locked latches with dead bolts shall hold both doors closed.
 4. Two (2) stainless steel 22 gauge satin finish shelves with hemmed edges shall be furnished and spacing shall be easily adjusted by owner using eight (8) track clips provided.
 5. Top cover is removable when inner door is opened and may be reattached to bottom when unit is inverted to reverse hand of door swing in the field. Lock programming instructions are provided.

2.09 DIAPER CHANGING STATION

- A. Horizontal Recessed Mounted Stainless Steel Baby Changing Station shall be **ASI Model No 9018**, or Horizontal Surfaced Mounted Stainless Steel Baby Changing Station shall be **ASI Model No 9019** as indicated on the Drawings as manufactured by *American Specialties, Inc.*
 1. Baby Changing Station shall be horizontal format and shall protrude no more than 4 inches (102 mm) from wall when in retracted position.
 2. Unit shall comply with 2010 ADA Accessibility Standards, ASTM F2285-04, and EN 12221-1.
 3. Unit shall support a static load of 300 lbs. (136.1 kg) and be tested in excess of 350 lbs. (158.8 kg).
 4. Unit shall be fabricated of non-porous plastic (FDA approved HDPE) tested according to ASTM G21 and ASTM G22.
 5. Unit shall contain a door facing and wall flange dress trim of satin finished 18 gauge type 304 stainless steel.
 6. Unit shall contain a surface mounting collar made from satin finished 22 gauge type 304

stainless steel.

7. No parts of the operating mechanism shall be accessible when unit is open or closed to provide a tamper-resistant and pinch proof user environment.
8. Unit shall have a damped gas spring to assist user in opening and closing bed tray with the use of one hand. Unit shall be provided with one integral heavy-duty bag hook.
9. Unit shall provide a bed-liner dispenser that may be easily converted to a multi-fold towel dispenser with no adapters.
10. Unit shall provide graphics and instructions in four languages on interior back.
11. Unit shall be provided with an adjustable two-part vinyl coated child protection safety-strap mounted with concealed fasteners on high walls of cradle.
12. Entire unit shall be assembled of completely sealed components to provide easy cleaning and no penetration zones to harbor microbes or bacteria.
13. Unit shall mount on standard stud wall dimensions and with proper anchoring may mount on all suitable wall constructions. Mounting fasteners shall be concealed after installation using color matched recess plug-covers supplied.
14. Unit bed tray and back shall be light grey in color and entire unit shall be recyclable at end of usable life. Unit shall be warranted for five (5) years against defects in material or workmanship.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.
- B. Verify reinforcement and anchoring devices are correct type and are located in accordance with shop drawings.
- C. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- D. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- E. For electrically-operated accessories, verify that electrical power connections are correct amperage, ready and in the correct locations.
- F. Refer to Section 061000 and Section 092900 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install toilet accessories plumb and level in accordance with shop Drawings and manufacturer's printed installation instructions.
- B. Locate toilet accessories at heights and locations required for compliance with local accessibility regulations, ICC A117.1 - Accessible and Usable Buildings and Facilities 2017 and the Americans with Disabilities Act.

3.04 CLEANING

- A. Remove manufacturer's protective vinyl coating from sight-exposed surfaces 24 hours before final inspection.
- B. Clean surfaces in accordance with manufacturer's recommendations.

3.05 PROTECTION OF INSTALLED PRODUCTS

- A. Protect products from damage caused by subsequent construction activities.
- B. Field repair of damaged product finishes is prohibited; replace products having damaged finishes caused by subsequent construction activities.

END OF SECTION

DIVISION 10 – SPECIALTIES

SECTION 104400 – FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

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.
 - 3. Accessories.

1.02 RELATED WORK

- A. Related work specified in other sections of the specifications:
 - 1. Section 042000 – Unit Masonry
 - 2. Section 055000 – Metal Fabrications
 - 3. Section 061000 – Rough Carpentry
 - 4. Section 099000 – Painting

1.03 CONTRACT DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 specification sections, apply to the 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. Provide fire extinguishers, cabinets, and accessories by single manufacturer.
- 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 and 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 013300.

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 APPLICABLE MANUFACTURERS

- A. Where shown on the drawings, provide fire extinguishers, cabinets, accessories manufactured by the following or architect approved equal:

Larsen's Manufacturing Co.,
7421 Commerce Lane N.E.
Minneapolis, MN 55432
(763) 571-1181 or (800)527-7367

2.02 MATERIALS

- A. Fire Extinguishers:
 - 1. Furnish and install Multi-Purpose dry chemical fire extinguishers similar or equal to **Model MP5-A**.
 - 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 extinguishers for kitchens shall be equal to **Model No. WC-6L** as produced by Larsen's Manufacturing Company. Extinguishers to be wall hung on brackets equal to Model No. B1, also by Larsen's. Wet chemicals for fire extinguishers shall be developed for the use of class "A" and "K" fires. Provide and install as described above.
 - 6. 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.

7. Fire extinguishers shall have a dial to indicate air pressure.
8. All fire extinguishers shall be of manufacture approved by the Architect.
9. The required quantity, and location of fire extinguishers shall be as shown on the drawings.
10. All fire extinguishers shall be fully charged and left ready for operation.

B. Fire Extinguisher Cabinets:

1. Fully recessed type fire extinguisher cabinets shall be Architectural Series **Model No. FS2409-R1** Fire Rated Cabinet as manufactured by Larsen Manufacturing Company, or equal as approved by the Architect.
2. 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.
3. Fire extinguisher cabinets shall be fabricated with steel doors. Doors shall be "*Vertical Duo-Panel*" style with clear tempered safety glass and red vertical die cut lettering reading "Fire Extinguisher".

C. Accessories:

1. Fire Blankets and Cabinets – Provide in all science and shop room locations and additionally where indicated on drawings.
2. Extinguisher Brackets.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that rough openings for cabinets are correctly sized and located.

3.02 INSTALLATION

- A. Install the items of this Section in strict accordance with the original design, approved shop drawings, and requirements of agencies having jurisdiction, as approved by the Architect, and approved shop drawings, anchoring all components firmly into position.
- B. Installation shall maintain fire rating of partitions requiring same.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

133419 – METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Metal Framing Components
- B. Metal Wall Panels and Trim
- C. Metal Roof Panels and Trim
- D. Metal Building Accessories

Designed, pre-engineered and shop-fabricated structural steel building frame.

1.02 RELATED SECTIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 - Specification Sections, apply to work of this section.
- B. Section 033000 – Cast-in-Place Concrete.
- C. Section 051200 – Structural Steel Framing.
- D. Section 053000 – Metal decking.
- E. Section 083323 – Rolling Service Doors.
- F. Section 083600 – Sectional Overhead Doors.
- G. Section 085113 – Aluminum Windows.
- H. Section 086200 – Plastic Unit Fall Protection Skylights.
- I. Section 099000 – Painting.

1.03 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC):
 - 1. AISC Specification for Structural Steel Buildings.
 - 2. AISC Serviceability Design Considerations for Low-Rise Buildings
- B. American Iron and Steel Institute (AISI):
 - 1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members
- C. American Welding Society (AWS):
 - 1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
 - 2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel
- D. Association for Iron & Steel Technology (AISE):
 - 1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
- E. ASTM International (ASTM):
 - 1. ASTM A 36 – Standard Specification for Carbon Structural Steel
 - 2. ASTM A 48 – Specification for Gray Iron Castings
 - 3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 4. ASTM A 194 – Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts
 - 5. ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
 - 6. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners

7. ASTM A449 – Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
8. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
9. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
11. ASTM A536 Standard Specification for Ductile Iron Castings
12. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts
13. ASTM A568 Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements
14. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
15. ASTM A635 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low Alloy with Improved Formability, General Requirements
16. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
17. ASTM A673 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
18. ASTM A755 – Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products
19. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
20. ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
21. ASTM A 992 – Standard Specification for Structural Steel Shapes.
22. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
23. ASTM A1018 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
24. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
25. ASTM A1063 – Standard Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process
26. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
27. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
28. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
29. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
30. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
31. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
32. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
33. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
34. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
35. ASTM F 436 – Specification for Hardened Steel Washers
36. ASTM F 844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use

37. ASTM F 1145 – Specification for Turnbuckles, Swaged, Welded, Forged
38. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
39. ASTM F 3125 – Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength. (replaces A325 & A490)

F. IAS – International Accreditation Service

G. LGSI – Light Gauge Steel Institute

H. SJI – Steel Joist Institute

I. FM Global:

1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

J. Metal Building Manufacturers Association (MBMA):

1. MBMA Metal Building Systems Manual

K. Underwriters Laboratories (UL):

1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies

1.04 DEFINITIONS

A. Metal Building System: A building system that will employ:

1. Either continuous or simple-span 'Z' or 'C'-shaped cold-formed purlins or open-web steel joists for support of the roof cladding.
2. Simple-span 'Z' or 'C'-shaped cold-formed purlins or open-web steel joists for support of the steel wall cladding. Three-plate, built-up rigid space frames and/or cold-formed 'C' or hot-rolled I-shaped post-and-beam framing to support the roof and wall secondary members.
3. All systems (cladding, roof and wall secondary, lateral primary framing, and longitudinal bracing) work together to provide resistance to vertical and lateral loading demands.

B. Gable Symmetrical: A continuous frame building with the ridge in the center of the building, consisting of tapered or straight columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (inset in the column line). The rafters may or may not have interior columns.

C. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. The eave height and roof slope may differ on each side of the ridge. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.

D. Single-Slope: A continuous frame building which does not contain a ridge, but consists of one continuous slope from side to side. The building consists of straight or tapered columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.

E. Lean-To: A building extension, which does not contain a ridge, but consists of one continuous slope from side to side. These units usually have the same roof slope and girt design as the building to which they are attached and supported by.

- F. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.
- G. Building Width: Measured from outside to outside of sidewall secondary structural member (girt) except Shadow Panel which is outside to outside of panel.
- H. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.
- I. Building Length: Measured from outside to outside of endwall secondary structural member except Shadow Panel which is outside to outside of panels.
- J. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.
- K. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
- L. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.
- M. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.
- N. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
- O. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof, assumed to act on the horizontal projection of the roof.
- P. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.
- Q. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.

1.05 DESIGN REQUIREMENTS

A. General

1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
2. Design structural mill sections and built-up plate sections in accordance with:
 - a. Code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.
3. Cold-Formed steel structural members and panels will generally be designed in accordance with applicable version of "Specifications for the Design of Cold-Formed Steel Structural Members", ANSI/AISI S-100
4. Design weldments per the following:

- a. Structural Welding
 - 1) Design per AWS D1.1, "Structural Welding Code – Steel", Latest Edition.
- b. Cold-Formed Welding
 - 1) Design per AWS D1.3, "Structural Welding Code – Sheet Steel", Latest Edition.

B. Design Code:

1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:

- a. Governing Building Code: **Building Code of New York State.**
- b. Year/Version: **2020**
- c. Occupancy Category: **B / S1.** ← ARCHITECT VERIFY OCCUPANCY CATEGORY
- d. RISK CATEGORY: II

C. Design Loads: ← add Energy Code: xxxxxxxx

- 1. Dead Load – Weight of the building system as determined by manufacturer.
- 2. Roof Live Load – **20 PSF.**
- 3. Collateral Load – **10 PSF.** Collateral loads shall not be applied to the roof panels.
- 4. Roof Snow Load:

- a. Ground Snow Load – ~~20 PSF.~~ ← 30 psf
- b. Snow Exposure Coefficient (Ce) – ~~1.1.~~ ← Ce - 1.0
- c. Thermal Coefficient (Ct) – ~~1.0.~~ ← ARCHITECT VERIFY THIS BUILDING WILL BE HEATED CONTINUOUSLY. Use Ct = 1.2 if unheated.
- d. Roof Snow Load – **21 PSF.**

5. Wind Load:

- a. Wind Speed – **115 mph**
- b. Wind Exposure – **C**

26 psf if Ct=1.2 is required.

6. Seismic Load:

- a. Spectral response acceleration for short periods (Ss) – ~~.229.~~ 0.271
- b. Spectral response acceleration for 1-sec. period (S1) – ~~.070.~~ 0.060
- c. Site Class – **D.**
- d. Seismic Importance Factor (Ie) - 1.0
- e. Seismic Design Category B

7. Floor Load.

- a. Live Load – **100 PSF.**
- b. Dead Load (Weight of Material by others)– **10 PSF.**
- c. Collateral Load – **10 PSF.**

Verify there is not a supported floor. slab on grade is not part of pre-engineered bldg .

8. Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents.

9. Crane Loads:

- a. Crane loads shall be a function of the Service Class as defined by the governing code and Crane Manufacturers Association of America (CMAA) and the rated tonnage (A- Standby or Infrequent service, B- Light service, C- Medium service, D- Severe Service, E- Severe Service, F- Continuous Severe Service)
- b. Cranes in Service Class E or F
- c. Service Class of Crane: Determine
- d. Deflection Criterion for Crane: Determine

DELETE IF THERE IS NO CRANE IN THE BUILDING

- e. Crane loads will be obtained from the crane manufacturer and supplied by the Architect to the metal building system manufacturer at the time of bid.
- f. Building structure shall be designed for the crane loads in accordance with the governing code.
- g. Multiple cranes in the same bay or aisle shall be designed in accordance with the governing code.
- h. If the governing code does not address multiple crane design practices, MBMA Metal Building Systems Manual shall be used.

D. General Serviceability Limits:

- 1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
- 2. Vertical deflection Limits
 - a. Roof Secondary (Purlins) - $L/240$ x span under snow load, $L/180$ x span under total load
 - b. Main Frame roof beams - $L/240$ x span under snow load, $L/180$ x span under total load
- 3. Horizontal Deflection Limits:
 - a. Wall Secondary (Girts) - $L/120$ x span
 - b. Main Frame (Building Sidesway or Drift) - $H/400$ x height at eave under any loading combination and in any direction.
- 4. Vertical deflection limits apply for the loads induced by a factored snow load (50-year mean recurrence interval), or the code required live load. The horizontal drift and deflection limits apply for the loads induced by a basic wind speed corresponding to a 10-year mean recurrence interval.

Based on roof supporting a ceiling. if not can be relaxed to $L/180$ & $L/120$

$H/400$ spec'd to limit damage to interior partitions.

1.06 SUBMITTALS

- A. Submit under provisions of Section 013300 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Drawings: American Buildings Company shall furnish complete erection drawings for the proper identification and assembly of all building components. These drawings will show anchor bolt settings, transverse cross sections, sidewall, endwall and roof framing, flashing, and sheeting and accessory installation details.
- D. Certifications: Standard drawings and design analysis shall be signed and sealed by a Professional Engineer licensed in the State of New York.
- E. The pre-engineered metal building manufacturer shall, in addition, provide complete construction drawings to the Architect signed and sealed by a New York State licensed Professional Engineer certifying that the structure is in full compliance with the New York State Uniform Fire Prevention and Building Code.
- F. Bill of Materials: Bills of material shall be furnished and shall include item weights.
- G. Preventive Maintenance Manual.

xx. Column Reactions and Anchor Placement Plan: Submit final column reaction calculations, column reaction schedule, and anchor rod placement plan in advance of erection drawings. Column reaction calculations, schedule and anchor plan shall be sealed by a Professional Engineer Licensed in the State of New York.

- H. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.
- I. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.
- J. Submit certification verifying that the metal roof system has been tested and approved by Factory Mutual as Class A.
- K. Submit certification verifying that the metal standing seam roof system has been tested in accordance with ASTM E 1592 test protocols.

1.07 QUALITY ASSURANCE

A. Manufacturer / Fabricator Qualifications:

- 1. All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years' experience.

B. Weldments/Welder/Weld Inspection Qualifications:

- 1. Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, "Structural Welding Code – Steel", latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, "Structural Welding Code – Sheet Steel", latest edition.

2. Welder and welding qualifications shall have been previously qualified within the past 12 months.

C. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

D. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by manufacturer upon request.

Design of structural components shall be under the direct supervision of a Professional Engineer experienced in the design of the product types specified in this section, licensed in the state where the project is located and insured for professional liability (errors and omissions) acceptable to Owner.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

- 1. Store and handle materials in accordance with manufacturer's instructions.
- 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
- 3. Do not store materials directly on ground.
- 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
- 5. Protect materials and finish during storage, handling, and installation to prevent damage.

C. 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.

D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.09 WARRANTY

- A. American Buildings Company offers a variety of competitive warranties for panel coatings, roof systems weather tightness, purchased products, and manufactured material. For specific warranty details and costs contact American Buildings Company at 334-687-2032.

Type	Requirements	Liability / Sq Ft	Eligible Product Lines
Manufacturer's Workmanship	One year workmanship Certificates issued upon request	FOB Materials Only	All products provided by the Manufacturer
Exterior Material and Finish	-25-year roof and wall materials - AZ50/AZ55 and SP (Silicone Polyester) -35-year roof and wall materials - PVDF -Valid in the contiguous United States and Canada	AZ50/AZ55 Substrate – FOB Materials only. Silicone Polyester (SP) Finish – Full repair, repaint or replacement cost. PVDF Finish – Full repair, repaint or replacement cost.	L3P, A3P, LocSeam, LocSeam 360, SSII, SS360 Parts made from embossed substrate are excluded from the material portion of the warranty, the finish portion of the warranty still applies Specifically <u>excluded</u> products are: - Products not manufactured but sold by the Manufacturer - Projects within 1000 ft. of seashore or any other body of salt water
Insulated Panel Exterior Finish	- 25 year roof and wall finish - Valid in the contiguous United States and Canada Special request for other locations on a job by job basis	PVDF Finish-Full repair, repaint, or replacement cost	AWIP roof and wall panels with PVDF Exterior Specifically <u>excluded</u> products are: Products not manufactured by AWIP or ABC but Sold by the Manufacturer Projects within 1000 ft. of seashore or any other body of saltwater
WeatherSure Standard Level 2 – SL2	- Includes <i>Exterior Material and Finish</i> - Standard 20-year weather tightness - Valid in the contiguous United States and Canada - No inspection. Installation is the responsibility of the installer. The Manufacturer shall bear no responsibility for incorrectly installed materials. Courtesy inspection can be purchased upon Contractor's request.	\$.50 / SqFt	Loc Seam, Loc Seam 360, SSII, SS360 on slopes equal to or greater than ¼" : 12 Specifically excluded are: - Cleated roof systems on slopes less than 3:12

add Section 1.10

1.10 SPECIAL INSPECTIONS

A. The Owner will engage the services of a qualified Special Inspector for this Project. The Special Inspector will provide and/or coordinate inspection and testing requirements as necessary in accordance with the provisions of the Building Code of New York State and the Statement of Special Inspections.

<p>WeatherSure Standard Level 3 – SL3</p>	<ul style="list-style-type: none"> - Includes <i>Exterior Material and Finish</i> - Standard 20-year weather tightness - Valid in the contiguous United States and Canada - Courtesy inspection included upon request. Installation is the responsibility of the installer. The Manufacturer shall bear no responsibility for incorrectly installed materials. Installation must be supervised by a Manufacturer's CICP Certified Supervisor 	<p>\$5.00 / SqFt</p>	<p>Loc Seam, Loc Seam 360, SSII, SS360 on slopes equal to or greater than ¼" : 12</p> <p>Specifically <u>excluded</u> are:</p> <ul style="list-style-type: none"> - Cleated roof systems on slopes less than 3:12
<p>WeatherSure Premium Level 2 – PL2</p>	<ul style="list-style-type: none"> - Includes <i>Exterior Material and Finish</i> - Premium 20-year weather tightness - Valid only in the contiguous United States - (1) Inspection included - Warranty issued only after inspection and approval by the authorized in-house inspector. 	<p>\$.50 / SqFt</p>	<p>Loc Seam, Loc Seam 360, SSII, SS360 on slopes equal to or greater than ¼" : 12</p> <p>Specifically <u>excluded</u> are:</p> <ul style="list-style-type: none"> - Cleated roof systems on slopes less than 3:12
<p>WeatherSure Premium Level 3 – PL3</p>	<ul style="list-style-type: none"> - Includes <i>Exterior Material and Finish</i> - Premium 20-year weather tightness - Valid only in the contiguous United States - Start-up, intermediate & final inspection included upon request - Warranty issued only after inspection and approval by the authorized inspector. - Installation must be supervised by a Manufacturer's CICP Certified Supervisor 	<p>\$5.00 / SqFt</p>	<p>Loc Seam, Loc Seam 360, SSII, SS360 on slopes equal to or greater than ¼" : 12</p> <p>Specifically <u>excluded</u> are:</p> <ul style="list-style-type: none"> - Cleated roof systems on slopes less than 3:12

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Design and these specifications are based on American Buildings Company www.americanbuildings.com, pre-engineered metal buildings, and 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.
- B. Products and pre-engineered metal building used shall be those upon which the design is based or shall be equal products and building approved in advance by the Architect.
- C. The specifications included in this section and the design drawings showing the pre-engineered metal building do not, in any way, relieve the building manufacturer of his responsibility to provide a building which meets all structural requirements of the New York State Uniform Fire Prevention

out of date reference? Building Code of New York State?

and Building Code and which meets the requirements of the Metal Building Manufacturer's Association and which represents and is consistent with the latest design developments of the building manufacturer.

2.02 MATERIALS

A. Primary Framing Steel:

1. Steel for mill-rolled structural sections shall conform to the requirements of ASTM specification A 36 or ASTM A 572 Grade 50 or 55 as applicable.
2. Steel for all built-up sections shall meet as applicable the physical and chemical properties of:
 - a. ASTM A 1011, Grade 55.
 - b. ASTM A 572, Grade 55.
 - c. ASTM A 529, Grade 55.
3. Steel used for endwall "C" sections shall meet the physical and chemical properties of ASTM A 1011, Grade 55. Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.

B. Secondary Framing Steel:

1. Steel used to form purlins, girts, eave struts and "C" sections shall meet the physical and chemical properties of ASTM A 1011, Grade 55.
2. Steel used to form zinc-coated (galvanized) purlins and girts shall meet the physical and chemical properties of ASTM A 653, Grade 50, 55 ksi minimum yield and G90 Coating designation as described in ASTM A 924.

C. Panels: Exterior panels shall conform to the following:

1. Panel material as specified shall be 26 gage zinc-coated (galvanized) steel, coating designation G90, conforming to the requirements of ASTM A 653, Grade 80. Minimum yield strength shall be 80,000 psi.

D. Panel Fasteners:

1. For Galvalume® and Painted finished roof panels: Premium Cast Zinc head.
2. For wall panels: Coated carbon steel.
3. Color of exposed fastener heads to match the wall and roof panel finish.
4. Concealed Fasteners: Self-drilling type, of size required.

E. Gutter, Flashing and Downspout:

1. Gutters and Flashings: All standard exterior gutters are 26 gage G90 zinc-coated (Galvanized) or AZ50 aluminum-zinc alloy-coated steel with a pre-painted finish. Standard rake flashing is 26 gage G90 zinc-coated (galvanized) or AZ50 aluminum-zinc alloy-coated steel with a pre-painted finish. All other gutter and flashings shall be a minimum 26 gage steel.
2. Downspouts: All downspouts shall be 29 gage zinc-coated (galvanized) or aluminum-zinc alloy-coated steel with color coordinated, pre-painted finish, rectangular in shape.

F. Panel Clips:

1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
2. S3PC Series: Short, Tall or Super Tall Sliding clips: shall be either 3 3/16", 4 5/8", or 5 1/2" inches in height and provide 1 1/2" (3" Max) inches of travel for panel thermal expansion and contraction, depending on clip choice.
3. LSEC Series: Short or Tall Sliding Clips: shall be either 2 3/8" or 3 1/2" nominal height and provide 1 1/4" (2 1/2" Max) inches of travel for panel thermal expansion and contraction depending on clip choice.

G. Sealant And Closures:

1. Sidelaps: Factory applied non-skinning Butyl mastic.
2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
3. Outside Closures: Closed-cell, plastic or metal.
4. Inside Closures: Closed-cell, plastic or metal.

2.03 PRIMARY FRAMING

- A. Rigid Frame: All rigid frames shall be welded, built-up "I" sections or mill-rolled structural sections. The columns and the rafters may be either uniform depth or tapered.
- B. Endwall Frames: All endwall roof beams and endwall columns shall be cold-formed "C" sections, mill-rolled structural sections, or built-up "I" sections as required by design.
- C. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.
- D. Bolt Holes, etc.: All base plates and flanges shall be shop fabricated to include bolt connections holes. Webs shall be shop fabricated to include cable brace or rod brace holes and flange brace holes.
- E. Shop Applied Primers – All uncoated structural steel members shall be cleaned of all foreign matter and loose mill scale as per requirements of the Structural Steel Painting Council cleaning specification SSPC-SP2 and SSPC-SP1 as required. Structural steel members will then receive a one mil coat of red oxide primer. Primer meets or exceeds the performance requirements of the specification SSPC-15, for Type 1 Red Oxide Paint. Primer is not intended as a finish coat and is compatible only for top coating with aliphatic solvent based alkyd enamels.

2.04 SECONDARY FRAMING

- A. Purlins and Girts: Purlins and girts shall be cold-formed "Z" or "C" sections with stiffened flanges. They shall be pre-punched at the factory to provide for field bolting to the primary framing. They shall be simple or continuous span as required by design.
- B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
 1. Depth: To be determined by design (8", 9.5" or 12")
 2. Maximum Length: To be determined by design.
 3. Finish: Gray Primer.
- C. Girts: Horizontal structural members that support vertical panels.

1. Depth: To be determined by design (8", 9.5" or 12"))
 2. Maximum Length: To be determined by design.
 3. Finish: Gray Primer.
- D. Eave Struts: Eave Struts shall be unequal flange, cold-formed "C" sections.
1. Depth: To be determined by design (8", 9.5" or 12"))
 2. Maximum Length: To be determined by design.
 3. Finish: Gray Primer.
- E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
1. Formed base sill.
 2. Base channel.
 - a. With flashing.
 - b. Without flashing.
 3. Base angle.
 - a. With flashing.
 - b. Without flashing.
 4. Base girt.
 - a. With flashing.
 - b. Without flashing.
 5. Finish: Gray Primer.
- F. American Buildings Company roof joist system.
1. Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
 2. Bridging
 3. Joist attachment
 4. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
- G. Pre-painted Cold Formed Materials – At option, cold formed secondary structural framing may use pre-painted coil stock which eliminates the need for shop applied primer. Primer will be applied in a thickness of 0.45 – 0.55 mils. Primer is not intended as a finish coat. Due to lubricants used to aid the roll forming process, the application of a tie coat must be used prior to application of a topcoat.

2.05 ROOF PANELS

- A. Roof panels shall be American Buildings Company's Standing Seam 360 Panel (S3P).
- B. American Buildings Company's Standing Seam 360 (S3P) Roof Panel shall have a configuration consisting of 2" high (3" including seam) by 4 3/4" wide rib, spaced on 24" centers. Panels shall be joined at the side laps with an interlocking seam standing 1" above the major rib. Each panel shall provide 24" net coverage in width. The female panel seam shall have factory applied sealant. This panel seam shall be interlocked by a specially designed electric seaming machine.
1. Gauge: 24 (std).
 2. Dimensions: 24 inches wide by 3 inches high.
 3. Clips: Tall Sliding.
 4. Clips: Short Sliding.
 5. Finish/Color: As specified in Article 2.8 PANEL FINISH.

2.06 WALL PANELS

- A. Wall panels shall be American Buildings Company's Heavy Embossed Flat Profile Insulated Panel (HE40).
- B. "HE40" Insulated Panel: A through-fastened wall sandwich panel with concealed fasteners.
 - 1. Exterior panel gauge: 26 (std).
 - 2. Interior panel gauge: 26 (std).
 - 3. Size / Thermal Value: 40 inches wide by 2 1/2 inches high (R-20).

2.07 ACCESSORIES

- A. Canopies: Overhanging or projecting roof structures off the sidewall or endwall. For aesthetic application or to cover entrance or walkway.
- B. Roof Line Trim:
 - 1. Trim Type: Simple Eave/Rake Trim.
 - 2. Trim Type: Sculptured Eave/Rake Trim.
 - 3. Trim Type: Low-Eave Gutter / Sculptured Rake Trim.
- C. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.
- D. Framed Openings: Used to frame out doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.
- E. Overhead door support framing shall be designed to resist applicable horizontal wind loads and shall consist of channel jambs with a channel header at the top of the opening. 26 gage steel, color coordinated flashing shall be provided to conceal panel edges at the opening unless otherwise specified.
- F. Walk Doors
 - 1. Size: As noted on the Contract Drawings.
 - 2. Accessories: As noted on the Contract Drawings.
 - 3. Size: 3'-0" by 7'-0" Single Leaf
- G. Windows: Self-flashing, self-framing horizontal slide or fixed narrow-lite windows.
 - 1. Type / Size: As noted on the Contract Drawings.
- H. Daylighting with Prismatic Skylights:
 - 1. Prismatic Skylights integrated with American Buildings Company's Standing Seam II or Standing Seam 360 roof panels.
 - 2. Curb Mounted Prismatic Skylights
- I. Soffit and Liner Panels:
 - 1. Soffit and Liner panels shall be either American Buildings Company's Multi-Rib Panel (MRP), Long Span III Panel (L3P), Architectural III Panel (A3P) or Soffit-Liner Panel (SLP).
 - 2. American Buildings Company's Multi-Rib Panel (MRP) shall have a configuration consisting of ribs 3/4" deep spaced 6" on center. Each panel shall provide 36" net coverage in width.

- a. Gauge: 26 (std).
 - b. Dimensions: 36 inches wide by 15/16 inch high.
 - c. Finish: As specified in Article 2.8 PANEL FINISHES.
- J. Facades: Decorative structural and panel system projecting from the face of a wall panel.
- K. Partitions: Interior or exterior walls that are inside the building footprint to section off parts of the interior space of a building.
- L. Roof Curbs: Roof curbs shall be manufactured from minimum 18 gage AZ55 aluminum-zinc alloy-coated steel. Curbs shall have an integral cricket type water diverter. The minimum curb height shall be 8".
- 1. Top of curb to be level, with 1 1/2" top flange.
 - 2. Curb walls insulated with 1 1/2"-3lb.density fiberglass insulation.
 - 3. Welded cricket on upslope side of curb to divert water.
 - 4. Metal rib covers supplied loose for flexibility when installing curb.
 - 5. Standard sub-frame shall be minimum 16 gauge steel.
 - 6. All fasteners and sealants required for installation shall be furnished by metal building manufacturer.
- M. Roof Vents: Accessories used on the roof to allow air to pass through.
- 1. Gravity ridge ventilators shall be manufactured from galvanized steel and painted white. The ventilator body shall be 24 gage and the skirt shall be adjustable to match the roof slope. Chain operated damper will be furnished. Ventilators shall be equipped with standard bird screens and riveted end caps. Ventilators shall be 10' long and have a 9" or 12" throat.
 - 2. 20" round ventilators shall be 24 gage and shall have an adjustable base for ridge mounting or a pitched base for on-slope mounting.
- N. Pipe Flashings: Pipe flashing shall be of a one piece construction and fabricated from an EPDM membrane and shall have an aluminum base that can be field conformed to any panel configuration. Pipe flashings shall be flexible for mounting on any roof slope. Service temperature ranges shall be from -30°F to +250°F. Three standard flashing sizes shall accommodate pipe sizes from 1/4" diameter up to 13" diameter.
- 1. Size: 1/4" to 4" Pipe
 - 2. Size: 4" to 7" Pipe
 - 3. Size: 7" to 13" Pipe
- O. Louvers: Louvers shall be manufactured from 20 gage zinc-coated (galvanized) steel, painted white, and shall be self-framing and self-flashing. They shall be equipped with adjustable dampers unless otherwise specified. Nominal size shall be 3'-0" X 4'-0" for Long Span III (L3P), Architectural III (A3P) and Architectural "V" (AVP) walls and 4'-0" X 4'-0" for Shadow Panel (HFP) walls.

2.08 PANEL FINISHES

- A. American Cool Roof: PVDF Cool Panel Paint System (PVDF Resin, 30-year Finish Warranty):
- 1. Color: As per Architect
- B. Insulated Wall panel:
- 1. Exterior panel:

- a. American Cool Roof: PVDF Cool Panel Paint System (PVDF Resin, 30-year Finish Warranty):
 - 1) Color: As per Architect
- 2. Interior panel:
 - a. American Cool Roof: SP-COOL™ Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
 - 1) Imperial White
- C. Liner Panel:
 - 1. American Cool Roof: SP-COOL™ Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
 - a. 26 & 24 gauge:
 - 1) Color: As selected by Architect
- D. Soffit-Liner Panel:
 - 1. American Cool Roof: PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
 - a. .032 Aluminum
 - 1) Color: Regal White (REGW)
 - b. 24 gauge:
 - 1) Color: As selected by Architect

2.09 FABRICATION

- A. General:
 - 1. Framing members shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs or distortions.
 - 2. All shop connections shall be in accordance with the American Welding Society (AWS) Code for Building Construction, as applicable. Certification of welder qualification will be furnished when required and specified at order entry.
 - 3. Visual inspection methods will be used for verification of weld quality as outlined by the AWS Structural Steel Welding Code, Visual Inspection Acceptance Criteria, Table 6.1.
 - 4. All framing members where necessary shall carry an easily visible identifying mark.
- B. Primary Framing:
 - 1. Plates, Stiffeners and Related Members.: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
 - 2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.

3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.

C. Open-Web Roof Joists:

1. Purlins for 'long-bay' building layouts shall consist of open-web bar joists designed under Steel Joist Institute (SJI) specifications by an SJI-Certified Joist Manufacturer for the prescribed loads.
2. Field welding of joist bridging and seats is an alternative method for connection of joists to supporting primary structural members.

D. Zee Purlins:

1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.

E. Girts

1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.

F. Bracing:

1. Diagonal Bracing: Diagonal bracing in the roof and sidewall shall be used to remove longitudinal loads (wind, crane, etc.) from the structure. This bracing will be furnished to length and equipped with hillside washers, cut washers and nuts at each end. It may consist of rods threaded at each end or galvanized cable with suitable threaded end anchors.
2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal, fixed base columns, or wall diaphragm must be used. Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind forces.
3. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loadings.
4. Bridging: Laterally bridge the top and bottom chords of the open-web bar joists as required by design thereof and specified on the building erection drawings.

G. Standing Seam Panels - General:

1. One side of the panel is configured as female, having factory applied butyl mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.

2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
3. Maximum panel length is 50 feet unless otherwise noted in the Contract Documents.
4. Endlaps:
 - a. Endlaps must have a 16 gauge backup plate and have the endlap joint fasteners installed in four factory applied dimples.
 - b. Apply mastic between the panels and secure with #14-14x1 inch self-drilling fasteners through the panels, and backup plate to form a compression joint.
 - c. "Through-the-Roof" fasteners may only be used at endlaps and eaves.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment's to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.03 INSTALLATION

- A. The erection of the metal building and the installation of accessories shall be performed in accordance with the American Buildings Company's erection manuals and the building erection drawings. The erection shall be performed by a qualified erector using proper tools and equipment. In addition, erection practices shall conform to Section 4, Common Industry Practices found in the most current version of the Metal Building Systems Manual. There shall be no field modifications to primary structural members except as authorized and specified by American Buildings

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 220000 – 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. AWS – 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 01 "Contract Closeout" Section.

1.07 PAINTING AND FINISHING

- A. Refer to Division 09, 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 220020

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 Plumbing 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.
- 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 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.
- 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 sub base material compacted as directed, to indicate 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.
 - 2. 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 drawings 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 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 03 Specifications for Concrete.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 220010 – CODES, STANDARDS, AND PERMITS

PART 1 – GENERAL

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 22 – PLUMBING

SECTION 220020 – 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 22 – PLUMBING

SECTION 220030 – SCHEDULE OF EQUIVALENCY

PART 1 – GENERAL

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 22 – PLUMBING

SECTION 220100 – 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 22 – PLUMBING

SECTION 220300 – 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 22 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 01 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 22 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 22 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 220555.
 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

<u>Pipe Size</u>	<u>Maximum Spacing</u>		<u>Rod Size</u>
	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 220680 for additional fire stopping requirements.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 220553 – PLUMBING IDENTIFICATION SYSTEMS

PART 1 – GENERAL

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.

PART 3 – EXECUTION

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 proportionately 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 220300 – Plumbing Basic Materials & Methods.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 220555 – 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 22 – PLUMBING

SECTION 220719 – 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

	<u>IPS 1-1/4" & Below</u>	<u>IPS 1-1/2" to 4"</u>	<u>IPS Above 4"</u>
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 750 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 750F, 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 22 – PLUMBING

SECTION 220801 – 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 01 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 Specification Section 226310.

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

- 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 22 – PLUMBING

SECTION 221000 – PLUMBING 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 22 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 2020 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, 3/4" male hose outlet, loose key opens box and faucet operator, chrome plated casting.
- B. Manufacturer:
1. 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, 3/4" 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, calibrated nameplate and memory stop. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61.
 - 2. Manufacturer: 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 1/4" 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 22 Section "220719 – Plumbing Insulation".

2.09 UNIONS

- A. Description: "No lead" Cast Brass with Solder Ends. Working pressure: 200 PSI W.O.G.

- B. Manufacturer: 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 conform to ASTM B813. 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. Manufacturer:

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 22 Section 220300 – "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 22 Section 220300 – "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.
- B. 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 22 Section "220719 – 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 220801 – "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 LEAD TESTING REQUIREMENTS

- 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 than 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 22 – PLUMBING

SECTION 221316 – SANITARY WASTE AND VENT PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 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 22 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 2020 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 2020 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 220553, 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. Manufacturer: Anaheim Co., Tyler Pipe.

2.05 BASIC PIPING SPECIALTIES

- A. General - provide piping specialties complying with Division 22 – Section 220300 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 22 – Section 220300 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.

C. Cleanout:

1. Cast iron cleanout with straight body for caulking into soil pipe hub and fitted with bronze plug countersunk or raised head as required.

D. Exterior Cleanout:

1. 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 220553.

3.02 INSTALLATION OF SOIL WASTE AND VENT PIPING

- A. General - install soil and waste piping in accordance with Division 22 – Section 220300 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.
- F. Connect bottom to drains so drainage will wash out rust and scale.
- G. Extend vents above floor line to not less than 6" above flood rim of highest fixture before running horizontally.
- H. Terminate vents 18 inches above roof line.
- I. 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 22 – Section 220300 Basic Materials and Methods section.

3.07 INSTALLATION OF SUPPORTS AND ANCHORS

- A. Install supports, anchors and seals in accordance with Division 22 – Section 220300 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 220801, "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 22 – PLUMBING

SECTION 224000 – 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 26 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 the 2020 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 or 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230000 – 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 1613 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. AWS 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 01 "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 099000 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 23 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 Division 23, shall be done by the Mechanical Contractor.
- B. Cut, channel, chase and drill floors, walls, partitions, ceilings and other surfaces necessary for mechanical installations in the manner 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 Mechanical 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 033000.

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 310000)

- 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 033000.

3.06 CONCRETE CURING AND PROTECTION

Reference Section 033000.

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 030130)

- 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230010 – CODES, STANDARDS, AND PERMITS

PART 1 – GENERAL

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

A.A.B.C.	Associated Air Balance Council
N.E.B.B.	National Environmental Balancing Bureau
NYSED	Manual of Planning Standards (Latest Edition)

All new equipment shall bear U.L. label and conform to the latest edition of the National Electric code.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230300 – 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 23 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 01 Specification Sections, apply to this Section.

1.03 SUBMITTALS

- A. General - Submit the following in accordance with Conditions of Contract and Division 01 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 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 procedure 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 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. 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 23 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).
 2. Alloy E: Tin (approximately 95 percent) and copper (approximately 5 percent).
 3. Alloy HA: Tin-antimony-silver-copper-zinc.
 4. Alloy HB: Tin-antimony-silver-copper-nickel.
 5. 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 the Building Code of New York State (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 23 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 230680 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 the Building Code of New York State (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)

<u>PIPE SIZE</u>	<u>ROD DIAMETER</u>
2" and smaller	3/8"
2-1/2" thru 3-1/2"	1/2"
4" thru 5"	5/8"
6" and over	3/4"

<u>TYPE</u>	<u>MAXIMUM SPACING</u>
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 Building Code of New York State (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 the Building Code of New York State (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 Building Code of New York State (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 23 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.
- Y. 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 Building Code of New York State (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 the Building Code of New York State (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 230680 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 the Building Code of New York State (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: Building Code of New York State (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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230400 – PAINTING OF MECHANICAL WORK

PART 1 – GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Types of painting of mechanical related work specified in this section include the following:
 - 1. Exposed piping systems.
 - 2. Exposed ductwork systems.
 - 3. Steel supports, hangers and rods.

- B. The scope of painting to be applied as part of the work under Division 23 shall consist of the following:
 - 1. Paint exposed mechanical work throughout entire project including piping, ductwork, and terminal HVAC equipment.
 - 2. Paint uninsulated ductwork and equipment.
 - 3. Paint exposed NON insulated pipe, black steel such as pipe hangers, supporting steel, tanks, and equipment having no prime or only a prime coat finish.

1.02 SUBMITTALS

- A. Submit manufacturer's technical information, including analysis of ingredients and application instructions for products used in painting work.

- B. Certification by the manufacturer that products supplied comply with State VOC Regulations

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver painting materials to job site in original, new and unopened containers bearing manufacturer's name and label showing the following information:
 - 1. Name and title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Contents by volume, for major pigments and vehicles.
 - 4. Thinning instructions.
 - 5. Application instructions.
 - 6. Color name and number.

- B. Store materials in approved fire-safe location with adequate ventilation. Area must be kept clean.

1.04 PROJECT CONDITIONS

- A. Comply with governing regulations concerning use of and conditions for application of paint. Comply with manufacturer's recommendations and instructions. Do not apply paint in unfavorable conditions of temperature, moisture (including humidity) or ambient contamination (dust and other pollutants).

PART 2 - PRODUCTS

2.01 GENERAL PAINTING PRODUCT REQUIREMENTS

- A. Painting products based on a system by Rust-Oleum. Equivalent systems by Devoe and Pratt and Lambert are acceptable.
- B. Steel surfaces - normal temperatures:
 - 1. First Coat - Rust-Oleum or equal Red Primer.
 - 2. Second Coat - Rust-Oleum or equal Zinc Chromate Rust-Inhibitive Primer.
 - 3. Third Coat - Rust-Oleum industrial enamels, finish color as directed.
- C. Steel surfaces - elevated temperatures above 150 deg. F.
 - 1. First Coat - Rust-Oleum or equal heat resistant primer.
 - 2. Second Coat - Rust-Oleum or equal heat resistant aluminum.
 - 3. Machinery, equipment and apparatus having factory applied prime coat shall be painted as specified above except omit first coat.
- D. Exposed canvas on pipe and equipment insulation:
 - 1. First Coat - Primer, Rust-Oleum primer-sealer.
 - 2. Second and third coats - Rust-Oleum Acrylic Series.
 - 3. Colors as directed.
- E. Vehicles and thinners: Comply with governing regulations and recognized safe practices in handling, use and drying of paint vehicles and thinners. Compatibility of paint products is the Contractor's exclusive responsibility. Select paint products to ensure freedom from problems relating to vehicles and thinners of type and within limits recommended by paint manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

- A. Clean surfaces before applying paint products. Remove oil and grease prior to mechanical cleaning. Comply with paint products manufacturer's instructions for surface cleaning and preparation.
- B. Remove surface applied accessories which are not to be painted, and reinstall after completion of painting. Protect non-removable items not to be painted, by covering with paper or plastic film.
- C. Ferrous metal surfaces: Remove mill scale and loose rust on surfaces which are not zinc coated or shop/factory prime coated.
 - 1. Clean shop applied prime coats on metal surfaces, and repair (touch-up) prime coats wherever abraded or otherwise damaged, prior to application of paint system.
- D. Zinc coated surfaces: Clean with non-petroleum based solvent. Wash with copper sulfate solution and flush with water, unless surface has been pre-treated, or unless treatment is not recommended by manufacturer of prime coat.

3.02 PAINT SYSTEM APPLICATION

- A. Comply with manufacturer's recommendations for mixing or stirring paint products immediately before application.
- B. Application limitations: Paint every accessible surface of each unit of work indicated to be painted, regardless of whether in location recognized as "concealed" or "exposed" except as otherwise indicated.
 - 1. Omit painting of ductwork and insulated piping above removable ceilings, but apply paint system to pipe hangers, duct hangers and similar unprotected ferrous materials.
 - 2. Omit painting on machined sliding surfaces and rotating shafts of equipment, and on nonferrous finished metals including chrome plate, stainless steel, special anodized aluminum, brass/bronze and copper, and on plastics and similar finished materials, except where specifically indicated to be color-coded by painting.
 - 3. Omit painting on required name plates, labels, identification tags, signs, markers, printed instructions, performance ratings, flow diagrams and similar text and graphics, located within the scope of work indicated to receive paint application.
 - 4. Omit specified prime coat of paint system for metal surfaces where surface has shop applied prime coat of equivalent quality. Apply prime coat on other surfaces to be painted, comply with paint manufacturer's instructions for prime coating where not otherwise indicated. Apply additional prime coats where suction spots or unsealed areas appear.
- C. Apply paint in accordance with manufacturer's directions. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance.
- D. Apply paint at edges, corners, joints, welds and exposed fasteners in manner which will ensure dry-film thickness equal to that of flat surfaces. Allow sufficient time between successive coats for proper drying (comply with manufacturer's drying instructions).
 - 1. Number of coats: Number indicated is minimum number, apply as many coats as are necessary to cover.
 - 2. Coating thickness: Apply paint in uniform coats without thinning in application thickness recommended by manufacturer for each coat.
 - 3. Apply paint in smooth finish without noticeable texture, cloudiness, spotting, holidays, laps, brush marks, runs, sags, ripples, ropiness and other surface imperfections.

3.03 CLEAN UP AND PROTECTION, PAINTING

- A. During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day. Do not leave in paint storage area.
- B. Spattered surfaces: Upon completion of painting work, clean paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting work. Correct damage by cleaning, repairing or replacing and repainting as directed. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings installed for protection of work not to be painted, after completion of painting operations. At completion of work by other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230513 – COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

- A. Internal electrical control devices that operate starters, controllers, etc. shall be furnished, installed, and wired under Division 23. 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.
- B. 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.
- C. 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.
- D. 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.
- E. 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.
- F. All equipment shall be provided with disconnect means (by Mechanical Contractor).
- G. 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).
- H. 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.
- I. The Contractor shall furnish all labor and material required for the installation of the systems. A brief description of the work is as follows:
 - 1. Furnish all electrical control wiring for the new equipment and controls.
 - 2. Contractor shall apply final finish to insure uniformity.
 - 3. All cutting, patching, and painting as required.
 - 4. All controls for units as hereinbefore specified and disconnect switches.

5. Testing of all mechanical contractor installed wiring as directed.
6. Contractor shall perform all work as stated on the documents for fire alarm fan shutdown for all new applicable equipment, unless noted otherwise.
7. 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230516 – EXPANSION COMPENSATION

PART 1 – GENERAL

1.01 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.

1.02 QUALITY ASSURANCE

- A. Refer to Division 01, for requirements pertaining to substitute materials and equipment.
- B. Comply with standards of the Expansion Joint Manufacturer's Association (EJMA).

1.03 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

2.01 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.

2.02 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.

2.03 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.

2.04 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.

2.05 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

3.01 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.

3.02 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.

3.03 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230519 – METERS AND GAUGES FOR HVAC PIPING

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:
9. Wika
10. Trerice
11. Weiss
12. Or approved equal

B. Dial Thermometers:

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.

C. 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.

3.02 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 high point of hydronic piping systems.
- C. Pressure gage cocks: Install in piping tee with snubber or syphon if steam.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230523 – GENERAL DUTY VALVES FOR HVAC PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 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 23 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230548 – VIBRATION ISOLATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work specified in this section.
- B. This section is a Division 23 Basic Materials and Methods section, and is a part of each Division 23 section making reference to vibration isolation products specified herein. Vibration isolation devices shall conform to the seismic requirements 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. 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
- B. Vibration isolation products furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 23 sections.
- C. 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 this project.

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 23 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.

- H. 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.
- I. 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.
- J. 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.
- K. Riser isolators - manufacturer's standard pad type isolator bonded to steel plate, formed for welding to pipe sleeve extension.
- L. 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.
- M. 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.
- N. 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.
 - 2. Rooftop units mounted on dunnage. (as well as internal spring isolator).
- 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230580 – MECHANICAL TESTING REQUIREMENTS

PART 1 – GENERAL

1.01 INCLUDED SYSTEMS AND EQUIPMENT

- A. The following is a partial list of the equipment and system test requirements included in this section:
1. Air handler systems
 2. Building management control system & energy management
 3. Hydronic piping and HVAC Pumps
 4. Exhaust fans
 5. Indoor air climate control--misc. systems
 6. Indoor air quality (IAQ)
 7. Terminal unit
 8. Test and balance (TAB) work
 9. Air Conditioning Equipment

1.02 DESCRIPTION

- A. This section specifies the functional testing requirements for Division 15 systems and equipment. From these requirements, the Commissioning Authority (CA) shall develop step-by-step procedures to be executed by the Subs or the Commissioning Authority. The general functional testing process, requirements and test method definitions are described in Section 01810 Commissioning. The test requirements for each piece of equipment or system contain the following:
1. The contractors responsible to execute the tests, under the direction of the CA.
 2. A list of the integral components being tested.
 3. Construction checklists associated with the components.
 4. Functions and modes to be tested.
 5. Required conditions of the test for each mode.
 6. Special procedures.
 7. Required methods of testing.
 8. Required monitoring.
 9. Acceptance criteria.
 10. Sampling strategies allowed.

1.03 PREREQUISITES

- A. The following applicable generic prerequisite checklist items are required to be listed on each written functional test form and be completed and checked off by CA prior to functional testing.
- B. All related equipment has been started up and start-up reports and construction checklists submitted and approved ready for functional testing.
- C. All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final set points and schedules with debugging, loop tuning and sensor calibrations completed.
1. Piping system flushing complete and required report approved.
 2. Water treatment system complete and operational.
 3. Vibration control report approved (if required).

4. Test and balance (TAB) complete and approved for the hydronic system.
5. All A/E punch list items for this equipment corrected. These functional test procedures reviewed and approved by installing contractor.
6. Safeties and operating ranges reviewed by the CA.
7. Test requirements and sequences of operation attached.
8. Schedules and set points attached.
9. False loading equipment, system and procedures ready.
10. Sufficient clearance around equipment for servicing.
11. Record of all values for pre-test set points changed to accommodate testing has been made and a check box provided to verify return to original values (control parameters, limits, delays, lockouts, schedules, etc.).
12. Other miscellaneous checks of the pre-functional checklist and start-up reports completed successfully.

1.04 MONITORING

- A. Monitoring is a method of testing as a stand-alone method or to augment manual testing.
- B. All points listed in the required monitoring section of the test requirements which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using data loggers. At the option of the CA, some control system monitoring may be replaced with data logger monitoring. At the CA's request, the Temperature Controls Contractor shall trend up to 20% more points than listed herein at no extra charge.
- C. Hard copies of monitored data must be in columnar format with time down the left column and at least 5 columns of point values on the same page.
- D. Graphical output is desirable, and will be required for all output, if the system can produce it.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

The following Sample test procedures are representative of the level of detail required for this project. The Owner reserves the right to work with the Contractor to amend these data sheets as necessary at no extra cost to the Owner.

3.01 AIR HANDLER UNITS (AHU / RTU)

- A. Parties Responsible to Execute Functional Test
 1. Temperature Controls Contractor: operate the controls to activate the equipment as needed.
 2. CA: to witness, direct and document testing.
- B. Integral Components or Related Equipment Being Tested

Construction Checklist ID	PC-_____
	PC-_____

 1. AHU/RTU and components (fans, coils, valves, ducts, VFD)
 2. Heat recovery coil, humidifier or evaporative cooling sections.
- C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The

commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

D. Functions/Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

The following testing requirements are an addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both ³	<u>Required</u> <u>Seasonal</u> <u>Test</u> ¹
<p>General</p> <p>1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks with which it is associated.</p>	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Mixed & supply air, & reset temperature control functions.	Both	
3. Economizer functions.	Both	Cooling
4. SF, and exhaust fan interlocks.	Either	
5. No CCV flow when there is HCV flow.	Both	
6. CCV & HCV modulation & positive shutoff (no leak-thru).	Manual	
7. Duct static pressure (SP) control.	Both	
8. Exhaust fan tracking and building SP.	Monitoring	
9. VFD (or inlet vanes) operation on SF and RF: modulation to minimum, control system PID, proportional band of speed vs controlling parameter, constancy of static pressure, verification of program settings, alarms, etc.	Both	2
10. Damper interlocks and correct modulation in all modes, including smoke and fire dampers.	Manual	
11. Temperature difference across HC & CC per specifications.	Manual	
12. Verification of minimum OSA control through varying VAV box positions.	Either	2
13. Heating and cooling coils freeze protection.	Manual	2
14. Branch duct control damper control.	Manual	
15. Night low limit, morning warm-up cycle.	Either	
16. Heat recovery operation.	Monitoring	
17. Verify TAB reported SF cfm with control system reading.	Manual	2
18. All alarms (low limits, high static, etc.).	Manual	
19. Heating and cooling coil capacity test, optional.	Manual	Design
20. Sensor and actuator calibration checks: on duct static pressure sensor on SAT, MAT, OSAT, OSA & RA damper and valve positions, SF cfm reading with TAB, and other random checks (EMS readout against hand-held calibrated instrument or observation must be within specified tolerances)	Manual	
21. Verify schedules and setpoints to be reasonable and appropriate		

¹Cooling season, Heating season or Both. "Design" means within 5° of season design (ASHRAE 2 1/2%),

or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

²Seasonal test not required if seasonal conditions can be adequately simulated.

³Refer to Special Procedures

E. Special Procedures (other equipment to test with, etc.; reference to function ID)

1. Reduced Testing for Smaller Units. For standard application AHU's less than 15 tons, the following modifications to the testing requirements apply: 1) either Manual or Monitoring will satisfy the verification requirement--where both is listed, choose one. 2) Testing Modes 6, 8, 11, 13 and 16 is not required.

F. Required Monitoring

1. All points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using data loggers. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
For each AHU being tested:					
RAT	5	5 days incl. weekend	Y	Y	1-3, 5
SAT	5	5 days incl. weekend	Y	Y	1-3, 5
CC LAT (optional)	5	5 days incl. weekend	Y	Y	1-3, 5
HC LAT (optional)	5	5 days incl. weekend	Y	Y	1-3, 5
MAT	5	5 days incl. weekend	Y	Y	1, 3
Indoor WB or enthalpy, if enthalpy economizer	5	5 days incl. weekend	Y	Y	1, 3
SF speed, if variable, else status	5	5 days incl. weekend	Y	Y	1, 5-9
RF speed, if variable, else status	5	5 days incl. weekend	Y	Y	1, 5-9
Duct SP	5	5 days incl. weekend	Y	Y	1, 7, 9
Building SP differential	5	5 days incl. weekend	Y	Y	8
OSAT	5	5 days incl. weekend	Y	Y	All
OSA-WB or enthalpy, if enthalpy economizer	5	5 days incl. weekend	Y	Y	1, 3
Indoor dry-bulb zones (expected to be most problematic)	5	5 days incl. weekend	Y	Y	All

Remarks:

CCV position (optional)

HCV position (optional)

SF cfm not required if not monitored

RF cfm not required if not monitored

G. Acceptance Criteria (referenced by function or mode ID)

1. 1-21. For the conditions, sequences and modes tested, the AHU/RTU, integral components and related equipment respond to varying loads and changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.
2. AHU/RTU with supporting systems shall be able to maintain the SA temperature within 1.0F either side of the deadband of the current setpoint without excessive hunting.
3. AHU/RTU and controls shall control the duct static pressure so that it does not drift more than an amount equal to 10% of the setpoint value either side of the deadband without excessive hunting.

H. Sampling Strategy for Identical Units

1. All identical AHU's/RTU's over 15 tons shall not have any sampling--test all units. However, 25% of the units may have monitoring be the verification method for modes listed with Monitoring or Both as testing methods, with no less than three units being fully tested per the above requirements.
2. All identical AHU's/RTU's equal to or less than 15 tons shall be sampled: Randomly test at least 50% of each group of identical equipment (the 1st sample) per the above tests. In no case test less than three units in each group. If 20% of the units in the first sample fail the functional performance tests, test another the remaining 50%, fully at the contractor's expense. This sampling applies to the testing subsections. That is, if calibration is off on more than 10% of the tested piece of equipment, then another sample shall have calibrations checked, but not all other tests need to be done on the second sample.
3. All units not included in the sampling testing and monitoring shall be fully monitored for the monitoring modes listed above in the monitoring section.

3.02 BOILER SYSTEM (HEATING WATER)

A. Parties Responsible to Execute Functional Test

1. Temperature Controls Contractor: operate the controls, as needed.
2. HVAC mechanical contractor or vendor: assist in testing sequences.
3. CA: to witness, direct and document testing.

B. Integral Components or Related Equipment Being Tested

	Construction Checklist ID
1. Boiler	PC- _____
2. Primary HW supply pumps	PC- _____
3. Heating water piping system	PC- _____
4. Secondary HW supply pumps	PC- _____
5. VFD on secondary pumps	PC- _____

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

D. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements.

The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both	<u>Required</u> <u>Seasonal</u> <u>Test</u> ¹
General 1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with.	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. <u>Primary Side.</u> Lead/lag staging of boilers, optimization, capacity modulation, and primary HW supply pumps.	Both	Heating
3. <u>Secondary Side.</u> Secondary WH supply pump staging, bypass valve operation, if no VFD and HWT reset. VFD operation: modulation to minimum, control system PID, proportional band of speed vs controlling parameter, verification of program settings,, alarms, etc.	Both	Heating
4. Check all alarms and safeties (high and low pressure and temperature, etc.), PRV and flow switch functions	Manual	
5. Test each possible lead boiler as lead boiler, and each pump as lead pump. Test pump lockouts.	Manual	
6. Flue gas analysis verification, optional	Manual	
7. Efficiency and capacity tests, optional	Manual	Heating
8. Verify boiler inlet/outlet pressures with startup report and manufacturer's recommendations	Manual	
9. Sensor and actuator calibration checks on: HWST, HWRT, pressure sensor controlling pump speed, mixing valve and other random checks (EMS readout against hand-held calibrated instrument must be within 0.5°F for temps. or within a tolerance equal to 10% of the pressure setpoint, with a test gage)	Manual	
10. Constancy of differential pressure (pump control parameter)	Monitoring	Heating
11. Verify schedules and setpoints to be reasonable and appropriate		

¹Cooling season, Heating season or Both. "Design" means within 5° of season design (ASHRAE 2 1/2%), or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

E. Special Procedures (other equipment to test with, etc.; reference to function ID)

1. False load boiler, if necessary.

F. Required Monitoring

1. All points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using data loggers. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
For each boiler and pump:					
Boiler current or status	5	5 days incl. weekend	Y	Y	1-3
HWST	5	5 days incl. weekend	Y	Y	1, 3
HWRT	5	5 days incl. weekend	Y	Y	1, 3
OSAT-DB	5	5 days incl. weekend	Y	Y	1-3
HWS primary pump current or status	5	5 days incl. weekend	Y	Y	1, 2
HWS secondary pump speed, if variable	5	5 days incl. weekend	Y	Y	1, 3
HWS secondary pump flow rate, if in EMS	5	5 days incl. weekend	Y	Y	1, 3
HWS secondary pump speed controlling parameter value	5	5 days incl. weekend	Y	Y	1, 3, 10

Remarks:

G. Acceptance Criteria (referenced by function or mode ID)

- 1-11. For the conditions, sequences and modes tested, the boilers, integral components and related equipment respond to varying loads and changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.
- Boiler shall maintain the supply water set point to within +/- 1.0F of set point dead band without excessive hunting.
- 9.-10. Pumping system and controls shall maintain the current desired pressure set point to within an amount equal to 10% of the set point value either side of the dead band without excessive hunting.

H. Sampling Strategy for Identical Units

- No sampling, test all.

3.03 BUILDING AUTOMATION SYSTEM (BAS)

A. Parties Responsible to Execute Functional Test

- Temperature Controls Contractor: operate the controls to activate the equipment.
- CA: to witness, direct and document testing.

B. Integral Components or Related Equipment Being Tested

- Building Automation System Construction Checklist ID PC-_____
- All construction checklists of controlled equipment

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The

commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

- D. A significant part of the BAS functional testing requirements is the successful completion of the functional tests of equipment the BAS controls or interlocks with. Uncompleted equipment functional tests or outstanding deficiencies in those tests lend the required BAS functional testing incomplete.
- E. Integral or stand-alone controls are functionally tested with the equipment they are attached to, including any interlocks with other equipment or systems and thus are not covered under the BAS testing requirements, except for any integrated functions or interlocks listed below.
- F. In addition to the controlled equipment testing, the following tests are required for the BAS, where features have been specified. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in the specifications.

<u>Function / Mode</u>	<u>Test Method</u> Manual (demonstration), Monitoring, Either or Both
MISC. FUNCTIONS	
1. All specified functions and features are set up, debugged and fully operable	Verbal discussion of features
2. Power failure and battery backup and power-up restart functions	Demonstration
3. Specified trending and graphing features demonstration	See equipment trends
4. Global commands features	Demonstration
5. Security and access codes	Demonstration
6. Occupant over-rides (manual, telephone, key, keypad, etc.)	Demonstration
7. O&M schedules and alarms	Demonstration
8. Scheduling features fully functional and setup, including holidays	Observation in terminal screens or printouts
9. Date and time setting in central computer and verify field panels read the same time	Demonstration
10. Included features not specified to be setup are installed (list)	Demonstration
11. Occupancy sensors and controls	Demonstration
12. Demonstrate functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad	Demonstration of 100% of panels and 10% of ports
13. All graphic screens and value readouts completed	Demonstration
14. Setpoint changing features and functions	Done during equipment testing
15. Communications to remote sites	Demonstration
16. Sensor calibrations	Sampled during equipment tests
17. "After hours" use tracking and billing	
18. Final as-builts or redlines (per spec) control drawings, final points list, program code, setpoints, schedules, warranties, etc. per specs, submitted for O&Ms.	Observation
19. Verify that points that are monitored only, having no control function, are checked for proper reporting to BAS.	Observation

<u>Function / Mode</u>	Test Method Manual (demonstration), Monitoring, Either or Both
INTEGRATED TESTS	
20. Fire alarm interlocks and response	Demonstration
21. Duty cycling (if specified)	Monitoring
22. Demand limiting (including over-ride of limiting)	Monitoring
23. Sequential staging ON of equipment	Either
24. Optimum start-stop functions	Monitoring
25. All control strategies and sequences not tested during controlled equipment testing	Either
26. Other integrated tests specified in the contract documents	
27. Security system interlocks	Demonstration
28. Fire protection and suppression systems	Demonstration

G. Special Procedures (other equipment to test with, etc.; reference to function ID) None

H. Additional Required Monitoring

- Besides the trending and monitoring required with the functional testing of equipment, all points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using data loggers. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
Misc. equipment current or status for duty cycling and demand limiting	5	5 days incl. weekend	Y	Y	21-22
Equipment or building kW or current for demand limiting	5	5 days incl. weekend	Y	Y	21-22
Optimum start/stop equip.	5	5 days incl. weekend	Y	Y	24

Remarks:

I. Acceptance Criteria (referenced by function or mode ID)

- For the conditions, sequences and modes tested, the BAS, integral components and related equipment respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.

J. Sampling Strategy for Identical Units

- Sample 10% of the field panels for procedure 9, and 10% of the local ports for procedure 12. If 10% fail, test another 10%. If 10% of those fail, test all remaining units at the contractor's expense.

3.04 EXHAUST FANS

- A. The testing requirements apply to the following fans (check all that apply): central restroom, mechanical room.
- B. Parties Responsible to Execute Functional Test
 - 1. Temperature Controls Contractor: operate the controls to activate the equipment, if BAS controlled.
 - 2. CA: to witness, direct and document testing.
- C. Integral Components or Related Equipment Being Tested
 Construction Checklist ID
 PC-_____
 - 1. Exhaust fans
- D. Prerequisites The applicable prerequisite checklist items listed in the beginning of **Section 15997** shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.
- E. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both ¹	<u>Required</u> <u>Seasonal</u> <u>Test</u>
General		
1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with.	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Verify schedules and setpoints to be reasonable and appropriate		
3. Function at fire alarm (off, depressurization, etc.)	Manual	
4. Interlocks to building pressurization control	Manual	
5. Speed controls	Either	
6. Check TAB report record of sound power level tests and space pressures and compare to specifications	Review	
7. Sensor calibration checks on any controlling temperature or pressure sensor	Manual	

¹Refer to Special Procedures

- F. Special Procedures (other equipment to test with, etc.; reference to function ID) None
- G. Required Monitoring

1. All points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using dataloggers. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
For each fan:					
Do be determined					

Remarks:

H. Acceptance Criteria (referenced by function or mode ID)

1. 1-6. For the conditions, sequences and modes tested, the fans, integral components and related equipment respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.
- I. Sampling Strategy for Identical Units of the same type and function, but different in size, are considered identical for sampling purposes.
1. Randomly test at least 10% of each group of identical equipment (the 1st sample). In no case test less than three units in each group. If 10% of the units in the first sample fail the functional performance tests, test another 10% of the group (the 2nd sample). If 10% of the units in the 2nd sample fail, test all remaining units in the whole group, fully at the contractor's expense. This sampling applies to the testing subsections. That is, if calibration is off on more than 10% of the tested piece of equipment, then another sample shall have calibrations checked, but not all other tests need to be done on the second sample.

3.05 INDOOR AIR CLIMATE CONTROL--MISC. SYSTEMS

- A. At least 10% of all space zones shall be verified to be maintaining proper climate control. Specific test requirements for this may have been identified elsewhere in this specification (e.g., under terminal units). For all areas not specifically specified, otherwise, the following tests shall be conducted.
- B. Parties Responsible to Execute Functional Test
1. Temperature Controls Contractor: operate the controls and provide trend logs
 2. CA: to witness, direct and document testing.
- C. Integral Components or Related Equipment Being Tested
1. Cooling plant (entire system)
 2. Heating plant (entire system)
 3. Air, water distribution system
 4. Control system
- D. Prerequisites All listed systems in Part B, above, shall have had successful functional tests completed prior to this test.
- E. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

This is a performance test to verify that the HVAC systems can provide and maintain the temperature and relative humidity levels specified, during normal and extreme weather and occupancy conditions. The test consists of monitoring, via trend logs, of various points during the cooling season when temperatures reach to within 5°F of season design (ASHRAE 2 1/2%).

F. Special Procedures (other equipment to test with, etc.; reference to function ID)

1. Building should be normally occupied during the test.

G. Required Monitoring

1. All points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Refer to the Monitoring section at the beginning of **Section 15997** for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
Space temperature control:					
Space temperature	5	5 days incl. weekend	Y	Y	1-3
OSAT-DB	5	5 days incl. weekend	Y	Y	1-3

Remarks:

H. Acceptance Criteria (referenced by function or mode ID)

1. Space temperature during occupied modes shall average within +/- 1°F of set point and always remain within 1°F of the ends of the dead band without excessive hunting of either the applicable damper or coil valve, or complaints of drafts or stuffiness from occupants.

I. Sampling Strategy for Identical Units of the same type and function, but different in size, are considered identical for sampling purposes.

1. Randomly test at least 10% of each group of identical equipment (the 1st sample). In no case test less than three units in each group. If 10% of the units in the first sample fail the functional performance tests, test another 10% of the group (the 2nd sample). If 10% of the units in the 2nd sample fail, test all remaining units in the whole group, fully at the contractor's expense. This sampling applies to the testing subsections. That is, if calibration is off on more than 10% of the tested piece of equipment, then another sample shall have calibrations checked, but not all other tests need to be done on the second sample.

3.06 SERVICE HOT WATER SYSTEM

A. Parties Responsible to Execute Functional Test

1. CA: perform and document testing.

B. Integral Components or Related Equipment Being Tested

Construction Checklist ID

1. Hot water heaters (heaters, mixing valves) PC-_____
2. Recirculating pumps PC-_____

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of **Section 15997** shall be listed on each functional test form and checked off prior to functional testing. The

commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

D. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both	<u>Required Seasonal Test</u>
General 1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with.	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Verify schedules and setpoints to be reasonable and appropriate		
3. Unoccupied pump operation	Either	
4. Mixing valve operation and temperature control	Either	
5. Sensor calibration checks on hot water temperature	Manual	

E. Special Procedures (other equipment to test with, etc.; reference to function ID) None

F. Required Monitoring None

G. Acceptance Criteria (referenced by function or mode ID)

1. 1-6. For the conditions, sequences and modes tested, the fan's integral components and related equipment respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.

H. Sampling Strategy for Identical Units

1. No sampling. Test all units.

3.07 TERMINAL UNITS

(This applies to standard applications, critical applications will have additional tests and a higher fraction tested.)

A. Parties Responsible to Execute Functional Test

1. Temperature Controls Contractor: operate the controls to activate the equipment.

B. Integral Components or Related Equipment Being Tested

Construction Checklist ID

1. Terminal unit (TU)

PC-_____

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of **Section 15997** shall be listed on each functional test form and checked off prior to functional testing. The

commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

D. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both ³	<u>Required Seasonal Test¹</u>
<p>General</p> <p>1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, warmup, shutdown, unoccupied & manual modes and power failure and restoration. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with, including all damper, valve and fan functions.</p>	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Sensor activator calibration checks on: SAT, MAT, zone air temperature damper position and other random checks (EMS readout against visual or hand-held calibrated instrument must be within 0.5°F for temps. or within a tolerance equal to 10% of static pressure setpoint, with an inclined manometer)	Manual	
3. Device and actuator calibration and stroke checks for heating coil valve and non-DDC dampers	Manual	
4. For the TU's tested, check the construction checklist items.	Observation	
5. Verify control parameters and setpoints to be reasonable and appropriate by reviewing the full program of 5% of all the TU's with each other for consistency. Verify the max. and min. cfm setpoints of all tested TU's against the control drawing and TAB values. Verify other TU programming parameters such as K-factors, deadbands, setpoints, stroke times, etc.	Observation	
6. Verify no CCV flow when there is HCV flow	Either	
7. Verify no hunting or significant overshoot by damper or valves.	Either	
8. Verify by measurement, CCV & HCV positive shutoff (no leak-thru)	Manual	
9. Verification of minimum OSA control through varying VAV box positions, if applicable	Either	2
10. All alarms (fan status, low limits, high static, etc.)	Manual	
11. Verify that TU is maintaining space setpoint temperatures	Monitoring	Both Design
12. Verify airflows and pressures (this random test is part of the TAB test)	--	

NOTES:

¹Cooling season, Heating season or Both. "Design" means within 5°F of season design (ASHRAE 2 1/2%), or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

²Seasonal test not required if seasonal conditions can be adequately simulated.

³Refer to Special Procedures

E. Special Procedures (other equipment to test with, etc.; reference to function ID) None

F. Required Monitoring

1. All points listed below which are control system monitored points shall be trended by the Temperature Controls Contractor. Other points shall be monitored by the CA using dataloggers. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
For each zone thermostat and space sensor and other critical areas, monitor:					
Space temperature	10	3 weekdays, summer design	Y	Y	11
Space temperature	10	3 weekdays, winter design	Y	Y	11
Space temperature	2	8 hours, occupied	Y	Y	7
Heating coil valve	2	8 hours, occupied	Y	Y	7
Damper position or cfm	2	8 hours, occupied	Y	Y	7

Remarks:

G. Acceptance Criteria (referenced by function or mode ID)

1. 1-11. For the conditions, sequences and modes tested, the TU, integral components and related equipment respond to varying loads and changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.
2. 10. Space temperature during occupied modes shall average within +/- 1°F of setpoint and always remain within 1°F of the ends of the deadband without excessive hunting of either the damper or coil valve, or complaints of drafts or stuffiness from occupants.

H. Sampling Strategy for Identical Units of the same type and function, but different in size, are considered identical for sampling purposes.

1. Testing. Randomly test at least 10% of each group of identical equipment (the 1st sample). In no case test less than three units in each group. If 10% of the units in the first sample fail the functional performance tests, test another 10% of the group (the 2nd sample). If 10% of the units in the 2nd sample fail, test all remaining units in the whole group, fully at the contractor's expense. This sampling applies to the testing subsections. That is, if calibration is off on more than 10% of the tested piece of equipment, then another sample shall have calibrations checked, but not all other tests need to be done on the second sample.
2. Monitoring. Ten percent of the total number of zones in the building, chosen by the Owner, shall be monitored. Within this 10%, shall be included a distribution of all air handlers, zones expected to have the greatest heating and cooling demand, perimeter and core zones and zones identified from the commissioning process that have exhibited potential problems.

3.08 TEST AND BALANCE WORK (TAB)

A. Parties Responsible to Execute Functional Test

1. TAB contractor: perform checks using test instruments.

2. Temperature Controls Contractor: operate the controls to activate the equipment.

3. CA: to witness, direct and document testing.

B. Integral Components or Related Equipment Being Tested

Construction Checklist ID

1. TAB water-side PC-_____

2. TAB air-side PC-_____

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the construction checklists previously completed by the installer, before the beginning of functional testing.

D. Purpose. The purpose of this test is to spot check the TAB work to verify that it was done in accordance with the contract documents and acceptable practice and that the TAB report is accurate.

E. The following tests and checks will be conducted. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Test or Check</u>	<u>Test Method</u>	<u>Required Seasonal Test³</u>
<p>A random sample of up to 25 % the TAB report data shall be selected for verification (air velocity, air or water flow rate, pressure differential, electrical or sound measurement, etc.). The original TAB contractor will execute the checks, witnessed by the commissioning authority. The TAB contractor will <u>use</u> the same test instruments as used in the original TAB work.</p> <p>A failure¹ of more than 10% of the selected items of a given system² shall result in the failure of acceptance of the system TAB report and the TAB contractor shall be responsible to rebalance the system, provide a new system TAB report and repeat random verifications of the new TAB report.</p> <p>The testing will include the verification of minimum outdoor air intake flows at minimum, maximum and intermediate total airflow rates for 100% of the air handlers. Other selected data to be verified will be made known upon day of testing.</p>	<p>Demonstration</p>	
<p>2. Verify that final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked by the TAB Contractor.</p>	<p>Demonstration</p>	

3. Verification that the air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity. This shall include a review of TAB methods, control setpoints established by TAB and a physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all TUs taking off downstream of the static pressure sensor, the TU on the critical leg has its damper 90% or more open.	Demonstration	
4. Verification that the water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity. This shall include a review of TAB methods, control setpoints established by TAB and a physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90% or more open.	Demonstration	

¹Failure of an item is defined as follows:

For air flow of supply and return: a deviation of more than 10% of instrument reading

For minimum outside air flow: 20% of instrument reading (30% for reading at intermediate supply flow for inlet vane or VFD OSA compensation system using linear proportional control)

For temperatures: a deviation of more than 1°F

For air and water pressures: a deviation of more than 10% of full scale of test instrument reading

For sound pressures: a deviation of more than 3 decibels. (Variations in background noise must be considered)

²Examples of a “system” are: the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system. Systems can be defined smaller if inaccuracies in TAB work within the smaller defined system will have little or no impact on connected systems.

³Cooling season, Heating season or Both. “Design” means within 5° of season design (ASHRAE 2 1/2%), or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

F. Special Procedures (other equipment to test with, etc.; reference to function ID) None

G. Required Monitoring None

H. Acceptance Criteria (referenced by function or mode ID)

1. Provided in footnote to test table above.

I. Sampling Strategy for Identical Units

1. Described in test table above.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230593 – 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 23 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:
 - a. 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.
 - b. 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.
 - c. 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.

- d. 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. S1.4 Specification For Sound Level Meters
 - b. S1.11 Specification 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230800 – COMMISSIONING OF HVAC

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The purpose of this section is to specify Division 23 responsibilities in the commissioning process.
- B. The systems to be commissioned are shown on the Drawings and noted in Section 230590 and Section 230593.
- C. Commissioning requires the participation of Division 23 to ensure that all systems are operating in a manner consistent with the Contract Documents. Division 23 shall be familiar with all parts of Division 01 and the commissioning plan issued by the CA and shall execute all commissioning responsibilities assigned to them in the Contract Documents.
- D. The commissioning process shall be performed in accordance with the latest Energy Code of New York State.
- E. An approved agency or design professional shall perform the commissioning. The Commissioning Agent shall not be affiliated with the Contractor.

1.02 RESPONSIBILITIES

- A. Mechanical, Controls and TAB Contractors. The commissioning responsibilities applicable to each of the mechanical, controls and TAB contractors of Division 23 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 230590 and Section 230593 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 specified to be commissioned. 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 23 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. 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 230900.
 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. Commissioning Team: The commissioning process will require cooperation of the Contractor, sub-contractors, vendors, Architect/ Engineer, Commissioning Agent, LEED Consultant (if applicable) and Owner.
- 1. The commissioning team shall be comprised of the following:
 - a. Contractor
 - 1) Project Manager
 - 2) Test Engineer
 - b. Subcontractors: As appropriate to product or system being commissioned.
 - c. Commissioning Agent
 - 1) Project Manager
 - 2) Project Engineers
 - d. Owner's Representative(s)
 - e. LEED Consultant (if applicable)
 - f. Architect/ Engineer
 - 1) Architect
 - 2) MEP Engineers

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. Division 23 shall provide all test equipment necessary to fulfill the testing requirements of this Division.

PART 3 - EXECUTION

3.01 SUBMITTALS

- A. Division 23 shall provide submittal documentation relative to commissioning as required in this Section Part 1, Section 013300.

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 Section 230590 and Section 230593. Division 23 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 1.02 above.

3.04 PRE-FUNCTIONAL CHECKLIST

- A. A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the Commissioning Agent to the contractor. Pre-functional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some pre-functional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The word "pre-functional" refers to before functional testing. Pre-functional checklists augment and are combined with the manufacturer's start-up checklist.

3.05 FUNCTIONAL PERFORMANCE TESTS

- A. Test the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The Commissioning Agent develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. Functional Performance Tests are performed after pre-functional checklists and startup are complete.

3.06 DEFICIENCY REPORT AND RESOLUTION RECORD

- A. Deficiency Report and Resolution Record: Document items of non-compliance in materials, installation, or operation.
- B. Non-Conformance. Non-conformance and deficiencies observed shall be addressed immediately, in terms of notification to responsible parties, and providing recommended actions to correct deficiencies.
 - 1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the Commissioning Agent. In such cases the deficiency and resolution shall be documented on the procedure form.
 - 2. For identified deficiencies:
 - a. If there is no dispute on the deficiency and the responsibility to correct it:
 - 1) The Commissioning Agent documents the deficiency and the adjustments or alterations required to correct it. The contractor corrects the deficiency and notifies the Commissioning Agent that the equipment is ready to be retested.
 - 2) The Commissioning Agent reschedules the test and the test is repeated.
 - b. If there is a dispute about a deficiency or who is responsible:
 - 1) The deficiency is documented on the non-compliance form and a copy given to the Consultant.
 - 2) Resolutions are made at the lowest management level possible. Additional parties are brought into the discussions as needed. Contractor shall have responsibility for resolving construction deficiencies. If a design revision is deemed necessary and approved by Owner, Architect/Engineer shall have responsibility for providing design revision.
 - 3) The Commissioning Agent documents the resolution process.
 - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and notifies the Commissioning Agent that the equipment is ready to be retested. The Commissioning Agent reschedules the test and the test is repeated until satisfactory performance is achieved.
 - 3. Cost of Retesting: Costs for retesting shall be charged to the Contractor.

3.07 FINAL COMMISSIONING REPORTS

- A. Two copies of the final commissioning reports must be provided to the engineer of record and owner.
- B. Division 23 shall compile and prepare documentation for all equipment and systems covered in the O&M manuals, according to this section prior to the training of owner personnel.
- C. The components of the Commissioning Report shall include the following and are defined as follows:
 - 1. Executive summary of process and results of commissioning – including observations, conclusions and outstanding items.
 - 2. History of any system deficiencies and how resolved.
 - a. Include outstanding deficiencies and plans for resolution.
 - b. Include plans for seasonal testing scheduled for a later date.
 - 3. System performance test results and evaluations.
 - 4. Summary of training completed and scheduled.
 - 5. Attach commissioning process documents.

- a. Commissioning Plan
- b. OPR – Owner’s Project Goals
- c. BOD – Basis of Design
- d. Executed installation checklists
- e. Executed functional performance test compliance documents.
- f. Recommendations for end-of-warranty review activities.

3.08 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 23 shall compile and prepare documentation for all equipment and systems covered in Division 23 and deliver this documentation to the GC for inclusion in the O&M manuals, according to this section.
- 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.

3.07 TRAINING OF OWNER PERSONNEL

- A. Division 23 Contractor shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.
- B. The CA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.
- 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.
 - 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 latest Guideline 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.

<u>Hours</u>	<u>System</u>
<u>8</u>	Chillers and System
<u>8</u>	Boilers and System
<u>3</u>	Piping Systems
<u>4</u>	Chemical Treatment
<u>12</u>	Air Handler Units
<u>8</u>	VRF Systems
<u>12</u>	Rooftop Units
<u>4</u>	Heat Exchangers
<u>1</u>	Spot Unit Heaters
<u>2</u>	Air Terminal Units
<u>1</u>	Central Exhaust Systems
<u>2</u>	Supplementary Fans
<u>2</u>	Pumps
<u>16</u>	Controls System
<u>16</u>	Control system Follow-up
<u>4</u>	Humidifiers

- D. Temperature Controls Contractor. The Temperature Controls Contractor shall have the following training responsibilities:
 1. Provide the Commissioning Agent, Architect/ Engineer and CM with a training plan four weeks before the planned training.
 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:
 - a. 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.
 - b. 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:
 - 1) 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.
 - 2) 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.
 - 3) 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.
 - 4) Every screen shall be completely discussed, allowing time for questions.
 - 5) Use of keypad or plug-in laptop computer at the zone level.
 - 6) Use of remote access to the system via phone lines or networks.
 - a) Setting up and changing an air terminal unit controller.
 - b) Graphics generation
 - c) Point database entry and modifications
 - d) Understanding DDC field panel operating programming (when applicable)
 - c. 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. Discuss 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. Unforeseen Deferred Tests:

- 1. If a test cannot be completed due to the building structure, required occupancy condition, of other deficiency, the functional testing may be delayed upon recommendation of the Commissioning Agent and the approval of the Owner. These tests are conducted in the same manner as the seasonal tests as soon as possible.

B. Seasonal Testing:

- 1. Schedule, coordinate, observe and document additional testing for seasonal variation in operations and control strategies during the opposite season to verify performance of the HVAC system and controls. Complete testing during the warranty period to fully test all sequences of operation.

C. Update O&M manuals and Record Documents as necessary due to testing.

3.09 WRITTEN WORK PRODUCTS

- A. Written work products of Contractors will consist of the start-up and initial checkout plan and the filled out start-up, initial checkout and construction checklists.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 233000 – AIR DISTRIBUTION

PART 1 – GENERAL

1.01 GENERAL

- A. Construct all apparatus of materials suitable for the conditions encountered during operation.
- B. Where corrosion can occur, appropriate corrosion-resistant materials and assembly methods must be used including isolation of dissimilar metals against galvanic interaction.
- C. All factory applied acoustical and thermal insulation, including facing and adhesives, it to be fire-resistant and to conform to requirements of NBFU and State Codes.
- D. Where in contact with the air stream, protect insulation against erosion or flaking by a factory applied plastic or mat facing.
- E. Locate and arrange motors, eliminators, filters, cooling and heating coils, and other components and accessories so that they are accessible for repair, maintenance, and replacement.
- F. Mount grease fitting directly on bearings unless the latter are not readily accessible. Where equipment bearings are not visible or are inaccessible, provide easily accessible extensions to bearing lubrication fittings.
- G. Thoroughly clean the entire system before installing filters or operating the fans.
- H. On systems containing filters, install filters and permanently seal the filter frames airtight before operating the fans. The Contractor, at his own expense, shall replace all dirty filters before turning over the system to the Owner, and furnish the Owner with one complete set of replacement filters for all banks. Seal all outlets around the edges to prevent air leakage.
- I. Bracing and supports indicated are the minimum acceptable. Install additional bracing or supports to eliminate any distortion or vibration when the systems are operating or under tests.
- J. Install ducts, castings, and hangers plumb and level, with joints square and devoid of sharp edges.
- K. Unless otherwise specified, construct all duct work, including angles, bars, and other bracings, hangers, supports, and accessories of galvanized steel, all in accordance with schedules in the latest ASHRAE Guide.
- L. Diffusers, grilles, registers, and transfers shall be sized and located as shown on the drawings.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 233113 – 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:

<u>Service</u>	<u>Material</u>	<u>Pressure Class</u>	<u>Velocity</u>
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 23 insulation sections, and is not included as work of this section.
- E. Duct accessories are specified in Division 23 Section and are included as work of this section.
- F. Inlets and outlets are specified in Division 23 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 01.

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.

B. 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:
 - 2. Ward.
 - 3. Ductmate.
 - 4. United McGill.
 - 5. 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 23 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.

3.05 BALANCING

- A. Refer to Division 23 Section 230593 "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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 233300 – 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.
- B. Provide fusible links 165 degrees F., vibration proof and secured with clinched "S" hooks or stainless steel bolts and lock nuts.
- C. Smoke Dampers: Conform to UL, fit with control shafts for operation by electric or pneumatic motors. Provide a 165 degrees F thermal link.
- D. Access Doors: Provide adjacent to all fire and smoke dampers.
- E. 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 23.
- 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 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 233400 – FANS

PART 1 – GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Extent of fan work is indicated on Drawings and Schedules, and by requirements of this section.
- B. Types of fans required for this project include the following:
 - 1. Centrifugal fans
- C. Vibration isolation required for fans is specified in other Division 23 sections, and is included as work of this section.
- D. Refer to Division 26 sections for wiring work, not work of this section.

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), furnished accessories, motor efficiencies, installation and start-up instructions.
- B. Shop Drawings: Submit shop drawings showing unit dimensions, details, method of assembly of components, and field connection details.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply and control wiring to equipment. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- D. Maintenance Data: Submit maintenance data and parts list for each type of equipment, and accessory. Include this data and product data in maintenance manual, in accordance with Division 01 requirements.

1.03 QUALITY ASSURANCE

- A. Provide fans which have been tested and rated in accordance with AMCA Standards and bear AMCA Certified Rating Seal.
- B. Provide fans which have been listed and labeled by UL.
- C. Provide motors and electrical accessories complying with NEMA Standards, and complying with NEC Code for workmanship and installation requirements.
- D. The manufacturer shall guarantee the fan to deliver the full quantity of air specified under the conditions stipulated without excessive vibration and with low noise level. Fans to have AMCA certified ratings based on tests made in accordance with AMCA Standard 210 and bear the UL label.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver fans with factory installed shipping skids and lifting lugs, pack components in factory fabricated protective containers.

- B. Handle fans carefully to prevent damage to components and finish. Do not install damaged components.
- C. Protect components from weather, dirt, construction traffic, etc.

PART 2 - PRODUCTS

2.01 CENTRIFUGAL FANS

- A. General: Provide centrifugal fans of size, type, arrangement and capacity as scheduled on Drawings, and as specified herein.
- B. Ratings: Test and rate fans in accordance with ASHRAE Standard 51 (AMCA Standard 210). Provide fans bearing AMCA Certified Ratings Seal.
- C. Fan Units: Provide factory assembled and tested fan units consisting of housing, wheel, fan shaft, bearings, vibration isolators, and side support structure. Clean, condition, and prime paint sheet metal parts prior to final assembly.
- D. Housings: Provide curved scroll housings, lockseam construction for sizes 24 inches to 40 inches, spot welded construction for sizes 44 inches to 60 inches, and continuous weld construction for sizes 66 inches and larger. Provide horizontally split housings, bolted together for sizes 66 inches and larger. Provide spun inlet cones and duct connections.
- E. Wheels: Provide BI / FC / Airfoil type blades (see schedule on drawings). Weld blades to wheel rim and hub plate. Key wheels to shafts. True and dynamically balance wheels after assembly.
- F. Shafts: Construct of AISI C 1040 or C 1045 solid hot rolled steel, turned and polished.
- G. Bearings: Provide heavy duty, grease lubricated, precision anti-friction ball or roller, self-aligning, pillow block type bearings selected for minimum average life (AFBMA L 50) of 100,000 hours.
- H. Motors
 - 1. Motor characteristics: Except where more stringent requirements are indicated, comply with the following requirements for motors:
 - a. Temperature rating: Rated for 40 degrees C environment with maximum 50 degrees C temperature rise for continuous duty at full load (Class A Insulation).
 - b. Starting capability: Provide each motor capable of making starts as frequently as indicated by automatic control system, and not less than 5 starts per hour for manually controlled motors.
 - c. Phases and current characteristics: Provide motors as scheduled; squirrel-cage induction polyphase motors for 1/2 hp and larger, and provide capacitor-start single-phase motors for 1/3 hp and smaller, except 1/6 hp and smaller may, at equipment manufacturer's option, be split phase type. Do not purchase motors until power characteristics available at locations of motors have been confirmed, and until rotation directions have been confirmed.
 - d. Service factor: 1.15 for polyphase motors and 1.35 for single-phase motors. All motors shall be premium efficiency type, in conformance with LIPA commercial energy rebate program.

- e. Motor construction: Provide general purpose, continuous duty motors, Design "B", except "C" where required for high starting torque.
 - 1) Bearings: Ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed where motor is normally inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, provide bearings designed to resist thrust loading.
 - 2) Enclosure type: Except as otherwise indicated, provide totally enclosed, fan cooled (TEFC) motors for indoor use. Provide weather protected Type I for outdoor use.
 - 3) Efficiency: Provide premium efficiency motors with efficiency as required to conform with current LIPA commercial energy rebate standards.
- f. Name plate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information.
- I. Drives: Provide V-belt drive, selected for 1.4 service factor. Provide adjustable pitch sheave, selected for midpoint at design conditions.
- J. Accessories: Provide the accessories as indicated on the schedule on the project drawings.
- K. Manufacturer: Subject to compliance with requirements, provide centrifugal fans of one of the following:
 - 1. Carnes Company Inc.
 - 2. Greenheck Fan Corp.
 - 3. Twin City Fan Corp.

PART 3 - EXECUTION

3.01 INSPECTION

- A. General: Examine areas and conditions under which fans are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF FANS

- A. General: Except as otherwise indicated or specified, install fans in accordance with manufacturer's installation instructions and recognized industry practices to ensure that fans serve their intended function.
- B. Coordinate with other work of as necessary for proper interfacing.
- C. Electrical Wiring: Ensure fans are wired properly, with rotation in intended direction for proper performance. Furnish copy of manufacturer's wiring diagram submittal to electrical installer.

3.03 FIELD QUALITY CONTROL

- A. Testing: After installation of fans has been completed, test each fan to demonstrate proper operation of units at performance requirements specified. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

3.04 SPARE PARTS

- A. General: Furnish to Owner, with receipt, one spare set of belts for each belt driven item.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 233713 – 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 drawings.
 - 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 26 – ELECTRICAL

SECTION 260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes general, procedural, and administrative requirements, for electrical products, equipment, and installation practices applicable to this Division.

1.02 RELATED DOCUMENTS

- A. All Contract drawings, Contract General and Supplementary Conditions, Division 01 Specification Sections, and Bidding Requirements apply to this section.
- B. The requirements of this section shall apply to all other sections of Division 26.
- C. The general electrical requirements of this division shall also apply to:
 - 1. Division 23 – Heating, Ventilating and Air Conditioning
 - 2. Division 27 – Communications
 - 3. Division 28 – Electronic Safety and Security

1.03 SCOPE OF WORK

- A. It is the declared intent of the project drawings and these specifications that the contractor shall provide for the complete installation of operational electrical circuits and systems as outlined in the project documents.
- B. The Electrical Contractor shall provide all materials, equipment, labor, transportation, storage, etc., as necessary for, and incidental to, the completion of all electrical work as indicated on the Drawings and in these Specifications.
- C. Included in the above is all related electrical demolition activities, temporary electrical facilities to support the work, final testing, adjusting training as applicable.
- D. Before submitting his proposal, the Electrical 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.

1.04 USE AND INTERPRETATION OF DRAWINGS

- A. The drawings are intended to be diagrammatic in nature and are for general electrical design and arrangement of circuits and components. Drawings do not detail every component of the electrical work, nor do they detail complete routing paths. Unless otherwise noted, the locations and elevations of electrical system components are approximate. Exact final locations are subject to the approval of the Owner's Representative. Additional minor adjustments may also be required to avoid conflicts with furniture or other obstructions or field conditions. Similarly, the routing of services, feeders, branch circuits, system wiring, as indicated on the drawings, is not intended to be the exact routing. Verify routing with Owner's Representative.
- B. Unless specifically noted otherwise, branch circuit designations, i.e. "home run" designations, are for grouping purposes only to indicate the panelboard or interconnection box from which the branch circuit is served. Actual panel pole circuit numbers are to be determined in the field.

- C. Drawings do not show all offsets, fittings, supports, pull or splice interferences, and elevation changes. Adjust installation of conduit, equipment location, etc. to accommodate work with the obstacles and interferences. Where a major and important rearrangement is necessary, report same to Architect for review. Obtain written approval for all major changes.
- D. Cooperate with all other Contractors and Owners and determine the exact route of all raceways and location of all equipment the Drawings are diagrammatic and indicate the general arrangement of systems and equipment unless indicated otherwise by dimensions or details. Install work substantially as indicated. Exact equipment locations and raceway routing, etc. shall be governed by actual field conditions and/or instructions of the Engineer and/or Owner's Representative.
- E. During the course of the work, should any ambiguities or discrepancies be found on the drawings or in the specifications, to which the Contractor has failed call attention before submission of his bid, then 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, with the exception the more stringent requirement shall prevail, 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.

1.05 COMPLETE SYSTEMS

- A. The drawings and specifications are intended to provide for a complete, operational electrical installation. However, both the drawings and specifications are for the Electrical Contractor's guidance and are in no way 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 Electrical Contractor shall furnish, install, and place in workmanlike manner all equipment, accessories, supports, fittings, backboxes and all other material needed for a complete electrical and operational installation. The Electrical Contractor shall make all final connections to equipment. The Electrical Contractor shall prepare such additional drawings as necessary or required for any purpose and shall submit them for the approval of the Engineer.

1.06 APPLICABLE CODES, STANDARDS AND REGULATIONS

- A. Comply with NFPA 70 (National Electrical Code (NEC)), version currently adopted by the Authority Having Jurisdiction (AHJ). Comply with NECA (National Electrical Contractor's Association) Standards for minimum professional installation methods and practices. Comply with all applicable federal, state and local laws, ordinances, codes, rules and regulations. Where the Contract Documents exceed these requirements, the Contract Documents shall govern. In no case shall work be installed contrary to or below minimum legal standards. Comply with local authorities having jurisdiction (AHJ) and resolve any conflicts. Where conflicts between codes and standards arise, the more stringent requirements shall be adhered to.
- B. The current applicable rules, restrictions and requirements of the utility companies providing service to the project site/facilities shall be adhered to. Provide all required coordination.
- C. Should any materials installed, or work performed, be found to be not in compliance with any of the listed codes and regulations, provide all materials, labor, and pay all costs necessary to correct the deficiencies at no additional cost.

1.07 REFERENCE CODES & STANDARDS

- A. All work shall be in accordance with:

1. New York State Uniform Fire and Prevention Codes and Supplements (latest editions in effect at time of bid):
 - a. New York State Building Code
 - b. New York State Existing Building Code
 - c. New York State Energy Conservation Code
 - d. New York State Fire Code

2. The latest editions at time of bid (unless otherwise noted) of the below standards of the following:
 - a. ADA Americans with Disabilities Act
 - b. ASA American Standards Association
 - c. ASTM American Society for Testing Materials
 - d. ETL Electrical Testing Laboratories, Inc
 - e. IES Illuminating Engineering Society of North America.
 - f. IEEE Institute of Electrical and Electronic Engineers
 - g. IPCEA Insulated Power Cable for Engineers Association
 - h. OSHA Occupational Safety and Health Act
 - i. NEC National Electric Code (2017)
 - j. NECA National Electrical Contractor's Association
 - k. NEMA National Electrical Manufacturers Association
 - l. NESC National Electrical Safety Code
 - m. NFPA National Fire Protection Association
 - n. UL Underwriter's Laboratories

3. Listings: All equipment, materials and devices shall be listed and labelled by a Nationally recognized Testing Laboratory (NRTL), such as Underwriters Laboratories, Inc (UL) for the intended use and shall bear its label.

4. The Rules and Regulations of the local utilities providing service to the project location.

5. The Rules and Regulations of the local Authority Having Jurisdiction (AHJ).

6. The Directives of the Owner of the Facility where the work is being performed.

- B. Before submitting his bid, the Electrical Contractor shall be familiar with the rules of the aforementioned Boards, Departments, Agencies, etc. having jurisdiction, applicable Codes. and shall notify the Engineer with his bid, if in his opinion any work or materials specified is contrary to any such rules. Otherwise, the Electrical 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.

1.08 DEFINITIONS

As Specified	All materials, equipment including the execution thereof as called for/shown in the Contract Documents.
Code Requirements	Minimum requirements necessary for compliance with applicable codes.
Concealed	Work not readily visible, including, but not limited to that which is inside walls, above ceilings, below or within slabs, below grade, within pipe and duct shafts chases or recesses.
Exposed	Work readily visible, including, but not limited to, that which is installed on wall/ceiling surfaces, below ceilings, etc. or otherwise not concealed.

Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnished by Others	Materials, equipment provided by others received and/or installed by the Electrical Contractor. It includes receiving delivery at job site.
Inspection	Visual observations by Owner, his Site Representative, Architect/Engineer, or another Agency.
Install	All labor and materials necessary, and incidental to, the mount or place equipment, etc., completely connect and make operational.
Labeled	Classification by a standards agency.
Provide	Furnish and install complete and operational.
Relocate	Disconnect, disassemble, and transport equipment to new locations, then clean, install and test and make ready for use. All necessary wiring and raceway extensions shall be considered incidental to the relocation process.
Remove	Disconnect, disassemble, dismount and dispose of off-site, including all associated appurtenances, wiring and raceway rendered unnecessary by the removal.
Reinstall	All labor and materials necessary, and incidental to, mount or place previously removed equipment at or near its pre-existing location. Clean completely connect and make operational. Includes minor wiring rework necessary.
Remove	Disconnect, disassemble and dispose. Includes demolition of associated wiring and conduit rendered unnecessary by removal of subject item.
Replace	Remove and provide new item.
Review	A general contractual conformance check of specified products.
Roughing	Conduit, backboxes etc. pursuant to equipment layout and installation.
Safe Off	De-energize, disconnect and make safe for removal or other work in the area by the Electrical Contractor or by Others.
Satisfactory	In conformance with and as specified in Contract Documents.
Site Representative	Owner's designated Construction Manager or Inspector at the work site.

1.09 EXISTING CONDITIONS

- A. The Electrical 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 Architect/Engineer, in writing, prior to 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 written notice had been filed by the Electrical Contractor with his bid.
- B. Where existing electrical systems of any voltage or purpose, or portions thereof, are to be re-used or modified, the Electrical Contractor shall test the affected portions for the purpose of identifying

pre-existing operational deficiencies. This shall include, but is not limited to, fire alarm, public address, security, CCTV, etc. Report any deficiencies, in writing, to the Owner or his designated representative. Deficiencies occurring after testing, not previously identified, shall be considered as a result of Contractor activities and shall be restored to working condition at no additional cost. If the Owner requests any of the pre-existing deficiencies be corrected by the Contractor, these shall be addressed at additional contract cost.

1.10 PERMITS, INSPECTIONS AND CERTIFICATES

- A. The Electrical Contractor shall procure and pay for all necessary drawings, permits, inspections and certificates required by the various governing agencies, etc. having jurisdiction or utilities providing service as part of the bid and shall turn over to the Engineer all permits for construction before starting work and certificates of test, inspection, and approval before requesting payment.
- B. Included in the above, the Electrical Contractor shall obtain a Certificate of Electrical Inspection for completed work from an approved third-party electrical inspection agency serving the project locale.

1.11 QUALITY ASSURANCE

- A. The Electrical Contractor shall be regularly engaged in the production or installation of specified products, and systems for not less than three years.
- B. All work under this Division shall be performed by a licensed electrician or done so under his direct supervision.
- C. All painting, patching, concrete work, carpentry, welding, core drilling, etc. incidental to the completion of Division 26 work shall be performed by skilled tradespersons appropriate to the work.

1.12 SUBMITTALS

- A. Within 30 days of the signing of the contract, prepare and submit for approval, per the procedures set forth in Division 01, all submittals required by Division 01, this Division and by all other Contract Documents.
- B. Required submittals may include, but not be limited to: Schedule of Values; Subcontractor List(s); Product Data; Shop Drawings; Test Reports; Calculations, Photometric Analysis, Certifications; Warranties; Operation & Maintenance Manuals; Record Drawings and various administrative submittals. Provide samples or mock-ups upon request at no additional cost.
- C. The number of copies submitted shall be as indicated in Division 01, or elsewhere in the Specifications or Contract Drawings. Electronic (.pdf or similar) may be submitted in lieu of hardcopies where permitted. Generally, all equipment and materials of the same classification, type or kind shall be submitted at one time.
- D. For materials, devices, equipment, etc. to be installed, as required in subsequent individual Division 26 sections, submit product data consisting of manufacturer's standard catalog cuts, descriptive literature and/or diagrams, etc. Submittals shall be provided in sufficient detail so as to clearly indicate compliance with all specified requirements and standards. Documents shall be clearly marked to indicate proposed product, selected options, selected accessories, selected finishes, etc. Please clearly indicate any equipment tags for each item as indicated on Drawings for correlation.
- E. For systems and equipment, as required in subsequent individual Divisions 26 sections provide project specific Shop Drawings which shall include all information listed in the Shop Drawings submittal requirements in the respective specification section. Include all pertinent information including, but not limited to, equipment/system identification, manufacturer/model, nameplate data,

dimensions, sizes, capacities, types, material, accessories and options, etc. Include any relevant performance data, system risers, wiring diagrams, etc. The documents provided shall be in sufficient detail so as to clearly indicate compliance with all project requirements and standards.

- F. Any construction delays caused by failure to submit shop drawings on time or in the proper format shall be the responsibility of the Electrical Contractor.
- G. Substitutions: Where products or materials are specified hereinafter by manufacturer's name and/or model number, 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 in lieu of the specified product with the understanding that the Engineer shall be the sole judge as to the equality to the specified item and acceptability of the submitted 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 item and/or intended substitute equipment, fixtures, etc. for their comparison and selection. Furnish any additional requested product information, calculations, etc. at no additional cost. Submission of substituted items is with the understanding that neither the Engineer nor the Owner is responsible for any delays or additional costs arising from review, acceptance, denial of said substituted item. Furthermore, any additional costs in material, labor, etc. or delays relating to the installation of substituted item shall be at no additional cost to the Engineer or Owner.

1.13 GUARANTEE

- A. For guarantee requirements, refer to the applicable section of the Conditions of the Contract.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Except where existing materials and equipment are called for to be reused, all materials and equipment furnished and installed under Division 26 shall be new, of standard first grade quality, undamaged, defect-free, 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.
- B. 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 nationally recognized rating bureau.
- C. Where specific devices, equipment, systems (or portions thereof) are indicated to be re-used, the Electrical Contractor, in the presence the Owner or his representative, shall verify proper operation of same prior to commencing work. Report any pre-existing defects or non-functioning items to the Engineer/Architect. The Electrical Contractor shall be held responsible for correcting and/or replacing any unreported items found to be defective up until Owner Acceptance at no additional cost.
- D. 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.
- E. 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.

2.02 NEW CIRCUIT BREAKERS INSTALLED IN EXISTING PANELBOARDS

- A. New circuit breakers installed in existing panelboards shall be listed for use in the intended panelboard.
- B. The new circuit breaker's interrupting rating shall meet or exceed the interrupting rating of the intended panelboard.

PART 3 – EXECUTION

3.01 GENERAL

- A. The electrical installation work shall be in accordance with the intent of the Contract Documents, and applicable Codes and Standards, and manufacturer' as determined by the Engineer.
- B. All materials and equipment shall be installed as in accordance with manufacturer's instructions, by mechanics experienced and skilled in their trade, in a neat and professional manner, in accordance with trade standards, and so as not to void any warranty or UL listing.
- C. Any workmanship considered by the Architect/Engineer as being faulty or substandard shall be removed and replaced by the Contractor to the satisfaction of the Architect/Engineer at no additional cost to the Owner.
- D. All work under the electrical contract shall be performed under the Contractor's direct supervision. Provide sufficient and qualified personnel necessary to complete the work in accordance with the Contract Documents and in accordance with the project schedule.
- E. Prior to installation, examine the areas and conditions under which the work is to be performed. Identify any conditions which will impact the proper and timely completion of the work. Do not proceed until the impacting conditions have been corrected.
- F. Install electrical raceways, wiring and systems parallel and perpendicular to building surfaces and components to the extent possible. Equipment, boxes, etc. shall be installed level and plumb.
- G. In general, run branch circuits in concealed above dropped ceilings, in furred walls, in voids and chases. All devices, conduits, wiring and conduits shall be recessed in new construction. In existing unfinished areas, such as mechanical spaces and storage areas wiring may be run exposed. In existing finished and public spaces where wiring cannot be practically concealed, such as block surfaces, wiring may be run in finished surface raceways secured using mechanically fastened clips.
- H. Unless otherwise indicated, provide final connections to all equipment, in accordance with manufacturer's instructions.

3.02 SAFE WORK PRACTICES

- A. To the greatest extent possible, all electrical work shall be performed on de-energized material and equipment using appropriate lock-out/tag-out procedures per OSHA requirements.
- B. Work on energized systems shall be approved by the Owner's representative. All persons working on energized equipment shall wear appropriate personal protective equipment (PPE) following safe work practices and the latest version of NFPA 70E. A minimum of two people is required to be working to ensure the safety of each.

3.03 DELIVERY, STORAGE AND HANDLING OF MATERIALS

- A. Comply with Division 01 requirements.
- B. The Contractor shall arrange with the Owner for storage of delivered materials related to the work. Where the Owner cannot provide safe, adequate, or sufficient space, provide off-site storage or, with owner approval, arrange and pay for sufficient secure on-site storage container(s). Locations of storage containers shall be coordinated with the Owner.
- C. The Electrical Contractor shall be responsible for coordinating, off-loading, receiving and storing all deliveries related to the work. Coordinate all haul routes and schedules with the Owner or Construction Manager.
- D. Products shall be delivered in manufacturer's original unopened packaging, with manufacturer's identification and product labelling.
- E. Products shall be stored in a manner which shall protect them from theft, damage, weather and entry of debris. Comply with all manufacturer's written storage recommendations.
- F. Promptly inspect delivered goods for damage and deficiencies. Arrange for their prompt replacement or removal from the site. Do not install damaged products.

3.04 COORDINATION AND COOPERATION

- A. The work called for in the Contract Drawings Specifications shall be carried on in conjunction with the continued operation of the building. The work shall be arranged such that its installation and operation will conform with and facilitate the early installation of the work.
- B. The Electrical 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 building's operation.
- C. Unless otherwise stated in the Contract Drawings, all outages to building systems will occur when the building is not in use. The Electrical Contractor shall include all premium time charges in the bid.
- D. The Electrical Contractor shall be responsible for the distribution and information concerning his work as required for the prompt installation. The Electrical Contractor will be held fully responsible for any delay in the work resulting from failure to distribute any information, etc. regarding his work as required. See also the applicable sections of the Conditions of the Contract.
- E. The Electrical Contractor shall coordinate and cooperate with the Contractors of other trades, Subcontractors, outside agencies, and with the Owner regarding placement, anchorage and accomplishment of the work. Resolve interferences between work of other disciplines or Contractors, prior to commencing installation.
- F. Coordinate with other trades for all demolition activities. Provide mark-outs for items to be demolished by others. De-energize and safe off circuits in demolition areas as required for a safe work area.
- G. Coordinate with other trades and with Owner for chases, slots and openings during the project as required to complete the installation of the electrical work in timely manner.
- H. Coordinate with other trades in scheduling all installation activities with the overall goal of completion of the project in a timely manner.

- I. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- J. During the installation of equipment and raceways, provide any offsets, fittings, boxes, accessories to achieve changes in elevation or location as necessary to avoid obstacles and interferences, per actual field conditions.
- K. Piping or other systems which are dependent upon slope have the right of way.
- L. Provide temporary dust caps on smoke detectors in the work area as necessary to prevent false alarms. Remove when no longer required.

3.05 SHUTDOWNS

- A. In accordance with the General Conditions, all shutdowns to existing electrical services are to be scheduled and approved, in advance, in writing, by the Owner. Unless otherwise noted, assume all temporary shutdowns to be performed while the building is not in operation. Include all premium time in bid. Include any applicable utility shutdown fees in bid.

3.06 DIMENSIONING

- A. Refer to architectural or other dimensioned drawings. However, field measurements take precedence over dimensioned drawings. Do not scale drawings.

3.07 PROTECTION OF THE WORK

- A. The Electrical Contractor shall effectively protect, at his expense, all materials and equipment, including his employees and building occupants, during the period of construction and 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 Contractor. Protect all electrical materials, equipment and work from the vandalism, weather elements, theft, paint overspray, concrete and mortar, construction debris and damage, etc. until acceptance by the Owner. Repair, replace and clean all electrical work so affected at no additional cost to the Contract.

3.08 CUTTING AND PATCHING

- A. All cutting, core drilling, etc. required to facilitate the proper installation of all work to be installed under Electrical ids the responsibility of the Electrical Contractor, unless indicated otherwise. 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.
- B. All penetrations to exterior walls and below grade foundations shall be made through sleeves provided by the Electrical Contractor and thoroughly sealed and caulked airtight and watertight.
- C. Roof penetrations shall be performed via approved roof curbs, pitch pockets, pipe portals etc. Unless otherwise indicated, provide all required materials and labor to perform the penetration and subsequent repair. All penetrations shall be repaired and sealed airtight and watertight in accordance with existing roof warranties and roof manufacturer directions. In no case shall any roof penetration or repairs violate existing warranties.
- D. Provide all new patching work to match existing conditions.

3.09 WATERPROOFING

- A. Wherever any of the work of Division 26 must pierce any waterproofing, this work shall be done by the Electrical Contractor with care. 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 watertight as approved by the Architect and/or as hereinafter specified.
- B. Conduits piercing the cement waterproofing of walls and 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, non-fire-rated walls and floors shall be grouted, caulked with oakum, and sealed with approved semi-plastic mastic compound on both sides of the wall.
- D. All roof penetrations shall be performed in a manner to obtain watertight seal and in conformance with existing roof warranties. Unless provided by others, provide pitch pockets, pipe portals or other means consistent with existing roof warranties for any roof penetrations. Coordinate penetrations for rooftop HVAC equipment with the Mechanical Contractor.

3.10 FIRESTOPPING

- A. Provide and apply listed firestopping materials to penetrations of fire-rated floor and wall assemblies for electrical installation. Firestopping shall restore original fire-resistance rating of assembly or better. Firestopping materials and installation requirements are specified in Section 078413 – Penetration Firestopping.

3.11 CEILING REMOVALS

- A. Unless otherwise noted in the contract Documents, existing ceilings which must be removed for the Electrical Contractor's installation or demolition work shall be done by the Electrical Contractor. No ceiling shall be removed without prior approval of the Owner. When directed by the Owner or Owner's Representative, removed ceilings shall be restored at the end of each working day. Ceilings which must be removed shall be restored to their original condition as soon as practical and prior to final payment.
- B. Store any removed ceiling tiles either in the ceiling space or at a designated space in the building until re-installation.
- C. Take all necessary precautions to prevent damage to the existing ceilings.
- D. Replace Contractor damaged ceiling tiles with new ceiling construction to match the existing and to the Owner's satisfaction.
- E. Coordinate with other trades when ceiling related work must be performed in common work areas.
- F. In areas with pre-existing ceiling damage, coordinate with the Owner's representative to document said damage, and determine if the Owner wishes to provide replacement ceiling materials for re-installation.

3.12 PHASE ROTATIONS

- A. The Electrical contractor is responsible to verify and maintain facility phase rotations throughout.

3.13 PAINTING AND FINISHING

- A. Where final painting and finishes are not being provided by other trades, provide all priming and painting to cuts and patches performed under this Contract in finished areas to match existing conditions.
- B. Provide matching painting and patching for surfaces in finished areas at locations of Electrical demolition and/or removals.
- C. Provide matching painting and patching to building surfaces damaged as result of Electrical installation work.
- D. Provide touch up painting to equipment furnished under this contract.
- E. All painting materials shall conform to paint specifications elsewhere in the Contract Documents, or in the absence of same, shall be suitable for the surfaces and environments used. In no case shall lead based paints be used.

3.14 CHECKOUT, TESTING AND ADJUSTING

- A. Provide all required programming, integration and adjustments, tune-ups. etc. as required to bring the equipment or system up to fully operational condition.
- B. 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 Electrical Contractor. Furnish all labor, material, and instruments for each test. All major tests shall be witnessed by the Engineer. Owner's representative and/or the Authority having jurisdiction, all of whom shall be given a minimum of one week's written notice prior to such tests.
- C. Tests shall be scheduled at least one week in advance and at a time so as not to disrupt building operation, and to allow Engineer and Owner representative(s) the opportunity to witness the test, unless directed otherwise. Tests shall not be scheduled until the system installation is complete and fully operational, unless indicated or otherwise directed.
- D. Where required by subsequent specification sections or by the manufacturer, arrange for and pay all costs for manufacturer's authorized representative(s) to be present at time of system or equipment start-up. The manufacturer's representative shall provide system integration and programming, start-up supervision, conduct and/or certify all required testing and adjusting, and provide any required training to the end user.
- E. Coordinate with the Owner or his designated representative where Owner preferences or input is required for system setup.
- F. Submit test reports neatly typewritten on 8-1/2 x 11" sheets indicating system or equipment being tested, date, and time of test, testing methodology, witnesses, testing results and any other pertinent information. Within five (5) days of test completion, submit written or electronic (PDF) copy of test reports for Engineer review, and include a copy with the appropriate operation and maintenance data.
- G. At no additional cost, the Electrical Contractor shall correct any deficiencies found, and replace any defective materials and equipment or unable to perform at design or rated capacity. Repeat testing without additional cost to the Owner or Contract until satisfactory results are achieved. Submit final report indicating any corrective measures taken and satisfactory test results.

3.15 FINAL INSPECTIONS

- A. Coordinate and obtain all final inspections as required by these specifications and as required by the Authority Having Jurisdiction. Obtain electrical inspection certificate from an authorized Electrical Inspection Agency. Include all costs in bid. Provide all inspection reports and Inspection certificates as part of closeout documents.

3.16 SYSTEMS DEMONSTRATION

- A. The Electrical Contractor shall be fully responsible for instructing the Owner's designated personnel in the operation and maintenance of all equipment and systems furnished under the Contract. All costs required for such instruction and demonstration shall be paid for by the Electrical Contractor. Such instruction shall take place in the presence of the Owner's representative upon completion of the work. The Owner reserve the right to record any training sessions. Furnish for Owner 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.

3.17 CLEANING

- A. Perform cleaning in accordance with Division 01.
- B. Maintain a clean work site. Remove from the premises, all packaging / shipping materials, waste, rubbish and construction debris. The premises shall be left clean and free of any debris and unused construction materials prior to final acceptance. Leave the area broom clean.
- C. Clean all electrical equipment enclosures of dirt, dust, wire cuttings and other foreign materials.
- D. Clean all light fixtures, lenses, reflectors and lamps of dirt, dust, fingermarks etc. Adjust lenses for proper fit.
- E. Remove all temporary dust caps from fire alarm devices.
- F. Provide touch-up painting to restore and refinish to match original condition surfaces of electrical equipment scratched, marred during shipping, handling or installation. Remove any rust and prime and paint as recommended by manufacturer. Pay particular attention to equipment installed outdoors in areas of harsh environment.

3.18 RECORD DOCUMENTS

- A. Prior to final payment, submit Close Out Documentation in accordance with Division 01.
- B. As-Built record drawings shall document installed locations of equipment, panelboards, disconnect switches and control devices. Document the approximate as-built routing of major feeders and underground conduit runs.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260519 – LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.01 SUBMITTALS

- A. Product Data: Manufacturer's standard catalog sheets, specifications, and installation instructions.

1.02 QUALITY ASSURANCE

- A. Electrical components, conductors, devices and accessories described herein shall be listed and labeled as defined by NFPA 70 by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), for the intended use and shall bear its label.

PART 2 - PRODUCTS

2.01 INSULATED CONDUCTORS AND CABLES

- A. Date of Manufacture: No insulated conductor more than one year old when delivered to the site will be acceptable.
- B. Acceptable Companies: General Cable Corporation., Cerro Wire & Cable Co. Inc., Prysmian Cables & Systems, or Southwire Co or equal.
- C. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor. Conductor sizes No. 8 and larger shall be stranded. Conductors No. 10 and smaller shall be solid. (Exception: For connections subject to vibration or where flexibility is otherwise required, equivalent stranded conductors may be substituted for solid).
- D. Types:
 - 1. Electric Light and Power Wiring:
 - a. Minimum conductor size is No. 12 AWG, unless indicated otherwise.
 - b. General: Rated 600V, NFPA 70 Type THHN/THWN-2 or XHHW-2.
 - c. Use of Non-Metallic Sheathed Cables (a/k/a 'Romex') Types 'NM', 'NMC', 'NMS', are NOT permitted; unless otherwise noted in the Contract Drawings
 - d. THHN/THWN-2 Gasoline and Oil Resistant: Polyvinylchloride insulation rated 600 V with nylon jacket conforming to UL requirements for type THHN/THWN-2 insulation, with the words "GASOLINE AND OIL RESISTANT II" marked thereon.
 - e. USE-2: Dual rated heat and moisture resistant insulation rated 600 V with jacket or dual-purpose insulation/protective covering conforming to UL requirements for type USE-2 service entrance cables.
 - f. Metal-Clad Cable, NFPA 70 Article 330 Type MC:
 - 1) Interlocked flexible galvanized steel armor sheath, conforming to UL requirements for type MC metal clad cable. Aluminum armored type MC cable is NOT permitted.
 - 2) Insulated copper conductors, suitable for 600 volts, rated 90°C, one of the types listed in NFPA 70 Table 310.13(A) or of a type identified for use in Type MC cable.

- 3) Internal full size copper ground conductor with green insulation.
 - 4) Acceptable Companies: AFC Cable Systems Inc., Southwire, General Cable.
 - 5) Connectors for MC cable: AFC Fitting Inc.'s AFC Series, Arlington Industries Inc.'s Saddle grip, or Thomas & Betts Co.'s Tite-Bite with anti-short bushings.
- g. MI: AFC Cable Systems' Type MI Cable, or Pentair Pyrotenax Mineral Insulated System 1850 Pyrotenax Cable:
- 1) Copper conductors.
 - 2) Seamless copper sheath.
 - 3) Two hour fire resistive rating UL system classified, listed in UL Building Materials Directory product category Electrical circuit Protective Systems (FHIT), or Fire Resistive Cables (FHJR).
 - 4) Fittings and accessories as required for a complete system to suit listing and installation conditions.
2. Class 1 Wiring:
- a. No. 18 and No. 16 AWG: Insulated copper conductors suitable for 600 volts, NFPA 70 types KF-2, KFF-2, PAFF, PF, PFF, PGF, PGFF, PTF, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF.
 - b. Larger than No. 16 AWG: Insulated copper conductors suitable for 600 volts, in compliance with NFPA 70 Article 310.
 - c. Conductor with other types and thickness of insulation may be used if listed for Class 1 circuit use.
3. Class 2 Wiring:
- a. Multiconductor Cables: NFPA 70 Article 725, Types CL2P, CL2R, CL2.
 - b. Other types of cables may be used in accordance with NFPA 70 Table 725.154(G) "Cable Substitutions", as approved.
4. Class 3 Wiring:
- a. Single Conductors No. 18 and No. 16 AWG: Same as Class 1 No. 18 and No. 16 AWG conductors except that:
 - 1) Conductors are also listed as CL3.
 - 2) Voltage rating not marked on cable except where cable has multiple listings and voltage marking is required for one or more of the listings.
 - b. Multiconductor Cables: NFPA 70 Article 725, Types CL3P, CL3R, CL3.
 - c. Other types of cables may be used in accordance with NFPA 70, Table 725.154(G) "Cable Substitutions", as approved.

2.02 CONNECTORS

A. General:

1. Connectors specified are part of a system. Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system.
2. Connectors shall be UL 486 A listed, or UL 486 B listed for combination dual rated copper/aluminum connectors (marked AL7CU for 75 degrees C rated circuits and AL9CU for 90 degrees C rated circuits).

3. Use of Split-Bolt type connectors is NOT permitted.
- B. Splices:
1. Spring Type:
 - a. Rated 105° C, 600V: Buchanan/Ideal Industries Inc.'s B-Cap, Electrical Products Div./3M's Scotchlok Type Y, R, G, B, O/B+, R/Y+, or B/G+, or Ideal Industries Inc.'s Wing Nuts or Wire Nuts.
 - b. Rated 150° C, 600V: Ideal Industries Inc.'s High Temperature Wire-Nut Model 73B, 59B or equal.
 2. Indent Type with Insulating Jacket:
 - a. Rated 105° C, 600V: Buchanan/Ideal Industries Inc.'s Crimp Connectors, Ideal Industries Inc.'s Crimp Connectors, Penn-Union Corp.'s Penn-Crimps, or Thomas & Betts Corp.'s STA-KON.
 3. Indent Type (Uninsulated): Anderson/Hubbell's Versa-Crimp or equal, VERSAtile, Blackburn/T&B Corp.'s Color-Coded Compression Connectors, Electrical Products Div./3M's Scotchlok 10000, 11000 Series, Burndy's Hydent, Penn-Union Corp.'s BCU, BBCU Series, or Thomas & Betts Corp.'s Compression Connectors or equal.
 4. Connector Blocks: NIS Industries Inc.'s Polaris System, or Thomas & Betts Corp.'s Blackburn AMT Series or equal.
 5. Resin Splice Kits: Electrical Products Div./3M's Scotchcast Brand Kit Nos. 82A Series, 82-B1 or 90-B1, or Scotchcast Brand Resin Pressure Splicing Method or equal.
 6. Heat Shrinkable Splices: Electrical Products Div./3M's ITCSN, Raychem Corp.'s Thermofit Type WCS, or Thomas & Betts Corp.'s SHRINK-KON Insulators or equal.
 7. Cold Shrink Splices: Electrical Products Div./3M's 8420 Series or equal.
- C. Gutter Taps: Anderson/Hubbell's GP/GT with GTC Series Covers, Blackburn/T&B Corp.'s H-Tap Type CF with Type C Covers, Burndy's Polytap KPU-AC, H-Crimpit Type YH with CF-FR Series Covers, ILSCO's GTA Series with GTC Series Covers, Ideal Industries Inc.'s Power-Connect GP, GT Series with GIC covers, NSI Industries Inc.'s Polaris System, OZ/Gedney Co.'s PMX or PT with PMXC, PTC Covers, Penn-Union Corp.'s CDT Series, or Thomas & Betts Corp.'s Color-Keyed H Tap CHT with HTC Covers or equal.
- D. Terminals: Nylon insulated pressure terminal connectors by Amp-Tyco/Electronics, Electrical Products Div./3M, Burndy, Ideal Industries Inc., Panduit Corp., Penn-Union Corp., Thomas & Betts Corp., or Wiremold Co. or equal
- E. Lugs:
1. Single Cable (Compression Type Lugs): Copper, one- or 2-hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, NSI Industries Inc.'s L, LN Series, Penn-Union Corp.'s BBLU Series, or Thomas & Betts Corp.'s 54930BE or 54850BE Series or equal.
 2. Single Cable (Mechanical Type Lugs): Copper, one- or 2-hole style (to suit conditions); Blackburn/T&B Corp.'s Color-Keyed Locktite Series, Burndy's Qiklug Series, NSI Industries Inc.'s

Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Locktite Series or equal.

3. Multiple Cable (Mechanical Type Lugs): Copper, configuration to suit conditions; Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Color-Keyed Locktite Series or equal.

2.03 TAPES

A. Insulation Tapes:

1. Plastic Tape: Electrical Products Div./3M's Scotch Super 33+ or Scotch 88, Plymouth Rubber Co.'s Plymouth/ Bishop Premium 85CW.
2. Rubber Tape: Electrical Products Div./3M's Scotch 130C, or Plymouth Rubber Co.'s Plymouth/Bishop W963 Plysafe or equal.

B. Moisture Sealing Tape: Electrical Products Div./3M's Scotch 2200 or 2210, or Plymouth Rubber Co.'s Plymouth/Bishop 4000 Plyseal-V or equal.

C. Electrical Filler Tape: Electrical Products Div./3M's Scotchfil, or Plymouth Rubber Co.'s Plymouth/Bishop 125 Electrical Filler Tape or equal.

D. Color Coding Tape: Electrical Products Div./3M's Scotch 35, or Plymouth Rubber Co.'s Plymouth/Bishop Premium 37 Color Coding or equal.

E. Arc Proofing Tapes:

1. Arc Proofing Tape: Electrical Products Div./3M's Scotch 77, Mac Products Inc.'s AP Series, or Plymouth Rubber Co.'s Plymouth/Bishop 53 Plyarc.
2. Glass Cloth Tape: Electrical Products Div./3M's Scotch 27/Scotch 69, Mac Products Inc.'s TAPGLA 5066, or Plymouth Rubber Co.'s Plymouth/Bishop 77 Plyglas.
3. Glass-Fiber Cord: Mac Products Inc.'s MAC 0527 or equal.

2.04 WIRE-PULLING COMPOUNDS

- A. To suit type of insulation; American Polywater Corp.'s Polywater Series, Electric Products Div./3M's WL, WLX, or WLW, Greenlee Textron Inc.'s, Cable Cream, Cable Gel, Winter Gel, Ideal Industries Inc.'s Yellow 77, Aqua-Gel II, Aqua-Gel CW, or Thomas & Betts Corp.'s Series 15-230 Cable Pulling Lubricants, or Series 15-631 Wire Slick or equal.

2.05 WIRE MANAGEMENT PRODUCTS

- A. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc: Catamount/T&B Corp., or Ideal Industries Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install conductors in raceways after the raceway system is completed.

- B. No grease, oil, or lubricant other than wire-pulling compounds specified may be used to facilitate the installation of conductors.

3.02 CIRCUITING

- A. Do not change, group, or combine circuits other than as indicated on the drawings.
- B. Do not change, group, or combine circuits other than as indicated on the drawings except as permitted under Section 260532 when reusing existing raceways.

3.03 SEPARATE NEUTRAL CONDUCTOR

- A. Provide a separate neutral conductor for each circuit. Use of common neutral for multiple circuits is NOT permitted.

3.04 CONDUCTOR SIZE

- A. Conductor Size:
 - 1. For Electric Light and Power Branch Circuits: Install conductors of size shown on drawings. Where size is not indicated, the minimum size allowed is No. 12 AWG.
 - 2. Light and Power homeruns shall be #12 AWG size, unless otherwise noted. Where Light and Power homeruns exceed 100 feet as measured to nearest outlet or switch to panelboard, the homerun shall be upsized to #10 AWG.
 - 3. For Class 1 Circuits:
 - a. No. 18 and No. 16 AWG may be used provided they supply loads that do not exceed 6 amps (No. 18 AWG), or 8 amps (No. 16 AWG).
 - b. Larger than No. 16 AWG: Use to supply loads not greater than the ampacities given in NFPA 70 Section 310.15.
 - 4. For Class 2 Circuits: Any size to suit application.
 - 5. For Class 3 Circuits: Minimum No. 18 AWG.

3.05 COLOR CODING

- A. General:
 - 1. Color coding for electric light and power conductors shall be by continuous colored insulation as described below.
 - 2. Large Conductors: Conductors of sizes No. 4 AWG and larger may be furnished with black insulation and color coded with Vinyl Color Coding Tape at all accessible points.
- B. Color Coding for 120/208 Volt Electric Light and Power Wiring:
 - 1. Color Code:
 - a. 2 wire circuit - black, white.
 - b. 3 wire circuit - black, red, white.
 - c. 4 wire circuit - black, red, blue, white.

2. White to be used only for an insulated grounded conductor (neutral). If neutral is not required use black and red, or black, red and blue for phase to phase circuits.
 - a. "White" for Sizes No. 6 AWG or Smaller:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length.
 - b. "White" for Sizes Larger Than No. 6 AWG:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length, or:
 - 3) Distinctive white markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install white color-coding tape at terminations, and at 1' 0" intervals in gutters, pull boxes, and manholes.
 3. Colors (Black, Red, Blue):
 - a. For Branch Circuits: Continuous color outer finish.
 - b. For Feeders:
 - 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutter, pull boxes, and manholes.
- C. Color Coding For 277/480 Volt Electric Light and Power Wiring:
1. Color Code:
 - a. 2 wire circuit – brown, gray.
 - b. 3 wire circuit – brown, yellow, gray.
 - c. 4 wire circuit – brown, yellow, orange, gray.
 2. Gray to be used only for an insulated grounded conductor (neutral). If neutral is not required use brown and yellow, or brown, yellow and orange for phase-to-phase circuits.
 - a. "Gray" For Sizes No. 6 AWG or Smaller.
 - 1) Continuous gray outer finish.
 - b. "Gray" For Sizes Larger Than No. 6 AWG:
 - 1) Distinctive gray markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install gray color-coding tape at terminations, and at 1' 0" intervals in gutters, pull boxes, and manholes.
 - c. Colors: (Brown, Yellow, Orange)
 - d. For Branch Circuits: Continuous color outer finish.
 - e. For Feeders:
 - 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at the time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutters, pull boxes, and manholes.

- D. More Than One Nominal Voltage System Within A building: Permanently post the color-coding scheme at each branch-circuit panelboard.
- E. Existing Color-Coding Scheme: Where an existing color-coding scheme is in use, match the existing color coding if it is in accordance with the requirements of NFPA 70.
- F. Color Code for Wiring Other Than Electric Light and Power: In accordance with ICEA standard S-73-532 (NEMA WC57-2004). Other coding methods may be used, as approved.

3.06 WIRE MANAGEMENT

- A. Use wire management products to bundle, route, and support wiring in junction boxes, pull boxes, wireways, gutters, channels, and other locations where wiring is accessible.

3.07 EQUIPMENT GROUNDING CONDUCTOR

- A. Install equipment grounding conductor:
 - 1. Provide an equipment grounding conductor for all circuits. Raceways shall not be relied upon as an equipment grounding conductor.
 - 2. Where multiple circuits are grouped in a common raceway, a single equipment ground sized as per Code may be permitted.
 - 3. Equipment grounding conductor shall be sized in accordance with the Contract Drawings. Where no size is indicated, provide minimum size equipment ground required by the Code.
 - 4. Where conductors are upsized to account for voltage drop, the equipment grounding conductor shall be proportionally upsized per Code, whether or not indicated on the drawings.
- B. Equipment grounding conductor is not intended as a current carrying conductor under normal operating circumstances.
- C. Color Coding For Equipment Grounding Conductor:
 - 1. Color Code: Green.
 - 2. "Green" For sizes No. 6 AWG or Smaller:
 - a. Continuous green outer finish, or:
 - b. Continuous green outer finish with one or more yellow stripes, or:
 - c. Bare copper (see exception below).
 - 3. "Green" For Sizes Larger Than No. 6:
 - a. Stripping the insulation or covering from the entire exposed length (see exception below).
 - b. Marking the exposed insulation or covering with green color-coding tapes.
 - c. Identify at each end and at every point where the equipment grounding conductor is accessible.

3.08 ARC PROOFING

- A. Where indicated on the drawings, arc proof feeders installed in a common pull box or manhole as follows:
 - 1. Arc proof new feeders.
 - 2. Arc proof existing feeders that are spliced to new feeders.

3. Arc proof each feeder as a unit (except feeders consisting of multiple sets of conductors).
4. Arc proof feeders consisting of multiple sets of conductors by arc proofing each set of conductors as a unit.
5. Arc proof feeders with half-lapped layer of 55 mils thick arc proofing tape and random wrapped or laced with glass cloth tape or glass-fiber cord. For arc proofing tape less than 55 mils thick, add layers to equivalent of 55 mils thick arc proofing tape.

3.09 INSULATED CONDUCTOR AND CABLE SCHEDULE - TYPES AND USE

A. Electric Light and Power Circuits:

1. Type THHN/THWN-2 or XHHW-2. : Wiring in dry or damp locations (except where special type insulation is required).
2. THHN/THWN-2, XHHW-2, or USE-2: Wiring in wet locations (except where type USE-2 insulated conductors are specifically required, or special type insulation is required).
3. XHHW-2 Wiring on rooftop locations.
4. THHN/THWN-2: Wiring installed in existing raceway systems (except where special type insulation is required).
5. THHN/THWN-2 or XHHW-2: Wiring for electric discharge lighting circuits (fluorescent, HID), except where fixture listing requires wiring rated higher than 90° C.
6. THHN/THWN-2 Marked "Gasoline and Oil Resistant": Wiring to gasoline and fuel oil pumps.
7. USE-2: Wiring indicated on the drawings to be direct burial in earth.
8. USE-2 Marked "Sunlight Resistant":
 - a. Service entrance wiring from overhead service to the service equipment.
 - b. Wiring exposed to the weather and unprotected (except where special type insulation is required).
9. MC:
 - a. Use of MC cable may be used in lieu of individual conductors in conduit, subject to the provisions of the NFPA 70 where run concealed above suspended ceilings and stud walls
 - b. Branch circuit wiring in wood framed construction (wood joists and wood stud partitions):
 - 1) Install conductors parallel with joists or studs and attach to the side of these timbers by galvanized straps spaced not more than 6 feet apart.
 - 2) Install conductors through holes bored in the center of the timbers when running at right angles to joists or studs.
 - 3) Do not attach the conductors to the edge of joists or studs.
 - c. Branch circuit wiring in movable metal partitions and movable gypsum partitions.
 - 1) Install conductors in accordance with partition manufacturer's recommendations.
 - d. Branch circuit wiring in metal stud partitions:

- 1) Install conductors parallel with studs and attach to the side by galvanized straps spaced not more than 6 feet apart.
 - 2) Install conductors through holes bored in the center of the metal member when running at right angles to studs.
 - a) Conductors shall be protected by listed bushings or listed grommets covering all metal edges.
 - 3) Do not attach the conductors to the edge of studs.
- e. Concealed Above Ceilings: Subject to the provisions of NFPA 70. Support MC cable from building structure. Mc cable shall not be permitted to be supported by the ceiling grid.
10. MI:
- a. Wiring for underplaster extensions.
 - b. Wiring in areas where indicated on drawings.
 - c. Where MI cable is installed in areas subjecting cable to corrosion, use PVC or HDPE jacketed MI cable (nonmetallic jacketed cable is not suitable for use in ducts, plenums or other spaces used for environmental air).

3.10 CONNECTOR SCHEDULE - TYPES AND USE

- A. Temperature Rating: Use connectors that have a temperature rating, equal to, or greater than the temperature rating of the conductors to which they are connected.
- B. Splices:
1. Dry Locations:
 - a. For Conductors No. 8 AWG or Smaller: Use spring type pressure connectors, indent type pressure connectors with insulating jackets, or connector blocks (except where special type splices are required).
 - b. For Conductors No. 6 AWG or Larger: Use connector blocks or uninsulated indent type pressure connectors. Fill indentions in uninsulated connectors with electrical filler tape and apply insulation tape to insulation equivalent of the conductor or insulate with heat shrinkable splices or cold shrink splices.
 - c. Gutter Taps in Panelboards: For uninsulated type gutter taps fill indentions with electrical filler tape and apply insulation tape to insulation equivalent of the conductor or insulate with gutter tap cover.
 2. Damp Locations: As specified for dry locations, except apply moisture sealing tape over the entire insulated connection (moisture sealing tape not required if heat shrinkable splices or cold shrink splices are used).
 3. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits, cold shrink splices or heat shrinkable splices. Exception: Splices above ground which are totally enclosed and protected in NEMA 3R, 4, 4X enclosures may be spliced as specified for damp locations.
- C. Terminations:
1. For Conductors No. 10 AWG or Smaller: Use terminals for:
 - a. Connecting wiring to equipment designed for use with terminals.
 2. For Conductors No. 8 AWG or Larger: Use compression or mechanical type lugs for:

- a. Connecting cables to flat bus bars.
 - b. Connecting cables to equipment designed for use with lugs.
3. For Conductor Sizes Larger Than Terminal Capacity On Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type connectors suitable for reducing connection.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260526 – GROUNDING AND BONDING

PART 1 – GENERAL

1.01 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.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's standard catalog cuts 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 Nationally Recognized Testing Agency (NRTL) acceptable to authorities having jurisdiction and marked for intended use.
 - 1. Comply with UL 467.
 - 2. Comply with NFPA 70.
 - 3. For overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
 - 4. 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. Erico International Corporation
 - 4. ILSCO
 - 5. Joslyn Corp.
 - 6. OZ Gedney Div.; General Signal Corp.
 - 7. Thomas and Betts Corp.
 - 8. Thompson Lightning Protection Corp.

2.02 GROUNDING CONDUCTORS

- A. Insulated conductors, comply with Section 260519.
- 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: Where indicated, provide handhole 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 SERVICE GROUNDING

- A. Provide a grounding electrode conductor, sized in accordance with the drawings or NFPA 70, connected to the neutral bus at the service disconnecting means and the opposite end connected to a listed grounding electrode.
- B. Equipment grounding conductors shall be connected to the ground bus at the service disconnecting means.
- C. Comply with NEC and local utility grounding requirements.

3.03 SEPARATELY DERIVED SYSTEM GROUNDING

- A. Separately derived systems shall include, but are not limited to:
 - 1. Transformers (exception: autotransformers)
 - 2. Generators (where neutral is switched)
 - 3. UPS systems when so configured.
- B. Comply with NFPA 70.
- C. A grounding electrode conductor, sized per the drawings or NFPA 70, shall be provided between the separately derived system grounded conductor and grounded metal frame or metal structural member. This connection shall be made at the source grounded conductor bus or at the first disconnecting means subject to the provisions of NFPA 70.
- D. Provides system bonding jumper, sized per drawings or NFPA 70 between the system grounded conductor bus and the equipment ground bus.
- E. There shall be no further connections between the grounded conductor and equipment ground downstream (load side) of the connection.

3.04 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 new feeders and branch circuits. Reliance solely on metallic raceways for equipment grounding means is NOT permitted.
- 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.

3.05 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.

3.06 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.

3.07 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 Section 310000. Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260529 – FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

PART 1 – GENERAL

1.01 SUBMITTALS

- A. Product Data: Manufacturer's standard catalog sheets, specifications and installation instructions.
- B. Unless noted otherwise, specific manufacturer's and / or model / part numbers indicated in this specification section, shall be interpreted as that "manufacturer and/or model / part number" or equal.

PART 2 - PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors: Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors: Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors: Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors: Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors: Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.
 - 1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
 - 2. Lag Screws: ASME B18.2.1.
 - 3. Machine Bolts: ASME B18.5 or ASME B18.9, Type, Class, and Form as required.

4. Wood Screws: Flat head, ASME B18.6.1.
5. Plain Washers: Round, ASME B18.22.1.
6. Lock Washers: Helical, spring type, ASME B18.21.1.
7. Toggle Bolts: Spring Wing Type; Wing AISI 1010, Trunion Nut AISI1010 or Zamac Alloy, Bolt Carbon Steel ANSI B18.6.3.

- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.04 TPR (THE PEEL RIVET) FASTENERS

- A. 1/4 inch diameter, threadless fasteners distributed by Subcon Products, 315 Fairfield Road, Fairfield, NJ 07004 (800) 634-5979.

2.05 HANGER RODS

- A. Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

2.06 "C" BEAM CLAMPS

- A. With Conduit Hangers:

1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.

- B. For Hanger Rods:

1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erico Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
2. For 3/8 Inch Hanger Rods: Caddy/Erico Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.
3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.07 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.

- B. Finishes:

1. Phosphate and baked green enamel/epoxy.
2. Pre-galvanized.
3. Electro-galvanized.
4. Hot dipped galvanized.
5. Polyvinyl chloride (PVC), minimum 15 mils thick.

C. Fittings: Same material and finish as channel.

D. UL Listed Systems:

1. B-Line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
2. Grinell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
3. Kindorf's B-901 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
4. Unistrut Corp.'s P-1000 (1-5/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

E. Hole Patterns: Chose hole patterns (or none) to suit the application.

2.08 MISCELLANEOUS FITTINGS

A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.

B. Pipe Straps:

1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series.
2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).

C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.

D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.

E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:

1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHFF, or Crouse-Hinds Co.'s UNH-1.
4. Eyelet: Unistrut Corp.'s M2250.

5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 3. Toggle bolts to fasten items to hollow masonry and stud partitions.
 4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
 5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.

1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking With Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 - 1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 - 2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
 - a. Before Fill Has Been Placed:
 - 1) Use thru-bolts and fish plates.
 - 2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - b. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs. from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction Work Contractor has placed concrete fill over decks.
 5. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 - 1) Use cast-in-place concrete inserts in fresh concrete.
 - b. If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
 6. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
 7. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 - 1) Use tee hanger inserts between adjacent flanges.

- 2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
- b. Existing Construction:
 - 1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
- 8. Attachment to Wood Construction: Use side beam brackets fastened to the sides of wood members to make attachments for hangers.
 - a. Under 15 lbs Load: Attach side beam brackets to wood members with 2 No. 18 x 1-1/2 inch long wood screws, or 2 No. 16 x 1-1/2 inch long drive screws.
 - b. Over 15 lbs Load: Attach side beam brackets to wood members with bolts and nuts or lag bolts. Do not use lag bolts in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts and nuts or lag bolts in the side of wood members at the mid-point or slightly above. Install plain washers under all nuts.

LOAD	LAG BOLT SIZE	BOLT DIAMETER
15 lbs to 30 lbs	3/8 x 1-3/4 inches	3/8 inch
31 lbs to 50 lbs	1/2 x 2 inches	1/2 inch
Over 50 lbs to load limit of structure.	Use bolt & nut.	5/8 inch

- c. Do not make attachments to the diagonal or vertical members of wood trusses.
- d. Do not make attachments to the nailing strips on top of steel beams.
- 9. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist. Either:
 - 1) Use bar hanger assembly, or:
 - 2) In addition to attachment to the stud, also provide far side box support.

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 - 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 - 1. Where conduit is supported from steel decking that does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.

- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 - 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
 - 2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not solely support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so Using one of the methods described below:
 - 1. Support fixtures to structure using 12 Ga. Aircraft Cable. Wires need not be taught to allow for servicing for the fixture.
 - 2. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 - 3. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
 - 4. Provide additional supports when recommended by the manufacturer.
- B. Number of Supports For Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer or shown on the drawings.
 - 1. Commercial and Industrial LED / Fluorescent Fixtures:
 - a. Support individual fixtures less than or equal to 2 feet wide X 4' long nominal at 2 points. In addition, lay in fixtures installed in suspended ceilings shall be secured to the grid using manufacturer's recommended fixture securing clips.
 - b. Support individual fixtures wider than 2 feet at 4 corners.
 - c. Support continuous row fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
 - d. Support continuous row fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.

3.06 SPECIAL AREA CEILING MOUNTED EQUIPMENT

- A. Provide safety tethers in addition to the standard mounting means for:
 - 1. Lighting fixtures, ceiling speakers, ceiling projectors, etc. installed in Areas of Assembly and/or other high ceiling spaces such as Atriums, Gymnasiums, Natatoriums, Auditoriums, Cafeterias, etc.

2. Theatrical lighting fixtures.

3.07 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.
- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260532 – RACEWAYS, FITTINGS AND ACCESSORIES

PART 1 – GENERAL

1.01 REFERENCES

- A. NFPA, NEMA, ANSI, and UL.

1.02 SUBMITTALS

- A. Product Data: Manufacturer's standard catalog sheets, specifications and installation instructions.

1.03 QUALITY ASSURANCE

- A. Electrical components, conductors, devices and accessories described herein shall be listed and labeled as defined by NFPA 70 by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), for the intended use and shall bear its label.

PART 2 - PRODUCTS

2.01 RACEWAYS

- A. Rigid Ferrous Metal Conduit (a/ka Galvanized Rigid Conduit (GRC)):
 - 1. Comply with UL 6 and ANSI C80.1.
 - 2. Minimum trade size – 3/4".
 - 3. Provide steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit), by Allied Tube & Conduit Corp., Republic Conduit, or Wheatland Tube Co or approved equal.
- B. Electrical Metallic Tubing (EMT):
 - 1. Comply with UL 797 and ANSI C80.6.
 - 2. Minimum trade size - 3/4".
 - 3. Provide steel, galvanized on the outside and enameled on the inside, UL categorized as Electrical Metallic Tubing (identified on UL Listing Mark as Electrical Metallic Tubing), by Allied Tube & Conduit Corp Republic Conduit, or Wheatland Tube Co. or approved equal.
- C. Flexible Metal Conduit (FMC):
 - 1. Comply with UL 1.
 - 2. Galvanized steel strip shaped into interlocking convolutions, UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or International Metal Hose Co. or approved equal.

D. Liquid-tight Flexible Metal Conduit (LFMC):

1. Comply with UL 360.
2. UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or Universal Metal Hose Co. or approved equal.

E. Rigid Nonmetallic PVC Conduit (RNC), Fittings, and Accessories:

1. Comply with Nema TC2 and UL 651.
2. Minimum trade size – 3/4".
3. UL categorized as Rigid Nonmetallic, Schedule 40 and Schedule 80 PVC conduit (identified on UL Listing Mark as Rigid Nonmetallic Conduit Aboveground and Underground Schedule 40; Rigid Nonmetallic Conduit Aboveground and Underground Extra Heavy Wall Schedule 80), by Beck Mfg./Picoma Industries, Cantex Inc., Carlon/Div. Of Lamson and Sessions, Ipex Inc., National Pipe & Plastics Inc., or Queen City Plastics Inc or approved equal.

F. Surface Metal Raceway, Fittings and Accessories:

1. Comply with UL 5. By Thomas & Betts Corp., Mono-Systems Inc. or Wiremold Co.
2. Provide ivory color unless otherwise noted.
3. Provide minimum Wiremold 700 or equal for single power or data drops. Refer to Division 27 for wireway containing power and technology conductors. Follow manufacturer's recommended raceway capacity for all types and sizes of conductors.

2.02 FITTINGS AND ACCESSORIES

A. Insulated Bushings:

1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' 1031 Series, OZ/Gedney Co.'s IBC-50 Series, Raco Inc.'s 1132 Series, Steel City/T & B Corp.'s BI-901 Series, or Thomas & Betts Corp.'s 1222 Series or approved equal.
2. Threaded malleable iron with 150 degrees C plastic throat; Appleton Electric Co.'s BU501 Series, Cooper/Crouse-Hinds' H1031 Series, or OZ/Gedney Co.'s IBC-50 Series.

B. Plastic Bushings for 3/4 Inch Conduit:

1. 105 degrees C minimum temperature rating; Appleton Electric Co.'s BBU50, BBU75, Blackburn (T & B Corp.'s) 50 BB, 75 BB, Cooper/Crouse-Hinds' 931,932, or OZ/Gedney Co.'s IB-50, IB-75, Raco Inc.'s 1402, 1403, Steel City/T & B Corp.'s BU-501, BU-502, or Thomas & Betts Corp.'s 222, 223 or approved equal.
2. 150 degrees C temperature rating; Appleton Electric Co.'s BBU50H, BBU75H, Cooper/Crouse-Hinds' H-931, H-932, or OZ/Gedney Co.'s A-50, A-75 or approved equal.

C. Insulated Grounding Bushings:

1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB-50 Series, Cooper/Crouse-Hinds' GLL Series, OZ/Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, Steel City/T & B Corp.'s BG-801 (1/2 to 2") Series, or Thomas & Betts Corp.'s 3870 or approved equal.
2. Threaded malleable iron/zinc electroplate with 150 degrees C plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB Series, Cooper/Crouse-Hinds' HGLL Series, or OZ/Gedney Co.'s IBC-50L Series, or Thomas & Betts Corp.'s 3870 or approved equal.

D. Connectors and Couplings:

1. Locknuts: UL, steel/zinc electroplate; Appleton Electric Co.'s BL-50 Series, Cooper/Crouse-Hinds' 11 Series, OZ/Gedney Co.'s 1-50S Series, Raco Inc.'s 1002 Series, Steel City/T&B Corp.'s LN-101 Series, or Thomas & Betts Corp.'s 141 Series or approved equal.
2. Grounding Wedge: Thomas & Betts Corp.'s 3650 Series or approved equal.
3. Couplings For Rigid Metal and IMC Conduit: Standard galvanized threaded couplings as furnished by conduit manufacturer, Allied Tube & Conduit Corp.'s Kwik-Couple, or Thomas & Betts Corp.'s Shamrock.
4. Three Piece Conduit Coupling For Rigid Metal and IMC Conduit: Steel, malleable iron, zinc electroplate; Allied Tube & Conduit Corp.'s Kwik-Couple, Appleton Electric Co.'s EC-50 Series, Cooper/Crouse-Hinds' 190M Series, OZ/Gedney Co.'s 4-50 Series, Raco Inc.'s 1502 Series, Steel City/T & B Corp.'s EK-401 Series, or Thomas & Betts Corp.'s 675 Series.
5. Electrical Metallic Tubing Couplings and Insulated Connectors: Set screw type fittings are not permitted. Provide Compression type, steel/zinc electroplate; Appleton Electric Co.'s TW-50CS1, TWC-50CS Series, Cooper/Crouse-Hinds' 1650, 660S Series, Raco Inc.'s 2912, 2922 Series, Steel City/T & B Corp.'s TC-711 Series, or Thomas & Betts Corp.'s 5120, 5123 Series or approved equal.
6. Flexible Metal Conduit Connectors: Arlington Industries Inc.'s Saddle-Grip, OZ/Gedney Co.'s C-8T, 24-34T, ACV-50T Series, or Thomas & Betts Corp.'s Nylon Insulated Tite-Bite Series or approved equal.
7. Liquid-tight Flexible Metal Conduit Connectors: Steel, malleable iron, zinc electroplate, insulated throat; Appleton Electric Co.'s STB Series, Cooper/Crouse-Hinds' LTB Series, OZ/Gedney Co.'s 4Q-50T Series, Raco Inc.'s 3512 Series, Steel City/T & B Corp.'s LT-701 Series, or Thomas & Betts Corp.'s 5332 Series or approved equal.

E. Conduit Bodies (Threaded):

1. Malleable Iron/Zinc Electroplate: Zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.'s Unilets, Cooper/Crouse-Hinds' Condulets, OZ/Gedney Co.'s Conduit Bodies, or Thomas & Betts Corp.'s Conduit Bodies. Or approved equal.

F. Expansion Fittings:

1. Malleable Iron, Zinc Electroplate Finish: Appleton Electric Co.'s XJ or OZ/Gedney Co.'s AX (TX for EMT), with external bonding jumper or approved equal.
2. Electrogalvanized Steel: Cooper/Crouse-Hinds' XJG (XJG-EMT for EMT), or Thomas & Betts Corp.'s XJG, with internal grounding or approved equal.

- G. Deflection Fittings: Appleton Electric Co.'s DF, Cooper/Crouse-Hinds' XD, or OZ/Gedney Co.'s Type DX or approved equal.
- H. Surface Metal Raceways: Use manufacturers approved fittings: couplings, ells, offsets, boxes etc. listed for use with ther raceway system. Match raceway finish.
- I. Sealant for Raceways Exposed to Different Temperatures: Sealing compounds and accessories to suit installation; Appleton Electric Co.'s DUC, or Kwiko Sealing Compound with fiber filler, Cooper/Crouse-Hinds' Chico A Sealing Compound with Chico X fiber, Electrical Products Division 3M Scotch products, OZ Gedney Co.'s DUX or EYC sealing compound with EYF damming fiber, or Thomas & Betts Corp.'s Blackburn DX.
- J. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips, or OZ/Gedney Co.'s Type M, Type R.
- K. Pulling-In-Line For Installation in Spare and Empty Raceways: Polypropylene monofilament utility line; Greenlee Textron Inc.'s Poly Line 430, 431, or Ideal Industries Powr-Fish Pull-Line 31-340 Series.

PART 3 - EXECUTION

3.01 RACEWAY INSTALLATION - GENERAL

- A. Install an equipment grounding conductor in all raceways. Raceway shall NOT be relied upon as an equipment ground conductor.
- B. For New Work: Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
 - 1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- C. For Rehab work. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (the contract documents do not indicate location, number, size or condition of existing raceways). Existing raceways may be reused if the following conditions are met:
 - 1. The existing raceway must be of adequate size for the new conductors to be installed as per NFPA 70 Chapter 9, Tables 1, 4, & 5; Annex C, Tables C1-C12a. More circuits may be enclosed by existing raceways than the circuiting shown on the drawings provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.
 - 2. Remove existing conductors.
 - 3. Demonstrate to the Owner's Representative that the existing raceway is clear of obstructions and in good condition.
 - 4. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
 - 5. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.

6. Install vertical conductor supports to replace existing or missing vertical conductor supports.
 7. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
 8. Furnish the Owner's Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design engineer for verification of NFPA 70 compliance.
- D. Raceways for Future Use (Spare Raceways and Empty Raceways): Draw fish tape through raceways in the presence of the Director's Representative to show that the raceway is clear of obstructions.
1. Leave a pulling-in line in each spare and empty raceway.
- E. Conduit Installed Concealed:
1. Install conduit concealed unless otherwise indicated on the drawings.
 2. Existing Construction:
 - a. Run conduit in existing chases and hung ceilings.
 - b. If conduit cannot be installed concealed due to conditions encountered in the building, report such conditions and await approval in writing before proceeding.
 3. New Construction:
 - a. Run conduit in the ceilings, walls, and partitions.
 - b. Conduit may not be installed in concrete floor slab unless otherwise indicated on the plans. (concrete slabs that are both ceilings and floors shall be treated as floor slabs).
 - c. Where indicated on the drawings, install conduit in concrete slabs, under slabs on grade, or under slabs above finished ceilings where indicated on the drawings. Concrete slabs that are both ceilings and floors shall be treated as floor slabs.
 - 1) Conduit in Slab: Run 3/4-inch conduit in the slab where placement of reinforcement and slab thickness is sufficient to allow 1-1/2 inches of concrete cover over conduit, otherwise run conduit under slab. Run conduit one inch and larger in the slab in the specific location(s) where it is indicated on the drawing to be run in the slab, otherwise run conduit under slab.
 - a) Run conduit under reinforcement where reinforcement is in upper portion or middle of slab.
 - b) Run conduit over reinforcement where reinforcement is in lower portion of slab.
 - c) Run conduit between reinforcement where reinforcement is in upper and lower portions of slab.
 - d) Separate parallel conduits minimum of 2 inches so that each conduit will be enveloped in concrete.
 - e) Pass conduit over steel beams, if any, parallel with the reinforcement.
 - f) Tie down conduit to avoid movement during placement of concrete.
 - g) Demonstrate to the Owner's Representative that conduit has been placed to allow minimum of 1-1/2 inches of concrete cover.
 - 2) Conduit Under Slab on Grade:
 - a) Run conduit under vapor barrier, if any.
 - b) Install equipment grounding conductor in each conduit. Bond at boxes and equipment to which conduit is connected.

- 3) Conduit Under Slab, Above Finished Ceiling:
 - a) Attach conduit to bottom of slab or structure supporting the slab.
 - b) Firestop through-penetrations of the slab.
4. If any portions of the conduit system cannot be installed concealed due to conditions encountered in the building, report such conditions and await approval in writing before proceeding.
- F. Conduits Penetrating Concrete Floor Slabs (Concrete slabs that are both ceilings and floors shall be treated as floor slabs):
 1. Provide a minimum of 2 inches between conduits that vertically penetrate elevated concrete slabs.
 2. Provide firestopping and spray on fireproofing at locations where conduits penetrate surface of floor slab and slab is part of fire rating required for construction.
- G. Conduit Installed Exposed:
 1. Install conduit exposed where indicated on the drawings.
 2. Install surface metal raceway on existing block wall construction in finished areas.
 3. Install conduit tight to the surface of the building construction unless otherwise indicated or directed.
 4. Install vertical runs perpendicular to the floor.
 5. Install runs on the ceiling perpendicular or parallel to the walls.
 6. Install horizontal runs parallel to the floor.
 7. Do not run conduits near heating pipes.
 8. Installation of conduit directly on the floor will not be permitted.
 9. Exposed conduits installed in finished area shall be painted by the Electrical Contractor to match surrounding areas. Exception – where general painting will be provided by other trades.
- H. Conduit Size: **Not smaller than 3/4-inch electrical trade size**. Where type FEP, THHN, THWN, THWN-2, XHH, XHHW, or XHHW-2 conductors are specified for use under Section 260519, the minimum allowable conduit size for new Work shall be based on Type THW conductors.
- I. Conduit Bends: For 3/4-inch conduits, bends may be made with manual benders. For all conduit sizes larger than 3/4 inch, manufactured or field fabricated offsets or bends may be used. Make field fabricated offsets or bends with an approved hydraulic bender.

3.02 RACEWAY INSTALLATION - SPECIAL AREAS

- A. Raceways Exposed to Different Temperatures: Where portions of an interior raceway system are exposed to widely different temperatures, seal interior and exterior of raceway to prevent circulation of air from a warmer to a colder section through the raceway installation.

1. Refrigerated Rooms: Install conduit body or junction box in the raceway system on warm side of refrigerated room. After conductors are installed, seal interior of the raceway at the conduit body or junction box.
 2. Heated Areas to Unheated Areas: After conductors are installed, seal interior of the raceway at the nearest conduit body, outlet or junction box in the heated area adjoining the unheated area.
- B. Conduit for Prefabricated Walk-In Refrigeration Boxes:
1. Install box wiring in conduit. Run conduit exposed on exterior of box unless project conditions require conduit to be run exposed on interior of box.
 - a. Install rigid ferrous metal conduit and galvanized fittings where the metal surfaces are galvanized steel.
 2. Create a thermal break where penetrating the box by installing maximum of 12 inches of Schedule 40 high density polyethylene conduit within the conduit run at the penetration. Seal the penetration.
 3. Install equipment grounding conductor in each conduit.
 4. Seal raceway as specified for raceways exposed to different temperatures.
- C. Conduits in Heating Tunnels: Install rigid ferrous metal conduit exposed in the tunnel and run conduit to avoid manhole entrances and other obstructions. Install equipment grounding conductor in each conduit.
- D. Conduit in Waterproofed Floors: Install conduit runs in waterproof floors to avoid penetrating the waterproofing. Avoid penetration of waterproofing with conduit risers so far as practicable.
1. Where it is necessary to puncture the waterproofing for a conduit riser, install a standard weight steel pipe sleeve extending one inch above the finished floor level. Flash the steel pipe sleeve to the waterproofing with 16-ounce copper. Construct the flashing with a copper tube extending the full height of the sleeve, soldered to a copper base extending 6 inches in all directions from the sleeve.
 2. The flashing will be integrated into the waterproofing by the Construction Contractor. Provide solid cast brass floor plates with chromium finish where pipe sleeves are exposed in rooms.

3.03 RACEWAY SCHEDULE

- A. Rigid Ferrous Metal Conduit: Install in all locations unless otherwise specified or indicated on the drawings.
- B. Electrical Metallic Tubing:
1. May be installed concealed as feeder or branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
 2. May be installed concealed as feeder or branch circuit conduits in hollow areas in dry locations, including:
 - a. Hollow concrete masonry units, except where cores are to be filled.
 - b. Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.

3. May be installed exposed as feeder or branch circuit conduits in dry, unfinished, non-hazardous locations.
- C. Flexible Metal Conduit: Install equipment grounding conductor in the flexible metal conduit and bond at each box or equipment to which conduit is connected:
1. Use for final conduit connection to recessed lighting fixtures in suspended ceilings. Use 4 to 6 feet of flexible metal conduit, minimum size 1/2 inch, between junction box and fixture. Locate junction box at least 1 foot from fixture and accessible if the fixture is removed.
 2. Use 1 to 3 feet of flexible metal conduit for final conduit connection to:
 - a. Emergency lighting units.
 - b. Dry type transformers.
 - c. Motors with open, drip-proof or splash-proof housings.
 - d. Equipment subject to vibration (dry locations).
 - e. Equipment requiring flexible connection for adjustment or alignment (dry locations).
 3. Use for concealed branch circuit conduits above existing non-removable suspended ceilings where rigid type raceways cannot be installed due to inaccessibility of space above ceiling.
 4. May be installed concealed as branch circuit conduits in drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
- D. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:
1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
 - a. Motors with weather-protected or totally enclosed housings.
 - b. Equipment subject to vibration (damp and wet locations).
 - c. Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).
- E. Rigid Nonmetallic PVC Conduit:
1. Schedule 40 or Schedule 80 as indicated on the drawings.
 - a. Use for protection of primary feeders within transformer vaults.
 - b. Use for exterior branch circuits or feeders.
 - c. Use underground or under slab feeders or branch circuits.
- F. Surface Metal Raceway: Use as exposed raceway system in finished spaces with existing CM U or concrete construction or at locations indicated on the drawings.
1. Use surface metal raceway system of size required for number of wires to be installed therein. Use specific size when indicated on the drawings.
 2. Do not run raceway through walls that have a plaster finish nor through masonry walls or floors. Install a pipe sleeve, or a short length of conduit with junction boxes or adapter fittings for raceway runs through such areas. Run raceway along top of baseboards, care being taken to avoid telephone and other signal wiring. Where raceway crosses chair railing or picture molding, cut the chair railing or picture molding to permit the raceway to lie flat against the wall.

Run raceway around door frames and other openings. Run raceway on ceiling or walls perpendicular to or parallel with walls and floors.

3. Secure raceway at intervals not exceeding 36 inches.
 4. Install separate equipment grounding conductor for grounding of equipment. The raceway alone will not be considered suitable for use as an effective path to ground.
 5. Outlet box covers for pendant mounted fluorescent fixtures may be omitted if the fixture canopy is notched to receive the raceway and the canopy fits snugly against the ceiling.
 6. Where equipment is mounted on an outlet box and the equipment base is larger than the outlet box, provide finishing collar around equipment base and outlet box or provide finishing collar/outlet box:
 - a. Finishing Collar: Same finish and peripheral dimensions as the equipment base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.
 - b. Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the equipment base to be mounted thereon, gage or thickness of metal as required by NFPA 70, including provision for mounting and knockouts for entrance of raceway.
- G. Wireways: May be used indoors in dry locations for exposed raceway between grouped, wall mounted equipment.

3.04 FITTINGS AND ACCESSORIES SCHEDULE

A. General:

1. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
2. Use zinc electroplate or hot dipped galvanized steel/malleable iron or cast iron alloy fittings and accessories in conjunction with ferrous raceways in dry and damp locations unless otherwise specified or indicated on the drawings.
3. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors, when required, if cabinet or boxes are not equipped with grounding/bonding screws or lugs.
4. Use caps or plugs to seal ends of conduits until wiring is installed to exclude foreign material.
5. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure, such as stub-ups under equipment, etc., and bond between bushings and enclosure with equipment grounding conductor.
6. Use expansion fittings where raceways cross expansion joints (exposed, concealed, buried).
7. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
8. Use 2 locknuts and an insulated bushing on end of each conduit entering sheet metal cabinet or box in dry or damp locations.
 - a. Plastic bushing may be used on 3/4 inch conduit in lieu of insulated bushing.
 - b. Terminate conduit ends within cabinet/box at the same level.

- B. For Rigid Metal Conduit: Use threaded fittings and accessories. Use 3 piece conduit coupling where neither piece of conduit can be rotated.
- C. For Electrical Metallic Tubing: Use compression type connectors and couplings.
- D. For Flexible Metal Conduit: Use flexible metal conduit connectors.
- E. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.
- F. For Rigid Nonmetallic PVC Conduit:
 - 1. Use conduit manufacturer's standard fittings and accessories.
 - 2. Provide expansion fittings for exterior conduits as required by NFPA 70.
- G. For Surface Metal Raceway: Use raceway manufacturer's standard fittings and accessories. Match raceway finish color.
- H. For Wireways: Use wireway manufacturer's standard fittings and accessories.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260534 – OUTLET JUNCTION AND PULL BOXES

PART 1 – GENERAL

1.01 REFERENCES

- A. NEMA, and UL.

1.02 SUBMITTALS

- A. Product Data: Manufacturer's standard catalog sheets, specifications and installation instructions.

1.03 QUALITY ASSURANCE

- A. Electrical components, conductors, devices and accessories described herein shall be listed and labeled as defined by NFPA 70 by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), for the intended use and shall bear its label.

PART 2 - PRODUCTS

2.01 GALVANIZED STEEL OUTLET BOXES

- A. Provide standard galvanized steel boxes and device covers in compliance with NEMA OS1 And UL 514A by Appleton Electric Co., Beck Mfg./Picoma Industries, Cooper/Crouse-Hinds, Raco/Div. of Hubbell, or Steel City/T & B Corp or approved equal.

2.02 GALVANIZED STEEL JUNCTION AND PULL BOXES

- A. Provide code gage, galvanized steel screw cover boxes in compliance with NEMA OS1 by Delta Metal Products Inc., Hoffman Enclosures Inc., Hubbell Wiegmann, Lee Products Co., or Rittal/Electromate or approved equal.

2.03 THREADED TYPE BOXES

- A. Outlet Boxes:

1. For Dry, Damp Locations: Provide zinc electroplate malleable iron or cast iron alloy boxes by Appleton Electric Co., Cooper/Crouse-Hinds Co., or OZ/ Gedney Co., or approved equal, with zinc electroplate steel covers to suit application.
2. For Wet Locations: Provide malleable iron or cast iron alloy boxes with hot dipped galvanized or other specified corrosion resistant finish in compliance with NEMA FB1 as produced by Cooper/Crouse-Hinds (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws, and malleable iron covers gasketed to suit application.

- B. Junction And Pull Boxes:

1. For Dry, Damp Locations: Provide zinc electroplate cast iron boxes by Appleton Electric Co., Cooper/Crouse-Hinds, or OZ/Gedney Co., or approved equal with zinc electroplate steel or cast iron cover.

2. For Wet Locations: Provide cast iron boxes in compliance with NEMA FB1 and UL 1773 by Cooper/Crouse-Hinds' (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), or approved equal, with stainless steel cover screws and cast iron cover gasketed to suit application.

C. Conduit Bodies, Threaded (Provided with a Volume Marking):

1. For Dry, Damp Location: Provide zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.'s Unilets, Cooper/Crouse-Hinds' Condulets, or OZ/Gedney Co.'s Conduit Bodies or approved equal.
2. For Wet Locations: Provide malleable iron or cast-iron alloy bodies with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds' Condulets (hot dipped galvanized or Corro-free epoxy power coat), or OZ/Gedney Co.'s Conduit Bodies (hot dipped galvanized) or approved equal, with stainless steel cover screws and malleable iron covers gasketed to suit application.

2.04 CORROSION RESISTANT BOXES

- A. Plastic Coated Outlet and Junction Boxes: Provide threaded type malleable iron boxes coated with 40 mils thick polyvinylchloride coating; Ocal/T&B Corp.'s Ocal-Blue System, PCD Inc.'s KorKap, KorKap XL, or Robroy Industries' Plastibond or Perma-Cote System or approved equal.
- B. Non-Metallic Junction and Pullboxes: Glass fiber reinforced polyester; Carlon/Div. of Lamon and Sessions' Himeline Series, Cooper/Crouse-Hinds' Krydon Products, or Robroy Industries' Stahlin Enclosures or approved equal.

2.05 SPECIFIC PURPOSE OUTLET BOXES

- A. As fabricated by manufacturers for mounting their equipment.

2.06 FINISHING COLLAR OR COMBINATION FINISHING COLLAR/OUTLET BOX (SURFACE MOUNTED EQUIPMENT USED WITH EXPOSED RACEWAY)

- A. Finishing Collar: Same finish and peripheral dimensions as the equipment base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.
- B. Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the equipment base, gage or thickness of metal as required by National Electrical Code, including provisions for mounting, and knockouts or threaded bosses for entrance of raceway.

2.07 FLOOR OUTLETS

- A. For combination power and technology floor boxes and outlets – refer to Division 27.
- B. Floor Outlet for Cast-In-Place Concrete Construction; Hubbell's Floor Boxes, Raco Inc.'s Tilt Top, or Steel City/T & B Corp.'s Floor Boxes:
 1. Concrete tight galvanized steel boxes (for installation above grade).
 2. Watertight cast iron boxes (for installation on or below grade).
 3. Fully adjustable top (including 10-degree angular adjustment) before and after installation.
 4. Service Fittings:

- a. Above Floor: Aluminum, doghouse style, to suit power, service.
- b. Flush Floor: Flush round cover with hinged lid (and carpet flanges for carpeted areas) to suit power service, finish to match hardware in area where installed.

2.08 OUTLET BOXES AND RELATED PRODUCTS FOR FIRE RATED CONSTRUCTION

- A. For combination power and technology floor boxes and outlets – refer to Division 27.
- B. Parameters For Use of Listed Metallic Outlet or Switch Boxes: UL Electrical Construction Equipment Directory - Metallic Outlet Boxes (QCIT).
- C. Wall Opening Protective Materials: As listed in UL Fire Resistance Directory - Wall Opening Protective Materials (CLIV), or UL Electrical Construction Equipment Directory - Wall Opening Protective Materials (QCSN).
- D. Floor Outlet Boxes:
 - 1. Poke-Through System: As listed in UL Fire Resistance Directory - Outlet Boxes and Fittings Classified for Fire Resistance (CEYY), or UL Electrical Construction Equipment Directory - Outlet Boxes and Fittings Classified for Fire Resistance (QBWY).
 - 2. Service Fittings:
 - a. Above Floor: Aluminum, doghouse style, to suit power service.
 - b. Flush Floor: Metallic flush round cover with hinged lid (and carpet flanges for carpeted areas) to suit power service, finish to match hardware in area where more installed.

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide all boxes required to complete the raceway system, regardless of whether indicated or not on the drawings.
- B. Provide boxes in sizes as required by Code.
- C. Provide dividers in boxes where difference in insulation rating exceeds 300V.

3.02 PREPARATION

- A. Before proceeding with the installation of junction and pull boxes, check the locations with the Owner’s Representative and have same approved.

3.03 INSTALLATION

- A. Mounting Position of Wall Outlets for Wiring Devices: Unless otherwise indicated, install boxes so that the long axis of each wiring device will be vertical.
- B. Height of Wall Outlets: Unless otherwise indicated, locate outlet boxes with their center lines at the following elevations above finished floor:

Lighting Fixtures	6'-0"
Lighting Fixtures in Stairway	7'-6"

Exit Lights	8'-0" where ceiling height allows a minimum of 6 inch clearance between ceiling and top of exit light. Otherwise mount exit light so that it's top is 6 inches below finished ceiling. Adjust height and clearances as required to suit installation over doors.
Night Lights	2'-0"
Hose Cabinet Lights	1'-0" above top of cabinet
Switches	4'-0"
Single & Duplex Receptacles	1'-6"*
Water Cooler Receptacles	2'-0"
Clock Receptacles	7'-6"
Range Receptacle	1'-6"
Special Purpose Receptacles	4'-0"
Thermostats	5'-0"
Manual Fire Alarm Boxes	4'-0"
Audible Notification Appliances	8'-0" where ceiling height allows a minimum of 6 inch clearance between ceiling and top of appliance. Otherwise mount appliance so that it's top is 6 inches below finished ceiling.
Visible Notification Appliances	Install outlet so that the bottom of the visible lens will be 6'-8" AFF.
Combination Audible/Visible Notification Appliances	Install outlet so that the bottom of the visual lens will be 6'-8" AFF, and the audible section will be above the visible section.
Radio	2'-0"
Television	2'-0"
Telecommunications	2'-0"
Telephone	2'-0"
Wall Handset Telephone.	Install outlet so that the highest operable part of the wall mounted telephone will not be more than 4'-0" AFF.

*In areas containing heating convectors, install outlets above convectors at height indicated on drawings.

C. Supplementary Junction and Pull Boxes: In addition to junction and pull boxes indicated on the drawings and required by NFPA 70, provide supplementary junction and pull boxes as follows:

1. When required to facilitate installation of wiring.
2. At every third 90 degree turn in conjunction with raceway sizes over 1 inch.
3. At intervals not exceeding 100 feet in conjunction with raceway sizes over 1 inch.

3.04 OUTLET, JUNCTION, AND PULL BOX SCHEDULE

A. Boxes For Concealed Conduit System:

1. Non-Fire Rated Construction:

- a. Depth: To suit job conditions and comply with NFPA 70 Article 370.
- b. For Lighting Fixtures: Use galvanized steel outlet boxes designed for the purpose.
 - 1) For Fixtures Weighing 50 lbs. or Less: Box marked "FOR FIXTURE SUPPORT".
 - 2) For Fixtures More Than 50 lbs: Box listed and marked with the weight of the fixture to be supported (or support fixture independent of the box).
- c. For Ceiling Suspended Fans:

- 1) For Fans Weighing 35 lbs or Less: Marked "Acceptable for Fan Support."
 - 2) For Fans Weighing More Than 35 lbs, up to 70 lbs: Marked "Acceptable for Fan Support up to 70 lbs (or support fan independent of the box)."
- d. For Junction and Pull Boxes: Use galvanized steel boxes with flush covers.
 - e. For Switches, Receptacles, Etc:
 - 1) Plaster or Cast-In-Place Concrete Walls: Use 4 inch or 4-11/16 inch galvanized steel boxes with device covers.
 - 2) Walls Other Than Plaster or Cast-In-Place Concrete: Use type of galvanized steel box which will allow wall plate to cover the opening made for the installation of the box.
2. Recessed Boxes in Fire Rated (2 hour maximum) Bearing and Nonbearing Wood or Steel Stud Walls (Gypsum Wallboard Facings):
 - a. Use listed single and double gang metallic outlet and switch boxes. The surface area of individual outlet or switch boxes shall not exceed 16 square inches.
 - b. The aggregate surface area of the boxes shall not exceed 100 square inches per 100 square feet of wall surface.
 - c. Securely fasten boxes to the studs. Verify that the opening in the wallboard facing is cut so that the clearance between the box and the wallboard does not exceed 1/8 inch.
 - d. Separate boxes located on opposite sides of walls or partitions by a minimum horizontal distance of 24 inches. This minimum separation distance may be reduced when wall opening protective materials are installed according to the requirements of their classification.
 - e. Use wall opening protective material in conjunction with boxes installed on opposite sides of walls or partitions of staggered stud construction in accordance with the classification requirements for the protective material.
 3. Other Fire Rated Construction: Use materials and methods to comply with the listing requirements for the classified construction.
- B. Boxes For Exposed Conduit System:
1. Dry and Damp Locations: Use zinc electroplate or hot dipped galvanized threaded type malleable iron or cast-iron alloy outlet, junction, and pull boxes or conduit bodies provided with a volume marking in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Galvanized steel boxes may be used in conjunction with conduit sizes over 1 inch in non-hazardous dry and damp locations.
 - b. Galvanized steel boxes may be used in conjunction with electrical metallic tubing where it is allowed (specified) to be installed exposed as branch circuit conduits at elevations over 10'-0" above finished floor.
 2. Wet Locations: Use threaded type malleable iron or cast iron alloy outlet junction, and pull boxes or conduit bodies (provided with a volume marking) with hot dipped galvanized or other specified corrosion resistant coating in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Use corrosion resistant boxes in conjunction with plastic coated rigid ferrous metal conduit.
 3. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Equipment Used With Exposed Raceway):

- a. Use finishing collar where surface mounted equipment is installed on an exposed raceway outlet box and the equipment base is larger than the outlet box.
 - b. Use combination finishing collar/outlet box where surface mounted equipment is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into equipment body due to equipment design.
- C. Specific Purpose Outlet Boxes: Use to mount equipment when available and suitable for job conditions. Unless otherwise specified, use threaded type boxes with finish as specified for exposed conduit system, manufacturer's standard steel (painted) boxes for surface metal raceway system and galvanized steel for recessed installations.
- D. Stencil cover of pull boxes used on systems over 600 V, in white lettering minimum 1/2 inches high, the words "DANGER HIGH VOLTAGE - KEEP OUT".

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All sections of the project manual are directly applicable to this specification section. Should a conflict arise between specification sections or between specifications and drawings and/or code requirements, the contractor shall notify the Architect/Engineer of the conflict in writing. If direction is not provided prior to the submission of the bid, the contractor shall price the more extensive system.

1.02 SUMMARY

- A. Clearly and properly identify the complete electrical system to indicate the loads served or the function of each item of equipment connected under this work.

PART 2 – PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145 for danger, caution or safety instruction signs.
- C. Comply with ANSI Z535.4 for safety signs and labels.
- D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.02 LABELS

- A. Pre-Printed: Permanent material pre-printed with black on white, with adhesive backing. Brady, 3M, or equal.
- B. Laminated Plastic: 3-ply laminated plastic, color as indicated, with 1/2-inch high white letters for low voltage. Lamicoid, or equal.
- C. Identification Plates: Engraved Phenolic/Lamacoid plastic, 1/16" thick, ASTM D 709 Type 1, black with white letters or white with black letters.
- D. Plastic Tape: Black or red with white letters, adhesive backing, field-printed with proper tool. Dymo-tape, or equal.
- E. Marker Tape: Clear adhesive-backed tape with black letters, for device plates. Kroy, or equal.

- F. Wire Markers: White with black numbers, adhesive-backed tape on dispenser roll. Brady, 3M, or equal.
- G. Marker Pen: Black permanent marker suitable for writing on metallic surfaces.

2.03 SIGNS

A. Baked-Enamel Signs:

1. Preprinted aluminum signs punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches.
4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlton Industries, LP
 - b. Champion America
 - c. Marking Services, Inc.
 - d. Approved Equal.

B. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
 - a. For signs up to 20 sq. inches, minimum 1/16-inch.
 - b. For signs larger than 20 sq. inches, 1/8 inch thick.
 - c. Engraved legend with colors as indicated below by type of service:
 - 1) Normal Power – Black background with white letters.
 - 2) Standby Power- Blue background with white letters.
 - 3) Emergency/Life Safety Power- Red background with white letters.
 - 4) UPS/Clean Power – Gray background with white letters to read “UPS POWER” or “CLEAN POWER.”
 - d. Punched or drilled for mechanical fasteners.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Brady Corporation
 - b. Carlton Industries, LP
 - c. Marking Services, Inc.
 - d. Approved Equal

2.04 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, #404 stainless-steel screws.

PART 2 – EXECUTION

3.01 GENERAL

- A. Prior to applying adhesive identification products, clean and prepare surfaces as recommended by manufacturer of identification product.
- B. Verify each item to be identified prior to application. Verify and coordinate all labelling information, colors etc. with the Drawings, Shop Drawings, manufacturer's wiring diagrams and manuals etc. and any special Owner labelling requirements. Labelling shall be consistent throughout Project.
- C. Install any labelling prior to installing acoustical ceilings or other concealment.
- D. Apply identification devices to surfaces that require finish after completion of finish work.
- E. Identification materials and devices shall not interfere with operation and maintenance of equipment.
- F. Attach signs and plastic labels that are not self-adhesive type with stainless steel mechanical fasteners appropriate to the location and substrate.
- G. Wraparound Marker Labels and Metal Tags shall be secured tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Labeling Instructions:
 - 1. Indoor Equipment: Non-ferrous metal or rigid plastic, stamped, embossed or engraved identification plates shall have white letters on black face or vice versa. Unless otherwise indicated, provide a single line of text with 1/8-inch- high letters on 1-1/2-inch- high label; where multiple lines of text are required, increase height accordingly.
 - 2. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - 3. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - 4. Labels not using self-adhesive attachment, shall be fastened using appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

3.02 IDENTIFICATION SCHEDULE

- A. General
 - 1. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.
 - a. Comply with 29 CFR 1910.145.
 - b. Identify system voltage with black letters on an orange background.
 - c. Apply to exterior of door, cover, or other access.
 - d. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - 1) Power-transfer switches.
 - 2) Controls with external control power connections.

2. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
3. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.

B. Low Voltage Switchgear

1. Label each switchgear section with laminated plastic label indicating switchgear name and section per the drawings / shop drawings, ampere rating, voltage. Indicate source from switch switchboard is fed and feeder size on incoming feeder section.
2. Label all protective devices with laminated plastic labels indicating the function or the load served.
3. Provide laminated plastic labels for all bussed spaces indicating the maximum ampere rating or size of future breaker or switch that may be installed in the space reserved.

C. Branch Circuit and Power Distribution Panelboards:

1. Provide laminated plastic labels on panel exterior which indicate panel name per the drawings, voltage, source, from which the panel is fed with laminated plastic labels attached to face trim. Indicate feeder source, feeder wire size, and feeder breaker or fuse size with marker tape or marker pen on the inside of the panel door.
2. For new or modified panelboards, provide typewritten or software generated panel directories, with protective, clear transparent covers, accurately accounting for every breaker installed, including spares. Schedules shall use the actual loads and room designations assigned by name or number near completion of the work. Do not use the designations from the drawings.
3. For power distribution panelboards, where no directory is present, label each protective device with laminated plastic labels indicating load served. Marker pen is permitted where space does not permit laminated plastic labels.

D. Motor Control Centers:

1. Label all motor control centers with laminated plastic labels indicating control center name per the drawings.
2. Label all starters and breakers with factory-provided labels or laminated plastic labels indicating the function or the load served and location.
3. Provide pre-printed labels for all spaces.

E. Transformers:

1. Label all transformers with identification plate indicating equipment label per the drawings, KVA, primary and secondary voltages, source, and load served.

F. Disconnect Switches

1. Label All Disconnect Switches with laminated plastic labels indicating device name per the drawings, and with permanent marker, the source, load served, and internal fuse size, if applicable.

G. Miscellaneous Equipment

1. Label all motor start switches, individual circuit breakers, relays, contactors, time switches, and indicating equipment with marker tape or laminated plastic labels indicating equipment number, source, and circuit number.
2. Where the controlling device is remote mounted from the serving panel, include the serving panel designation and circuit number with additional plastic tape labels.

H. Receptacles

1. All receptacle plates shall be marked in marker tape on the face of the plate, with the receptacles panel and branch circuit designation. The identification shall be made with clear self-adhesive tape with black 10-point letters. Apply the tape at the top of the device plate.
2. Receptacles connected to a GFCI-protected circuit downstream from the protecting device shall be labeled "GFCI Protected."

I. Outlet, Pull, And Junction Boxes

1. For exposed and those above suspended ceilings, label covers of power junction boxes neatly by hand using permanent marker, indicating source and circuit number.
2. For exposed ceilings in occupied public spaces, where conduits, junction boxes, etc. are to be painted to blend into the ceiling, provide aforementioned labelling on the inside cover of the junction box.

J. Conduits

1. Label all exposed conduit runs in non-public spaces or accessible ceiling spaces with source panel and circuit number using neatly written permanent marker. Include destination in labelling for all feeder conduits. Space labels a maximum of 50 feet apart and at least one per room. Label conduits at entrances of all "J" boxes, distribution panels, MCC, panelboards, etc.
2. Omit labelling exposed conduits in occupied public spaces.

K. Emergency Lighting Fixtures:

1. Ceiling mounted and wall mounted emergency light which are equipped with integral emergency back-up battery or are tied into an emergency power system (emergency generator, remote inverter, etc.), shall be readily identified with a 3/4" dia. red circular adhesive label either on the fixture or on the ceiling grid surrounding the fixture.
2. Exceptions:
 - a. Twin head battery pack emergency unit fixtures and
 - b. Fixtures equipped with integral emergency battery with an indicator LED clearly visible without removing any lensing.

L. Special Systems (Fire Alarm, Security, Pa, Etc.): subject to the provisions of the respective specification section for each system:

1. Equipment Cabinets, Terminal Cabinets, Power Supply Cabinets, Control Panels, Patch Panels, Racks:
 - a. Provide identification plates with equipment identification as indicated on the drawings.

- b. Label termination blocks and ports.
2. Pullboxes, Enclosures, Junction Boxes:
- a. Provide identification plate including system type and location designation, if any, per the Drawings or Shop Drawings on cover.
 - b. Indicate equipment and location(s) from which enclosed cables originate.
3. Fire Alarm:
- a. Fire alarm junction boxes shall be red unless another standard is used by owner.
 - b. Initiation Devices, Notification Appliances, Fire Alarm Relays – Provide zone or address identification label, clear Marker Tape, red or black letters.
 - c. Remote Smoke Detector Lamps and Test Stations – Provide label indicating the location of the connected device.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 260810 – 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 in this type of work on a regular basis.

1.02 TIMELINE

- 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 any 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	(Hz), Voltage, Power A or FLA, Phase, Wire,
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	(Hz), Voltage, Power A or FLA, Phase, Wire,
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	(Hz), Voltage, Power A or FLA, Phase, Wire,
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	(Hz), Voltage, Power A or FLA, Phase, Wire,
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 [<input type="checkbox"/>] No [<input type="checkbox"/>]
Hazardous Location:	Yes [<input type="checkbox"/>] No [<input type="checkbox"/>]
Equipment Condition:	New [<input type="checkbox"/>] Used [<input type="checkbox"/>]
Security/Signaling Equipment	Yes [<input type="checkbox"/>] No [<input type="checkbox"/>]
Product Under Current UL Evaluation	Yes [<input type="checkbox"/>] No [<input type="checkbox"/>]
Homeland Security Equipment	Yes [<input type="checkbox"/>] No [<input type="checkbox"/>]
E85 Gasoline Equipment	Yes [<input type="checkbox"/>] No [<input type="checkbox"/>]

END OF SECTION

DIVISION 26 – ELECTRICAL
SECTION 262416 – 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 DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 260500 – Common Work Results for Electrical
- C. Section 260553 – Identification for Electrical Systems

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. UL98 – Fusible Switches

1.04 SUBMITTALS – FOR REVIEW / APPROVAL

- A. The following information shall be submitted to the Engineer for each panelboard:
 - 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
 - 6. Product data sheets

1.05 SUBMITTALS – FOR CONSTRUCTION

- A. The following information shall be submitted for record purposes:
- B. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process.
- C. Installation information

1.06 QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.
- B. For the equipment specified herein, the manufacturer shall be ISO 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.

1.07 REGULATORY REQUIREMENTS

- A. Panelboard overcurrent protective devices shall be selectively coordinated with all supply side overcurrent protective devices as required for this project by the National Electrical Code/NFPA 70 Articles 645.27, 700.27, 701.27 and 708.54.
- B. The panelboards and components shall be UL labeled.

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 MANUAL

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Subject to requirements, provide product by one of the following:
 - 1. Eaton
 - 2. Siemens
 - 3. General Electric
 - 4. Square D
 - 5. Approved Equal
 - a. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Ratings.
- B. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or panelboard schedules, but not less than 22,000 amperes RMS symmetrical.
- C. Panelboards rated 480 Vac shall have short-circuit ratings as shown on the drawings or panelboard schedules, but not less than 14,000 amperes RMS symmetrical.
- D. Panelboards shall be labeled with a UL short-circuit rating. Series rated panelboards shall be provided with a label or manual stating the conditions of the UL series ratings. Information in the manual shall include, at minimum:

1. Size and type of upstream device
2. Branch devices that can be used
3. UL tested and listed series short-circuit rating.

2.02 CONSTRUCTION

- A. Interiors shall be completely factory assembled. 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 branch circuit 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 semi flush cylinder lock and catch assembly. Door-in-door trim shall be provided. Both hinged trim and trim door shall utilize three-point latching. No tools shall be required to install or remove trim. Trim shall be equipped with a door-actuated trim locking tab. Equip locking tab with provision for a screw such that removal of trim requires a tool, at the owner's option. Installation shall be tamper resistant with no exposed hardware on the panelboard trim.
- 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.

2.03 BUS

- A. Main bus bars shall be tin-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 system ground bus shall be included in all panels.
- C. Full-size (100%-rated) insulated stand-off 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 panels designated on drawings with oversized neutral conductors.

2.04 BRANCH CIRCUIT PANELBOARDS – CIRCUIT BREAKER

- A. The minimum short-circuit rating for branch circuit panelboards shall be 10,000 amperes symmetrical at 240 volts, and 14,000 amperes symmetrical at 480 volts, or as indicated on the drawings. Panelboards shall be fully rated. Panelboards shall be Eaton type Pow-R-Line 1a, Pow-R-Line 2a or Pow-R-Line 3a or approved equal.
- B. Bolt-on 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. All circuit breakers shall be thermal-magnetic type with common handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame. Ratings through 100-ampere trip shall take up the same pole spacing. Circuit breakers shall be UL listed as type SWD for lighting circuits.

- D. Circuit breaker handle locks (ON position) shall be provided for all circuits that supply exit signs, emergency lights, energy management, and control system (EMCS) panels and fire alarm panels.

2.05 BRANCH CIRCUIT PANELBOARDS – FUSIBLE

- A. The minimum short-circuit rating for branch circuit panelboards shall be as specified herein or as indicated on the drawings. Panelboards shall be fully rated. Panelboards shall be Eaton type Pow-R-Line 3FQS, Bussman Type QSCP, or engineer approved equal.
- B. Panelboard shall have an integrated spare fuse compartment for up to (6) spare CUBE fuses as standard.
- C. Branch circuit disconnecting means shall be bolt-on Bussmann Type CCPB with Bussmann Low-Peak CUBE fuses or approved equal utilized for overcurrent protection. Ratings shall be available from 15-100A with minimum interrupting rating of 300kA symmetrical and 200kA short circuit current assembly rating.
- D. Branch circuit devices shall include a non-defeatable interlock to prevent removal of fuse under load. Provide a fuse ampacity rejection feature to prevent over fusing of branch disconnect. Fuses shall be indicating type with permanently installed neon indicating light. Branch devices shall be finger-safe when panelboard trim is removed. Provide lockout/tagout provision for each branch circuit position.

2.06 DISTRIBUTION PANELBOARDS – CIRCUIT BREAKER TYPE

- A. Distribution panelboards equipped with bolt-on devices shall have interrupting ratings as indicated on the drawings. Panelboards shall be fully rated. Panelboards shall be Eaton type Pow-R-Line 3a or Pow-R-Line 4B or approved equal. Panelboards shall have molded case circuit breakers as indicated below.
- B. Where indicated, provide circuit breakers UL listed for application at 100% of their continuous ampere rating in their intended enclosure.
- C. Main breakers, if furnished, shall be equipped with microprocessor-based trip units that have integral Arc Flash Reduction trip feature. The use of zone selective interlocking to emulate this function does not meet the intent of this specification and will not be allowed.
- D. Distribution circuit breakers shall be fixed mounted type and equipped with either microprocessor-based trip units or thermal magnetic trip units as scheduled on the contract drawings.
- E. Provide shunt trips, bell alarms, and auxiliary switches as shown on the contract drawings.

2.07 DISTRIBUTION PANELBOARDS – FUSIBLE SWITCH TYPE

- A. Distribution panelboards shall be equipped with main and branch fusible switches and include fuses with ratings indicated on the drawings. Fusible distribution panelboards shall be Eaton type Pow-R-Line 4F or approved equal.

2.08 PANELBOARD SUBMETERING

- A. Where shown on the drawings, supply a UL listed microprocessor-based Multi-Point Metering System (MPM), Eaton type PX Multipoint Meter or approved equal having the specified features.
- B. MPM shall have 60 channels for current sensor input. Meter shall auto-detect sensor rating and have standard tamper detection.

- C. MPM shall calculate power and energy consumption in accordance with ANSI C12.20 (0.5%) metering specification and store metered data in nonvolatile memory.
- D. MPM shall store the following per phase and system total for each metering point.
 - 1. Voltage, Current, and Frequency (system total only)
 - 2. Watts, VAR, VA, and power factor
 - 3. Watt hours including forward and reverse.
- E. MPM shall store energy profile information for each metering point in non-volatile memory. The demand profile time period shall be adjustable from 1, 5, 15, 30 and 60 minutes for fixed method and 1, 5, and 15 minutes for sliding method. The MPM shall have the ability to sync with external input to the on-board demand input. The MPM shall be able to save a minimum of 1 year of load profile data for all 60 meter points on a 15 minutes basis.
- F. MPM shall be provided with multiple communications ports and protocols, including the following capability:
 - 1. RS-485 remote display port
 - 2. RS-485 Modbus RTU
 - 3. USB Local Configuration Port
 - 4. HTML web pages
 - 5. File transfer protocol (ftp)
 - 6. RJ-45 10/100Base-T Ethernet network port
 - 7. Modbus TCP
 - 8. BACnet/IP
 - 9. SMTP(Simple Mail Transfer Protocol) for email support
 - 10. SNMP(Simple Network Management Protocol) MIB support
 - 11. Ethernet TCP/IP
 - 12. NTP(Network Time Protocol) support

2.09 SURGE PROTECTION DEVICES

- A. SPD shall comply with ANSI/UL 1449 4th Edition or later listing by Underwriters Laboratories (UL).
- B. SPD shall be factory installed integral to the panelboard by the original equipment manufacturer and shall be a product of the same manufacturer as the panelboard and breakers.
- C. The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable single-mode modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
- D. Electrical Requirements:
 - 1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
 - 2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall not be less than 115% of the nominal system operating voltage.
 - 3. The suppression system shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any

environmental hazards. End of life mode to be open circuit. Unit with end of life short-circuit mode are not acceptable.

4. Unit shall operate without the need for an external overcurrent protection device (OCPD) and be listed by UL as such. Unit must not require external OCPD or replaceable internal OCPD for the UL Listing.
5. Protection Modes – The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

Configuration	Protection Modes			
	L-N	L-G	L-L	N-G
Wye	•	•	•	•
Delta	N/A	•	•	N/A
Single Split Phase	•	•	•	•
High Leg Delta	•	•	•	•

6. Nominal Discharge Current (In) – All SPDs applied to the distribution system shall have a 20kA In rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an In less than 20kA shall be rejected.
7. ANSI/UL 1449 4th Edition Voltage Protection Rating (VPR) – The maximum ANSI/UL 1449 4th Edition VPR for the device shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N; L-G; N-G	700	1200	1500
L-L	1200	2000	3000

2.10 ENCLOSURE

- A. Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical 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.
- C. Where indicated on the drawings, branch circuit panelboards shall be column width type.

2.11 NAMEPLATES

- A. Provide an engraved nameplate for each panel section as per Specification Section 260553.

2.12 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 INSTALLATION

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.
- B. Provide typed directory for each panelboard.

END OF SECTION

DIVISION 26 – ELECTRICAL
SECTION 262726 – WIRING DEVICES

PART 1 – GENERAL

1.01 SCOPE

- A. The Contractor shall furnish and install, where indicated, wiring devices, complete with backboxes and wallplates as specified herein, and as shown on the contract drawings.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 260500 – Basic Electrical Requirements
- C. Section 260532 – Interior Raceways Fittings and Accessories
- D. Section 260534 – Outlet, Junction and Pull Boxes

1.03 SUMMARY

- A. Section Includes:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Receptacles with integral USB charger.
 - 3. Receptacles with integral Arc Fault Circuit Interrupter, AFCI.
 - 4. Plugload Control Receptacles.
 - 5. Twist-locking receptacles.
 - 6. Receptacles with integral surge-suppression units.
 - 7. Isolated-ground receptacles.
 - 8. Hospital-grade receptacles.
 - 9. Tamper-resistant receptacles.
 - 10. Weather-resistant receptacles.
 - 11. Snap switches and wall-box dimmers.
 - 12. Wall-switch and exterior occupancy sensors.
 - 13. Communications outlets.
 - 14. Pendant cord-connector devices.
 - 15. Cord and plug sets.
 - 16. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

1.04 DEFINITIONS

- A. AFCI: Arc fault circuit interrupter.
- B. EMI: Electromagnetic interference.
- C. GFCI: Ground-fault circuit interrupter.
- D. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- E. Plugload Control Receptacle: Automatically occupancy switched receptacle.
- F. RFI: Radio-frequency interference.
- G. TVSS: Transient voltage surge suppressor.
- H. UTP: Unshielded twisted pair.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.

1.06 ACTION SUBMITTALS

- A. Product Data: Manufacturer's standard catalog cut, highlighted for each type of product used.
- B. Samples: One for each type of device and wall plate specified, in each color specified when so indicated on the drawings or requested by the Architect/Engineer.

1.07 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.08 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. None unless otherwise specified on the drawings.

1.09 QUALITY ASSURANCE

- A. Electrical components, conductors, devices and accessories described herein shall be listed and labeled as defined by NFPA 70 by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), for the intended use and shall bear its label.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; Wiring Device-Kellems (Hubbell) or a comparable product by one of the following:
 1. Arrowhart Wiring Devices, Inc.; Division of Eaton.
 2. Leviton Manufacturing Co., Inc.
 3. Pass & Seymour/Legrand (Pass & Seymour).
 4. Approved equal.
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.02 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors shall NOT be used unless otherwise specifically indicated in the drawings.

2.03 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles:

1. Requirements: Heavy Duty 125 V, 20A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
2. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; HBL5361 (single), HBL5362 (duplex) (Design Basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton; 5361 (single), AH 5362 (duplex).
 - c. Leviton Manufacturing Co., Inc.; 5361 (single), 5362 (duplex).
 - d. Pass & Seymour/Legrand (Pass & Seymour); 5361 (single), 5362 (duplex).
 - e. Approved Equal.

B. USB Charging Convenience Receptacles:

1. Requirements: Tamper Resistant, 125 V, 20A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 1310, and FS W-C-596. Compatible with USB 1.1/2.0/3/0 devices, including Apple products.
2. Subject to compliance with requirements, provide duplex receptacle with 2 USB charging Ports or a comparable product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; USB 20X2 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton, TR7756.
 - c. Leviton Manufacturing Co., Inc. T5832
 - d. Pass & Seymour/Legrand (Pass & Seymour) TR5362USB.
 - e. Approved Equal

C. Arc Fault Convenience Receptacles:

1. Requirements: 125 V, 20A: tamper resistant. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
2. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; AFR20TR (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton. TRAFCI20
 - c. Leviton Manufacturing Co., Inc. AGTR2
 - d. Pass & Seymour/Legrand (Pass & Seymour), AFR202
 - e. Approved Equal

D. Arc Fault / Ground Fault Dual Function Convenience Receptacles:

1. Requirements: 125 V, 20A, tamper resistant, Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 943, UL 498, and FS W-C-596.
2. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; AFGF20TR (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton. TRAFCI20
 - c. Leviton Manufacturing Co., Inc. AFTR2
 - d. Pass & Seymour/Legrand (Pass & Seymour), AFGFR202TR
 - e. Approved Equal

E. Plugload Controlled Convenience Receptacles:

1. Requirements: 125 V, 20A, permanent controlled face marking: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
2. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; one controlled face BR20C1, or two controlled faces, BR20C2 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton, 5362CH (one face), 5362CD (2-faces)
 - c. Leviton Manufacturing Co., Inc. 5362-S1(one face) or 5362-S2 (two faces)
 - d. Pass & Seymour/Legrand (Pass & Seymour).5362CH (1-face) or 5362CD (2-faces)
 - e. Approved Equal.

F. Isolated-Ground, Duplex Convenience Receptacles:

1. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.
2. Requirements: 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
3. Subject to compliance with requirements, provide or a comparable product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; IG5362 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton; IG 5362.
 - c. Leviton Manufacturing Co., Inc.; 5362IG.
 - d. Pass & Seymour/Legrand (Pass & Seymour); IG5362.
 - e. Approved Equal.

G. Tamper-Resistant Convenience Receptacles:

1. Requirements: 125 V, 20 A: Comply with NEMA WD1, NEMA WD6 Configuration 5-20R, UL 498 Supplements, and FSW-C-596.
2. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Wiring Device - Kellems; HBL5362TR (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton; TRBR20.
 - c. Leviton Manufacturing Co., Inc.; TBR20.
 - d. Pass & Seymour/Legrand (Pass & Seymour); TR63.
 - e. Approved equal.

2.04 GFCI RECEPTACLES

A. Description:

1. Straight blade, non-feed-through type unless otherwise specified in the drawings.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Self-test function, line / load reversal protection.

4. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
5. Extra heavy duty, weather and tamper resistant.
6. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
7. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; GFR5632TR (design basis).
 - b. Cooper Wiring Devices, Inc.; Division of Eaton; VGF20.
 - c. Leviton Manufacturing Co., Inc.; 7899.
 - d. Pass & Seymour/Legrand (Pass & Seymour); 2099.
 - e. Approved Equal

2.05 RETRACTABLE CORD REELS

A. General Requirements:

1. Comply with NEMA WD 1, UL 20, and FS W-S-896.
2. Switches, 120/277 V, 20 A, 1HP @ 120V, 2HP @ 240V:

B. Description:

1. Steel construction including mounting base, 20A, 125VAC, NEMA 2 positive latching mechanism, minimum 5' long input power cord and plug, adjustable guide arm, 25'L minimum 12/3 power cord.
2. UL 355 listed / certified.
3. Provide with double duplex GFCI straight blade receptacles on the payout end. Exception – Integral GFCI protection not required where upstream GFCI protection is provided by a GFCI branch circuit breaker or other device.
4. Unless otherwise noted in the drawings provide safety yellow color when used in shop classrooms, white when used in Science lab or Family/Consumer Science classrooms.
5. Provide with swivel base.
6. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; HBL45123 Series (design basis)
 - b. KH Industries RTB3L Series.
 - c. Approved equal.

2.06 CORD AND PLUG SETS

A. Description:

1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.

3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.07 TOGGLE SWITCHES

A. General Requirements:

1. Comply with NEMA WD 1, UL 20, and FS W-S-896.
2. Switches, 120/277 V, 20 A, 1HP @ 120V, 2HP @ 240V:

B. Single Pole:

1. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1221 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton, Inc.; AH 1221.
 - c. Leviton Manufacturing Co., Inc.; 1221-2.
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC1.
 - e. Approved equal.

C. Double Pole:

1. Subject to compliance with requirements, provide or a comparable product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1222 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton, Inc.; AH1222.
 - c. Leviton Manufacturing Co., Inc.; 1222-2.
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC2.
 - e. Approved equal.

D. Three Way:

1. Subject to compliance with requirements, provide or a comparable product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1223 (design basis)
 - b. Arrow Hart Devices, Inc.; Division of Eaton.; AH1223.
 - c. Leviton Manufacturing Co., Inc.; 1223-2.
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC3.
 - e. Approved equal.

E. Four Way:

1. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1224 (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Easton.; AH1224.
 - c. Leviton Manufacturing Co., Inc.; 1224-2.
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC4.
 - e. Approved equal.

F. Pilot-Light Switches:

1. Description: Single pole, with neon-lighted handle, illuminated when switch is "off.

2. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1221-PL for 120 and 277 V
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton.; AH1221-PL (120 ad 277 V).
 - c. Leviton Manufacturing Co., Inc.; 1221-PLR (120V) or 1221-7PLR (277V).
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC1RPL (120V) or PS20AC1RPL7 (277V).
 - e. Approved equal.
- G. Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors.
1. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; HBL1557 (design basis)
 - b. Arrow Hart Devices, Inc.; Division of Eaton.; 1995.
 - c. Leviton Manufacturing Co., Inc.; 1257.
 - d. Pass & Seymour/Legrand (Pass & Seymour); 1251.
 - e. Approved equal.

2.08 KEY-OPERATED SWITCHES, 120/277 V, 20 A

A. General Requirements:

1. Comply with NEMA WD 1, UL 20, and FS W-S-896.
2. Switches, 120/277 V, 20 A, 1HP @ 120V, 2HP @ 240V.
3. Single Pole, with factory-supplied key in lieu of switch handle.

B. Single Pole:

1. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; 1221L (design basis)
 - b. Cooper Wiring Devices, Inc.; Division of Cooper Industries, Inc.; AH1221L.
 - c. Leviton Manufacturing Co., Inc.; 1221-2L.
 - d. Pass & Seymour/Legrand (Pass & Seymour); PS20AC1-L.
 - e. Approved equal.

C. Key-Operated, Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

1. Subject to compliance with requirements, provide product by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; HBL1557L (design basis)
 - b. Arrow Hart Wiring Devices, Inc.; Division of Eaton.; 1995L.
 - c. Leviton Manufacturing Co., Inc.; 1257L.
 - d. Pass & Seymour/Legrand (Pass & Seymour); 1251L.
 - e. Approved equal.

2.09 WALL-BOX DIMMERS

- A. Shall be compatible with lighting type used. Coordinate with drawings and lighting specification divisions.

2.10 WALL PLATES

- A. Single and combination types shall match corresponding wiring device style. Multi-gang installations shall be installed under a single piece wall plate.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: Type 302 stainless steel, 0.04-inch thick, brushed brass with factory polymer finish.
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, listed and labeled for use in wet and damp locations.
 - 5. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.11 FLOOR SERVICE FITTINGS

- A. Floor Service assemblies specified herein shall be for power use only. For assemblies containing data communications or combination power and data communications refer to technology drawings and specification sections for applicable products.
- B. Type: Modular, flush-type, flap-type, above-floor, single-service units suitable for wiring method used as indicated in the drawings.
- C. Compartments: Barrier separates power from voice and data communication cabling.
- D. Service Plate: Rectangular or Round as indicated, finish die-cast aluminum finish with satin finish, unless otherwise indicated.
- E. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.

2.12 POKE-THROUGH ASSEMBLIES

- A. Poke-Through assemblies specified herein shall be for power use only. For assemblies containing data communications or combination power and data communications refer to technology drawings and specification sections for applicable products.
- B. Where not otherwise indicated on the drawings, subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; products named below or a comparable product by one of the following:
 - 1. FSR.
 - 2. Wiremold / Legrand.
 - 3. Approved equal.
- C. Activation Type:
 - 1. Recessed Activation.
 - a. Hubbell System One - Recessed Activation or approved equal.
 - 1) S1R4PT: 4-inch core with two 1/2 inch and one 3/4 inch feed conduits.
 - 2) Outlets: S1R4PTQUAD: Power only, with four power outlets.

b. Provide with appropriate subplate for device mounting and cover, finish chosen by Architect.

- 1) Cover Flange: 0.12 inch thick, ADA compliant.
- 2) Finish: As specified by Architect.

D. Surface Activation.

1. Hubbell System One - Surface Activation or approved equal:
 - a. S1PT4X4FIT with two 3/4 inch conduits for low voltage, one 3/4 inch for power.
2. Provide with appropriate subplate for device mounting and cover, finish chosen by Architect.
3. Cover Flange: ADA compliant appropriate for use in the floor finish installed.
4. Furniture Feed Cover: S1PFFT for tile applications or S1PFF for carpet applications as appropriate with one 3/4 inch connection for power and one 1-1/2 inch connection for low voltage.
 - a. Finish: As specified by Architect.

E. Pedestal Activation.

1. PT7XC, 2-inch poke through insert with a RX80 series pedestal, size as required or approved equal.

F. Description:

1. Factory-fabricated and -wired assembly of below-floor junction box with multi-channeled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
2. Comply with UL 514 scrub water exclusion requirements.
3. Service-Outlet Assembly: As indicated on the plans."
4. Size: Selected to fit cored holes in floor and matched to floor thickness.
5. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
6. Closure Plug: Arranged to close unused cored openings and reestablish fire rating of floor.
7. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors

2.13 PREFABRICATED MULTIOUTLET ASSEMBLIES

- A. Unless otherwise noted in the drawings, Subject to compliance with requirements, provide 20A, 120V by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems; Plug TrakHBL24 series steel.
 - b. Wiremold / Legrand.
 - c. Approved equal.
- B. Two-piece surface painted steel brushed aluminum or PVC raceway, with factory-wired multi-outlet harness.

- C. Components shall be products from single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- D. Raceway Material: Painted Metal for general use. PVC where subject to corrosive conditions.
- E. Multi-outlet Harness:
 - 1. Receptacles: 20 A, 125-V, NEMA WD 6 Configuration 5-20R receptacles complying with NEMA WD 1, UL 498, and FS W-C-596.
 - 2. Receptacle Spacing: 12 inches, unless otherwise indicated.
 - 3. Wiring: No. 12 AWG solid, Type THHN copper, single circuit.

2.14 SERVICE POLES

- A. Subject to compliance with requirements, provide service poles or comparable product by one of the following:
 - 1. Hubbell Wiring Device Kellems; HBL PP series (design basis).__
 - 2. MonoSystems.
 - 3. Legrand / Wiremold.
 - 4. Approved equal.
- B. Description:
 - 1. Factory-assembled and -wired units to extend power and voice and data communication from distribution wiring concealed in ceiling to devices or outlets in pole near floor.
 - 2. Poles: Nominal 2.5-inch- square cross section, with height adequate to extend from floor to at least 6 inches above ceiling, and with separate channels for power wiring and voice and data communication cabling.
 - 3. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports; with pole foot and carpet pad attachment.
 - 4. Material and Finish: Painted steel.
 - 5. Wiring: Sized for minimum of five No. 12 AWG power and ground conductors and a minimum of four, four-pair, Category 3 or Category 5 voice and data communication cables.
 - 6. Power Receptacles: Two duplex, 20-A, straight-blade receptacles complying with requirements in this Section.
 - 7. Voice and Data Communication Outlets: complying with requirements in Division 27.

2.15 FINISHES

- A. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: Brown unless otherwise indicated or required by NFPA 70 or device listing. Exceptions – a) In offices, Libraries, Cafeterias, etc., color as specified by Architect, b) In partially renovated rooms - match existing devices to remain.
 - 2. Wiring Devices Connected to Emergency / Standby Power System: Red.

3. TVSS Devices: Blue.
 4. Isolated-Ground Receptacles: White, with orange triangle on face.
 5. Controlled Receptacles – Green (where available) or where not available, other color differing from general use receptacles in the area.
- B. Wall Plate Color: See “Wallplates” above. For plastic covers, match device color.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. See plans for device mounting heights. Otherwise, comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
1. Install devices flush and level.
 2. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 3. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

4. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
5. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
6. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
7. Use a torque screwdriver when a torque is recommended or required by manufacturer.
8. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
9. Tighten unused terminal screws on the device.
10. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
11. Receptacles shall have a bonding conductor from the grounding terminal to the metal conduit system. Self-grounding receptacles using mounting screws as bonding means are not acceptable.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to left.

F. Wall Switches:

1. Install wall switches with OFF position down.

G. Device Plates:

1. Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
2. Install device plates flush and level.

H. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
4. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on bottom. Group adjacent switches under single, multi-gang wall plates.
5. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.02 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.03 IDENTIFICATION

- A. Comply with Section 260553 – Identification for Electrical Systems.
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.04 FIELD QUALITY CONTROL

- A. Tests for Wiring Devices:
 - 1. Inspect each wiring device for defects.
 - 2. Verify each receptacle device is energized. Acceptable line voltage range is 105 to 132 V.
 - 3. Test each receptacle for proper polarity. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. Operate each wall switch and wall dimmer with circuit energized and verify proper operation.
 - 7. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- B. Wiring device will be considered defective if it does not pass tests and inspections.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 265100 – INTERIOR LIGHTING

PART 1 – GENERAL

1.01 SCOPE

- A. This section includes furnishing, installing and connecting interior lighting systems.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, the Related Sections listed below, apply to this Section.
- B. Related Sections:
 - 1. Section 260500 – Common Work Results for Electrical
 - 2. Section 260519 – Low-Voltage Electrical Power Conductors & Cables
 - 3. Section 260526 – Grounding and Bonding

1.03 DEFINITIONS

- A. Lighting Fixture: An electrical device that contains one or more lighting elements which provide illumination. The terms “lighting fixture”, “fixture” “luminaire” carry the same meaning.
- B. Night Lights: Light fixtures that are wired to the unswitched leg of the circuit. Night lights are not to be confused with emergency lights, which have a second source of power and may be switched.

1.04 SUBMITTALS

- A. Product Data: Arrange in order of luminaire designation. The submittals shall include data on features, ratings, listings, certifications, accessories, finishes, dimensions, emergency components, photometric data, and luminaire efficiency data.
- B. Manufacturer standard cut sheets fully highlighted or red-lined with selected features and options.
- C. Closeout Submittal: Installation, Operation, and Maintenance Manuals.
- D. Substitutions and/or equivalents: Where substitute or equivalent fixtures are proposed for use by the Contractor, and upon request of the Engineer or Architect, provide complete site-specific point by point photometric analysis of the proposed fixtures. The analysis shall be provided at no additional cost. Floor plan backgrounds will be provided by the Engineer /Architect upon request. Results shall include for each space:
 - 1. Average illumination levels (in footcandles.)
 - 2. Max/min ratios
 - 3. Power density (Watts/sq.ft.)
 - 4. Legend and schedule of proposed fixtures which includes lumen output per fixture, watts per fixture.
 - 5. Fixture mounting heights (ft.).
 - 6. Any de-rating factors applied.
 - 7. Point by point plot of illumination levels at not more than 2' x 2' spacing.

1.05 QUALITY ASSURANCE

- A. Lighting fixtures shall be of specification grade and listed or labeled by Underwriters Laboratories (UL) or an approved Nationally Recognized Testing Laboratory (NRTL).
- B. LED fixtures shall comply with the following:
 - 1. UL Standard 8750 "Light Emitting Diode Equipment for Use in Lighting Products", IES Standard LM-79 "Electrical and Photometric Measurements of Solid-State Lighting Products", IES Standard LM-80 "Measuring Lumen Maintenance of LED Light Sources", and IES Standard TM-21 "Projecting Long Term Lumen Maintenance of LED Light Sources".
 - 2. ANSI C78.377 "Specifications for the Chromaticity of Solid State Lighting Products" with LEDs binned within a maximum three-step MacAdam Ellipse to ensure color consistency amongst luminaries of the same type.

1.06 WARRANTY

- A. For non-LED lighting fixtures and components, provide a complete warranty for parts and labor for a minimum of one year from the date of Substantial Completion.
- B. For LED fixtures, lamps, drivers, and components, provide a complete warranty for parts and labor for a minimum of five years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 LIGHTING FIXTURES

- A. Provide lighting fixtures in accordance with the Fixture Schedule.
 - 1. Provide only LED fixtures with a Design Lights Consortium (DLC) listing, a U.S. Department of Energy (DOE) "LED Lighting Facts" label, or a U.S. Environmental Protection Agency (EPA) ENERGY STAR label, which have demonstrated third-party testing verification.
- B. Unless otherwise specified, LED fixtures shall have a color temperature of 3500 degrees K, a CRI of 80 minimum, and a lumen maintenance L70 rating of 50,000 hours minimum.
- C. Recessed lighting fixtures shall be thermally protected.
- D. LED fixtures shall be modular and allow for separate replacement of LED light elements and drivers. User serviceable LED light elements and drivers shall be replaceable from the room side.
- E. Dimmable LED fixtures shall have either a 0-10 volt, 3-wire dimming driver, or a two-step (50%-100%) line voltage, two switch controlled dimming driver, as shown on the drawings.

2.02 LAMPS

- A. Unless otherwise specified, LED lamps shall have a color temperature of 3500 degrees K, a CRI of 80 minimum, and a lumen maintenance L70 rating of 50,000 hours minimum.
- B. Retrofit LED lamps shall comply with NEMA SSL 4 "SSL Retrofit Lamps: Suggested Minimum Performance Requirements".

2.03 BALLASTS AND DRIVERS

- A. LED drivers shall be electronic type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47 Part 15, and comply with NEMA SSL 1 "Electronic Drivers for LED Devices, Arrays, or Systems". LED drivers shall have a sound rating of "A", have a minimum efficiency of 85%, and be rated for a THD of less than 20 percent at all input voltages.
- B. Dimmable LED drivers shall be 0-10V type, unless otherwise noted. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.
- C. Ballasts and drivers shall be rated for the ambient temperatures in which they are located. Outdoor fixtures shall be equipped with ballasts or drivers rated for reliable starting to -20 degrees F. Indoor fixtures located in areas with direct sunlight or above normal ambient temperatures shall have ballasts or drivers rated at 65 degrees C minimum.
- D. Individually fused ballasts and drivers shall have their fuses accessible from outside of the fixture chassis.

2.04 EMERGENCY LIGHTING

- A. Emergency lighting shall consist of normal lighting fixtures with generator or battery-inverter system backup, emergency lighting fixtures with individual battery backup, or sealed beam emergency lighting units in accordance with the Fixture Schedule.
- B. Emergency lighting fixtures shall be capable of providing the listed emergency illumination for not less than 90-minutes after loss of normal power.
 - 1. Battery-backed LED emergency lighting fixtures shall consist of a normal LED fixture with some or all the LEDs connected to a UL 924 Listed battery and charger. The battery shall be nickel cadmium and sized for a minimum of 90 minutes of fixture operation. The charger shall be solid-state and provide overload, short circuit, brownout and low battery voltage protection. The battery and charger shall include self-diagnostic and self-exercising circuitry to exercise and test itself for 5 minutes every month and for 30 minutes every 6 months. The fixture shall include a test/monitor module with LED status indicating lights mounted to be visible to the public. The fixture shall not contain an audible alarm.
 - 2. Sealed beam emergency lighting units shall be UL 924 Listed, dual voltage 120/277V input, and shall consist of sealed beam LED lamps connected to an internally mounted battery and charger. The battery shall be nickel cadmium and sized for a minimum of 90 minutes of battery operation. The charger shall be solid-state and provide overload, short circuit, brownout and low battery voltage protection. The unit shall be suitable for wall or ceiling mounting as required. It shall include self-diagnostic and self-exercising circuitry to exercise and test itself for 5 minutes every month and for 30 minutes every 6 months. The unit shall include a test/monitor module with LED status indicating lights mounted to be visible to the public. The unit shall not contain an audible alarm.

2.05 EXIT SIGNS

- A. Exit signs shall be of the LED type. Fluorescent, electro luminescent light panel, or self-powered luminous signs shall not be used. Subject to requirements, provide product from Chloride, Dual-Lite, Emergi-Lite, Exide Lightguard, Lightalarms, Lithonia, LSI Industries, Morelite, Prescolite, or Sure-Lites or approved equal.
 - 1. Dual Voltage Input 120/277V, 60Hz., UL 924 Listed, UL Damp Location Listed.

2. LED's shall be wired in parallel to prevent multi-lamp failure and shall be concealed within the sign by a clear panel and red optical diffuser. Power consumption shall not exceed 2 watts per face.
3. Exit signs shall have white die-cast aluminum or polycarbonate housings with universal mounting brackets; brushed aluminum stencil faces with red or green letters and multi-directional knockout arrows.
4. Exit signs shall be provided with extra faceplate for field conversion from single to double face.
5. Exit signs shall be provided with UL 924 Listed, 90-minute emergency battery packs and battery chargers when required. Batteries shall be maintenance-free nickel-cadmium and shall be mounted within the signs.
6. Shall include integral test switch and power indicator light.
7. New exit signs in installed existing buildings shall match the existing exit sign color scheme (red or green)

2.06 COMBINATION EMERGENCY / EXIT SIGNS

- A. Combination emergency / exit signs shall be subject to the requirements outlined for sealed beam emergency lights and exit lights as described above. Subject to requirements, provide product from Chloride, Dual-Lite, Emergi-Lite, Exide Lightguard, Lightalarms, Lithonia, LSI Industries, Morelite, Prescolite, or Sure-Lites or approved equal.

2.07 LOW VOLTAGE LIGHTING CONTROL WIRING

- A. 0-10VDC Dimming Control Wiring:
 1. UL TYPE CMP/CL3P/FPLP plenum rated cable, 300V, 75CC
 2. 16AWG or 18AWG stranded copper conductors,
 3. White outer jacket, (2) conductors - violet and pink
 4. Southwire Spec #70194 or equal

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

- A. Comply with NFPA 72, NECA 1 and manufacturer's installation instructions.
- B. Support recessed troffers independently of the ceiling grid system by using two safety wires minimum on diagonally opposite corners of the fixtures. Support recessed downlights by using safety wires or by rigidly attaching the fixtures to the building structure or ceiling grid system. Removable T-bar clips shall not solely be used to attach fixtures to the ceiling grid system.
- C. Install fixtures level, with no gaps between adjacent fixtures or between fixtures and surrounding surfaces. Lenses, reflectors, and trims of fixtures shall be properly and uniformly aligned.
- D. Where fixtures are shown with dual switches, control all inner lamps with one switch and all outer lamps with the other switch. Where dimming or occupancy sensor-controlled fixtures are shown, control the fixtures in accordance with the appropriate wiring diagram or manufacturer's instructions.

- E. Connect night light fixtures and emergency lighting fixtures to the hot (unswitched) side of the area lighting circuits.
- F. Provide an individual feed with ground conductor from a junction box to each lighting fixture. Lighting fixtures shall not be daisy chained.
- G. Drops to recessed fixtures may be flexible metallic conduit, or manufactured wiring systems may be used where accessible. Fixtures shall be provided with sufficient length to permit removal and lowering of the fixtures 12" below the ceiling.
- H. Provide green grounding conductors back to the panel ground for lighting circuits. Raceways shall not be used as grounding conductors.
- I. Fixtures shall have their exterior labels removed and shall be thoroughly cleaned. Burned out lamps or arrays shall be replaced. Cracked or damaged lenses shall be replaced.
- J. Locate emergency lighting remote battery packs and remote test/monitor modules identically so their status indicating lights are visible to the public and they form a straight line when viewed from the end of the corridor or room. Where a suspended ceiling exists, center the status indicating lights in adjacent ceiling tiles.
- K. Mount sealed beam emergency lighting units where shown and aim their lamps to light the egress path as uniformly as possible.
- L. When emergency lighting fixtures contain audible alarms, disable the alarms in accordance with manufacturer's instructions.
- M. Sealed beam emergency lighting unit fixtures and the emergency supply of emergency battery/inverter fixtures shall be wired to the area lighting circuit ahead of any switching controls. Exception, when three or more normal lighting circuits supply a separate and uninterrupted area, that may be supplied from a separate dedicated circuit from the same panel and provided with a lock-on circuit breaker.
- N. Clean all fixtures of construction dust and fingerprints prior to final inspection.

3.02 FIELD QUALITY CONTROL

- A. A visual inspection shall be performed to verify cleanliness and alignment of the fixtures. Misalignment and light leaks shall be corrected and rattles due to ventilation system vibration shall be eliminated. Damaged or broken lenses shall be replaced.
- B. Perform an operational test to verify that all fixtures illuminate properly, dimming systems dim properly (i.e. no flicker), and lighting zones are switched according to the drawings.
- C. Test all emergency and exit lighting by interrupting the normal lighting supply to verify proper operation. Verify proper re-transfer to normal operation upon restoration of normal power.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 265600 – EXTERIOR LIGHTING

PART 1 – GENERAL

1.01 SCOPE

- A. This section includes furnishing, installing and connecting exterior lighting systems.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, the Related Sections listed below, apply to this Section.
- B. Related Sections:
 - 1. Section 260500 – Common Work Results for Electrical
 - 2. Section 260505 – Low-Voltage Electrical Power Conductors & Cables
 - 3. Section 260526 – Grounding and Bonding
 - 4. Section 260543 – Underground Ducts and Raceways for Electrical Systems

1.03 DEFINITIONS

- A. Lighting Fixture: An electrical device that contains one or more lighting elements which provide illumination. The terms “lighting fixture”, “fixture” “luminaire carry the same meaning.

1.04 SUBMITTALS

- A. Product Data: Arrange in order of luminaire designation. The submittals shall consist of manufacturer’s standard catalog cuts and shall include data on features, ratings, listings, certifications, accessories, finishes, dimensions, emergency components, photometric data, and luminaire efficiency data.
- B. Manufacturer standard cut sheets shall be fully highlighted or red-lined with selected features and options to be provided.
- C. Installation, Operation, and Maintenance Manuals.
- D. Substitutions and/or equivalents: Where substitute or equivalent fixtures are proposed for use by the Contractor, and upon request of the Engineer or Architect, provide complete site-specific point by point photometric analysis of the proposed fixtures. The analysis shall be provided at no additional cost. Floor plan backgrounds will be provided by the Engineer /Architect upon request. Results shall include for each space:
 - 1. Average illumination levels (in footcandles.)
 - 2. Max/min ratios
 - 3. Power density (Watts/sq.ft.)
 - 4. Legend and schedule of proposed fixtures which includes lumen output per fixture, watts per fixture.
 - 5. Fixture mounting heights (ft.).
 - 6. Any de-rating factors applied.
 - 7. Point by point plot of illumination levels at not more than 2’ x 2’ spacing.

1.05 QUALITY ASSURANCE

- A. Lighting fixtures shall be of specification grade and listed or labeled by Underwriters Laboratories (UL) or an approved Nationally Recognized Testing Laboratory (NRTL).
- B. LED fixtures shall comply with the following:
 - 1. UL Standard 8750 "Light Emitting Diode Equipment for Use in Lighting Products", IES Standard LM-79 "Electrical and Photometric Measurements of Solid-State Lighting Products", IES Standard LM-80 "Measuring Lumen Maintenance of LED Light Sources", and IES Standard TM-21 "Projecting Long Term Lumen Maintenance of LED Light Sources".
 - 2. ANSI C78.377 "Specifications for the Chromaticity of Solid-State Lighting Products" with LEDs binned within a maximum three-step MacAdam Ellipse to ensure color consistency amongst luminaries of the same type.

1.06 WARRANTY

- A. For non-LED lighting fixtures and components, provide a complete warranty for parts and labor for a minimum of one year from the date of Substantial Completion.
- B. For LED fixtures, lamps, drivers, and components, provide a complete warranty for parts and labor for a minimum of five years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 POLES

- A. General:
 - 1. Poles shall be as shown on the drawings, and as specified. Finish shall be as specified on the drawings.
 - 2. The pole and arm assembly shall be designed for wind loading of 100 mph minimum, as required by wind loading conditions at project site, with an additional 30% gust factor and supporting luminaire(s) and accessories such as shields, banner arms, and banners that have the effective projected areas indicated. The effective projected area of the pole shall be applied at the height of the pole base, as shown on the drawings.
 - 3. Poles shall be anchor-bolt type designed for use with underground supply conductors. Poles shall have handhole having a minimum clear opening of 2.5 x 5 inches. Handhole covers shall be secured by stainless steel captive screws.
 - 4. Provide a steel-grounding stud opposite handhole openings, designed to prevent electrolysis when used with copper wire.
 - 5. Provide a base cover that matches the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts.
 - 6. Hardware and Accessories: All necessary hardware and specified accessories shall be the product of the pole manufacturer.
 - 7. Provide manufacturer's standard finish, as scheduled on the drawings.

B. Types:

1. Aluminum: Provide round or square aluminum poles as indicated in the drawings manufactured of corrosion-resistant AA AAH35.1 aluminum alloy conforming to AASHTO LTS-4. Poles shall be seamless extruded or spun seamless type.
2. Steel: Provide round or square steel poles having minimum 11-gauge steel with minimum yield/strength of 48,000 psi and factory finish. Galvanized steel poles shall comply with ASTM A123 and A153.

C. Foundations for Poles:

1. Foundations shall be cast-in-place concrete, or pre-cast concrete, having 4000 psi minimum 28-day compressive strength.
2. Foundations shall support the effective projected area of the specified pole, arm(s), luminaire(s), and accessories, such as shields, banner arms, and banners, under wind conditions previously specified in this section.
3. Place concrete in spirally wrapped treated paper forms for round foundations, and construct forms for square foundations.
4. Rub-finish and round all above-grade concrete edges to approximately 6 mm (0.25-inch) radius.
5. Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups. Anchor bolts shall be positioned as per the pole manufacturer requirements.
6. Prior to concrete pour, install electrode per Section 260526 - GROUNDING AND BONDING.
7. Only pole manufacturer supplied, or approved anchor bolts may be used in pole foundations.
8. Pre-cast concrete foundations, conforming to the drawings may be used in lieu of cast-in place foundations.

2.02 LIGHTING FIXTURES

- A. Provide lighting fixtures in accordance with the Fixture Schedule.
- B. Luminaires shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and driver/ballast heat, and safe cleaning and re-lamping.
- C. Provide fixtures with all required mounting hardware, backboxes, adapters, etc. to mount fixtures to poles, walls etc.
- D. Illumination distribution patterns, BUG ratings and cutoff types as defined by the IESNA shall be as shown on the drawings.
- E. Incorporate ballasts in the luminaire housing, except where otherwise shown on the drawings.
- F. Lenses shall be frame-mounted, heat-resistant, borosilicate glass, with prismatic refractors, unless otherwise shown on the drawings. Attach the frame to the luminaire housing by hinges or chain. Use heat and aging-resistant, resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

- G. Lamp sockets for high intensity discharge (H.I.D) fixture shall have locking-type porcelain enclosures in conformance to the applicable requirements of ANSI C81.61-09 and UL 496-08.
- H. Pre-wire internal components to terminal strips at the factory.
- I. Bracket-mounted luminaires shall have levelling provisions and clamp-type adjustable slip-fitters with locking screws.
- J. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.
- K. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings, match finish process and color of pole or support materials.
- L. Luminaires shall carry factory labels, showing complete, specific lamp and ballast information.

2.03 LAMPS

- A. Where lamps are furnished separately, install the proper lamps in every luminaire installed and every existing luminaire relocated or reinstalled as shown on the drawings.
- B. Lamps shall be general-service, outdoor lighting types.
- C. High-Pressure Sodium (HPS) Lamps: Comply with NEMA C78.42, Color Rendering Index (CRI) 21 (minimum), wattage as indicated on fixture schedule. Lamps shall have minimum average rated life of 24,000 hours.
- D. Metal-Halide Lamps: Comply with NEMA C78.43 or NEMA C78.1381. Lamps shall be pulse start or ceramic type with wattage and correlated color temperature as indicated on fixture schedule.
- E. LED sources shall meet the following requirements:
 - 1. Operating temperature rating shall be between -40 degrees C (-40 degrees F) and 50 degrees C (120 degrees F).
 - 2. Correlated Color Temperature (CCT): 5000K unless otherwise specified in the drawings.
 - 3. Color Rendering Index (CRI): greater than or equal to 85.
 - 4. The manufacturer shall have performed reliability tests on the LEDs luminaires complying with Illuminating Engineering Society (IES) LM79 for photometric performance and LM80 for lumen maintenance and L70 life.
- F. Mercury vapor lamps shall not be used.

2.04 BALLASTS AND DRIVERS

- A. LED drivers shall be electronic type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47 Part 15, and comply with NEMA SSL 1 "Electronic Drivers for LED Devices, Arrays, or Systems". LED drivers shall have a sound rating of "A", have a minimum efficiency of 85%, and be rated for a THD of less than 20 percent at all input voltages.
- B. Dimmable LED drivers shall be 0-10V type. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.
- C. Ballasts and drivers shall be rated for the ambient temperatures in which they are located. Outdoor fixtures shall be equipped with ballasts or drivers rated for reliable starting to -20 degrees F. Indoor

fixtures located in areas with direct sunlight or above normal ambient temperatures shall have ballasts or drivers rated at 65 degrees C minimum.

- D. Individually fused ballasts and drivers shall have their fuses accessible from outside of the fixture chassis.

2.05 EMERGENCY LIGHTING

- A. Provide emergency egress lighting where indicated on the drawings.
- B. Emergency lighting shall consist of normal lighting fixtures with generator or battery-inverter system backup, emergency lighting fixtures with individual battery backup, or sealed beam emergency lighting units in accordance with the Fixture Schedule.
- C. Emergency lighting fixtures shall be capable of providing the listed emergency illumination for not less than 90-minutes after loss of normal power.
 - 1. Battery-backed LED emergency lighting fixtures shall consist of a normal LED fixture with some or all the LEDs connected to a battery and charger. The battery shall be nickel cadmium and sized for a minimum of 90 minutes of fixture operation. The charger shall be solid-state and provide overload, short circuit, brownout and low battery voltage protection. The battery and charger shall include self-diagnostic and self-exercising circuitry to exercise and test itself for 5 minutes every month and for 30 minutes every 6 months. The fixture shall include a test/monitor module with LED status indicating lights mounted to be visible to the public. The fixture shall not contain an audible alarm. Batteries used outdoors shall be cold weather rated (-4 °F).

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

- A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer's recommendations.
- B. Pole Foundations:
 - 1. Excavate only as necessary to provide sufficient working clearance for installation of forms or foundation and proper use of tamper to the full depth of the excavation. Prevent surface water from flowing into the excavation. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath, and the end of conduit.
 - 2. Install poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
 - 3. After the poles have been installed, shimmed, and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 9 mm (0.375-inch) inside diameter through the grout, tight to the top of the concrete base to prevent moisture weeping from the interior of the pole.
- C. Install lamps in each luminaire requiring lamping.
- D. Adjust and aim luminaires that require aiming.
- E. Wall-Mounted Fixtures:

1. Install per NEC, the drawings and manufacturer's instructions.
2. Provide all required mounting hardware.
3. Install fixtures on suitable listed backboxes.
4. All building penetrations shall be thoroughly caulked and sealed watertight.

3.02 GROUNDING

- A. Install grounding for exterior lighting using materials and methods specified in Section 16060 Grounding and Bonding.
- B. Install a 10-foot-long x 3/4" diameter copper clad ground rod at each pole.
- C. Connect the ground lug of metal pole to the ground rod using a #6 AWG copper conductor. Where the copper grounding conductor is connected to metal other than copper, provide bi-metallic connectors listed for this purpose.

3.03 FIELD QUALITY CONTROL

- A. Verify operation of fixtures and controls after installing and energizing circuits.

END OF SECTION

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

SECTION 284613.10 – FIRE ALARM SYSTEM (MODIFY EXISTING)

PART 1 – GENERAL

1.01 SUMMARY

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.
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, backboxes 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.

1.02 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.

1.03 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:
 - a. ANSI/NFPA 70 - National Electrical Code.
 - b. ANSI - American National Standards Institute.
 - c. ASME A17.1 Safety Code for Elevators and Escalators
 - d. FM - Factory Mutual System.
 - e. NFPA – National Fire Protection Association
 - f. NFPA 72 - National Fire Alarm Code
 - g. UL – Underwriters' Laboratories:

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, provide Manufacturer's standard catalog sheets, specifications, and installation instructions. Catalog sheets shall be clearly highlighted to show selected models, accessories, options etc.
- B. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, riser diagrams 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.

1.05 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 and passwords.
 2. Device address list.
 3. Updated O&M Manual.

1.06 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.

1.07 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.

1.08 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 wiring for removal and reinstallation. Such warranty shall be required of the installing contractor even if in excess of original manufacturer warranties.
 - 1. Warranty period: In conformance with the requirements of the Contractor's Guarantee within Specification Section 017000, beginning upon completion of equipment installation and commissioning.

1.09 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

2.01 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.

2.02 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. Heat Detectors.
 - 4. Beam Detectors.
 - 5. Fire suppression system operation
 - 6. 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 or 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. Communication loss with any network panel.
 9. Amplifier panel loss on voice notification system.
 10. Activation of any Carbon Monoxide Detector.
- D. System Supervisory signal initiation shall be by one or more of the following devices or actions:
1. Sprinkler Tamper Switch activation.
 2. Duct detector activation.
 3. Low pressure switch activation on dry pipe sprinkler system.
- E. 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 and any associated carbon monoxide notification devices.

2.03 FIRE-ALARM CONTROL UNIT - EXISTING

- A. The existing FACP is as shown on the drawings.
- B. Fire alarm circuits, subject to compatibility with the existing panel, shall be as follows:
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 hold-open devices that control 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. Maintain existing automatic transmission of alarm, supervisory, and trouble signals to a remote alarm station.
- G. 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. Provide additional battery capacity to meet code minimums if required by the addition of new devices.

2.04 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.

2.05 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.

2.06 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.

2.07 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 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.

2.08 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. Audible (Horn): 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. Speakers: Unless otherwise required for compatibility with the existing system: High intelligibility across frequency range of 300 to 8000 HZ, 25 or 70 VRMS operation, (5) field selectable taps 1/8 watt up to 2 watts, mountable on 4" square backboxes.
- D. Visible Notification Appliances (Strobes): 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:
 2. 15/30/75/110 cd, selectable in the field.
 3. Mounting: Wall mounted unless otherwise indicated.
 4. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 5. Flashing shall be in a temporal pattern, synchronized with other units.
 6. Strobe Leads: Factory connected to screw terminals.
 7. Mounting Faceplate: Factory finished, red (wall mounted) or white (ceiling mounted)
 8. Match existing system devices.
 9. For visible notification devices associated with carbon monoxide detectors – provide the above with the exception of provide with amber colored lens, and shall have either no engraving or the word "ALERT". In NO case shall the engraving "FIRE" be present in these devices.
- E. Combination Horn/Strobe or Speaker Strobe: Shall match the criteria of the individual component devices as described above.

2.09 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, NRTL 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

3.01 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.

3.02 EQUIPMENT INSTALLATION

- A. General:
 - 1. Comply with NEC, NFPA 72 and manufacturer requirements or installation of fire-alarm equipment.
 - 2. Prior to performing any work, perform a test of the devices in the work area to confirm existing operational status. Report any non-functional devices to the Owner's Representative for corrective action to be taken, if any, at Owner expense. Devices not functioning after this test shall be considered as Contractor fault and shall be repaired or replaced at Contractor expense.
 - 3. Follow Division 260500 Section "Common Work Results for Electrical", for anchorage requirements.

4. Verify dimensions in the field. Lay out work in the most direct and expeditious manner to avoid interference.
 5. 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.
 6. Coordinate fire alarm detectors and associated equipment with existing ceiling or roof materials, lighting, ductwork, conduit, piping, suspended equipment, structural and other building components.
 7. 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.
 8. 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. Locate ceiling mounted detectors not less than 4" from any wall.
 6. Locate wall mounted smoke detectors not more than 12" from the ceiling.
 7. Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
 8. 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. Fire Alarm manual pull stations shall be mounted no less than 42" and not more than 48" above finished floor to the operable part.

- G. Visible Alarm-Indicating Devices shall be installed with the 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.
- H. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.03 PATHWAYS

- A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed. Support from "j-hooks" or wiring bridles secured to structural members. Fire alarm wiring shall not be supported by the ceiling grid.
- 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.

3.04 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.

3.05 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals.

3.06 INTEGRATION

- A. New Devices: Perform all required programming to enroll new points into the fire alarm system programming.
- B. Removed Devices: Perform all required programming to delete all permanently removed points from the fire alarm system programming.
- C. Relocated Devices: Perform all required programming required to relabel alarm points affected by building renovations and re-configurations.

3.07 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. Coordinate and obtain any inspections required by the Authority Having Jurisdiction to obtain certificate of occupancy. Include any fees in bid.
3. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
4. 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.
5. Test audible appliances for the private operating mode according to manufacturer's written instructions.
6. Test visible appliances for the public operating mode according to manufacturer's written instructions.
7. 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.

3.08 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

DIVISION 31 – EARTHWORK
SECTION 310000 – EARTHWORK

PART 1 - GENERAL

1.01 GENERAL

- A. Applicable provisions of the "Conditions of the Contract" shall govern all work under this section.
- B. Contractor must observe and adhere to New York Code, 6 NYCRR, Chapter IV and all applicable Subchapters and Parts for the receipt of, or removal, transport, tracking and disposal of all soils and construction waste and debris, as enforced by the New York State Department of Environmental Conservation. All fees associated with testing of materials and debris either at the point of origin (site) or point of termination, are to be borne by the Contractor.
- C. Related Documents:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 01 of these Specifications.
 - 2. Section 033000 – Cast-In-Place Concrete
 - 3. Section 310001 – Site Work General Provisions
 - 4. Section 312500 – Erosion and Sediment Controls
 - 5. Section 320117 – Pavement Repair and Resurfacing
 - 6. Section 321216 – Asphalt Paving
 - 7. Section 321216.11 – Asphalt Overlay
 - 8. Section 334000 – Storm Drainage Utilities
 - 9. Other Division 31, 32 & 33 Sections related to the work of the Contract as applicable.

1.02 SCOPE/SUMMARY

- 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. Erect and maintain barriers in accordance with all local municipal and state requirements.
 - 2. Remove all obstructions in the way of new construction work which may be required in addition to clearing and removal work specified under Section 310001 – Site Work General Provisions.
 - 3. Excavation and preparation of sub grade for building slabs, floor slabs, depressions and pits, foundations, interior and exterior column footings, walks, stairs, ramps, and pavements. All other excavation which may be required to complete the work and is not specified under other sections.
 - 4. Shoring, sheathing, and pumping.
 - 5. Backfilling all work within building lines to the required grades.
 - 6. Granular fill course for support building slabs is included as part of this work.
 - 7. Excavating and backfilling of trenches within building lines.
 - 8. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances, transformer pads, and conduits for same, underfloor

utility lines, etc. inside or outside of the building footprint.

9. Filling and grading.

10. Finish grading of sub grade.

11. Finished grades.

B. Final grading, together with placement and preparation of topsoil for lawns and planting, is specified elsewhere in Division 32 - Exterior Improvements.

1.03 DEFINITIONS

A. Excavation consists of removal of material encountered to subgrade elevations indicated or required by the work and subsequent disposal of materials removed. Materials to be excavated shall be non-classified and shall include all rock, earth, or other materials encountered in excavating and grading operations for building or site work. The contract price covers the removal of all such materials to the depth and extent indicated on the drawings specified herein or as required to perform the work.

B. Unauthorized excavation consists of removal of materials beyond required sub grade elevations or dimensions without specific direction of the Soils Engineer. Unauthorized excavation, as well as remedial work directed by the Soils Engineer, shall be at the Contractor's expense.

1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation with compacted controlled structural fill material or by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.

2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Construction Manager (when applicable), Architect or the Soils Engineer.

C. Additional Excavation: When excavation has reached required subgrade elevations, notify the Architect/Engineer, who will make an inspection of conditions. If Architect/Engineer (based upon Soils Engineer's reports) determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by the Soils Engineer.

1. Removal of unidentified unsuitable materials and its replacement beyond the limits required for the construction work as directed will be paid on basis of Conditions of the Contract relative to changes in the work.

D. Sub grade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.

E. Fill is that material removed from excavations or imported from off site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter. Fill material is subject to approval.

F. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

1.04 SUBMITTALS

A. Test Reports: The Contractor shall submit the following reports directly to the Construction Manager (if applicable), the Owner, and the Architect:

1. Test reports on borrow material.
2. Verification of suitability of each footing subgrade material, in accordance with specified requirements including substantiation of and structural capacity of existing rock on which new footings are to bear.
3. Field reports; in-place soil density tests.
4. One optimum moisture-maximum density curve for each type of soil encountered.
5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- C. Use equipment adequate in size, capacity, and numbers to accomplish the work of this section in a timely manner.
- D. Engineering, Testing, and Inspection Services: The Contractor shall make arrangements for and the Owner shall pay for a qualified independent geotechnical testing laboratory and associated soil engineer (acceptable to the Owner) to perform soil survey and soil testing service for sampling and testing of materials proposed to be used as well as substantiation and verification of existing subsurface conditions when desired depths of excavation are reached. The Contractor will be responsible for all costs associated with failed tests resulting from their work.
- E. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory and associated soils engineer must demonstrate to the Owner's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the work.

1.06 SOILS ENGINEER (SERVICES AS EMPLOYED AND PAID BY THE OWNER)

- A. For site conditions without complex soil problems, a registered soils engineer shall be engaged to perform the following minimum services:
 1. Examine on-site materials to determine suitability for use.
 2. Recommend locations for placing on-site materials.
 3. Recommendations for compacting on-site materials.
 4. Determine suitability of soil under footings, foundations.
 5. Perform compaction tests and supervise filling operations.
- B. Soils engineer's services for problem site conditions shall include the above and the following additional work at minimum:

1. Determine extent of unsuitable material removal.
2. Testing of materials proposed for use from off-site and on-site sources.
3. Dewatering recommendations.
4. Supervising the placing and compacting of approved materials and under footings, foundations, slabs, utility lines, and paved areas.
5. Supervising environmental protection procedures as required by Federal, State, and Municipal Agencies.

NOTE: Copies of soils reports prepared by soils engineer are to be sent to the Owner, the Architect, and Construction Manager (if applicable).

1.07 PROJECT CONDITIONS

- A. Site Information: Data in subsurface investigation reports were used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Construction Manager, The Architect, and the Owner will not be responsible for interpretations or conclusions drawn from these data by the Contractor.
 1. Additional test borings and other exploratory operations may be performed by the Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
- B. Examine the areas and conditions under which the work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- C. Set all lines, elevations, and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.
- D. Existing Utilities: Locate existing underground utilities in areas of excavation work. This work to be substantiated and paid by this Contractor. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. If damaged, repair or replace at no additional cost to the Owner.
 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with the Owner, the Construction Manager (if applicable) and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 2. Do not interrupt existing utilities service facilities occupied by the School or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.
 3. Provide minimum 48-hour notice to the Construction Manager (when applicable), Architect, and Owner, and receive written notice to proceed before interrupting any utility.
 4. If service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.

5. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Architect and secure his instructions.
 6. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- E. Use of Explosives: Use of explosives is permitted for certain types of rock removal only but that use must be substantiated with the Owner, Architect/Engineer, State, and Local Agencies prior to bidding and again prior to commencement of work.
1. The use of explosives is only permitted when the Owner has been notified of same by written notice of the Contractor through Architect/Engineer, thereby permitting the Owner and its surrounding neighbors the required legal notices to vacate and/or protect their properties, buildings, homes, or premises as needed.
- F. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 3. Provide all protective measures necessary for the safety of workmen. The above shall be carried out in accordance with and in compliance with regulations of local, county, federal, and OSHA authorities having jurisdiction over same. Protection is entirely the responsibility of the Contractor.
 4. The work shall be executed so that no damage or injury will occur to the Owner's property or building, to public and adjoining or adjacent structures, streets, paving, sewers, gas, water, electric, or any other pipes. Should any damage or injury caused by the Contractor or anyone in his employ, or by the work under this Contract occur, the Contractor shall, at his expense, make good such damage and assume all responsibility for such injury.
 5. The above shall also include the protection of all existing sewers and drainage systems to remain in use within the area affected by the work of this project.
 6. Monuments, benchmarks, and other reference features on streets bounding this project shall be protected. Should these be disturbed in any manner, the Contractor shall have them replaced.
 7. Use every means necessary to prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
 8. Maintain access to adjacent areas at all times.
- G. The Contractor is to acquaint himself with the existence and location of all surface and subsurface structures and utilities within the project area. He is not to damage any of those that are to remain, and he is to leave them accessible and make the necessary provisions by sheeting, hanging, supporting, or other means necessary to obtain this result, subject to the approval of Architect/Engineer, the local municipality, the utility company involved, and any other agencies having jurisdiction over this project.
- H. Prior to entering his bid, the Contractor shall visit the site and familiarize himself with all existing conditions. All nearby existing buildings and utilities shall be inspected by the Contractor prior to

entering his bid.

- I. Borings were prepared by others, and provided by the Owner. The Geotechnical Report contained herein shall be reviewed prior to bid. The documents are for information only. Contractor shall interpret for themselves the soil condition underlying the surface of the ground.
- J. Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.
- B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CG, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Granular Fill: Naturally or artificially graded mixture or natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand meeting requirements for New York State Department of Transportation Standard Specification 304.2.02, Type 4 unless otherwise indicated.
- D. Subbase Material: Graded mixture of crushed rock, with 100 percent passing a 2-inch sieve and meeting requirements for New York State Department of Transportation Standard Specification 3.04-2.02, Type 2, unless otherwise indicated.
- E. Backfill and Fill Materials: Satisfactory non-expansive soil materials free of organic material, roots, other deleterious substances, clay, rock or gravel larger than 2 inches in any dimension, debris, waste and frozen materials.

2.02 CONTROLLED STRUCTURAL FILL OR MATERIAL

- A. Imported controlled structural fill shall consist of inert material that is hard, durable stone and coarse sand, practically free from silts, clay, frozen sections, and foreign substances. It may consist of either natural or washed soil and must be free of organics. The material shall be a well graded mixture, shall have no material larger than 4", and must have the following gradations by weight:

Maximum retained on 3/4-inch sieve:	30%.
Maximum retained on No. 4 sieve:	50%.
Maximum passing 100 sieve:	25%.
Maximum passing 200 sieve:	5%.

This grading shall be determined in accordance with ASTM Standard Specification C117 and C136.

2.03 SUB BASE FILL OR MATERIAL

- A. Sub base fill shall consist of inert material that is clean, hard, durable stone, sand, and non-plastic silt completely free from clays, frozen sections, and foreign substances. It may consist of either natural or washed soil and must be free of organics. The sub base fill shall be a well graded mixture, shall have material not larger than 2 inches, and must comply with the following grain size gradation by weight:

Maximum passing No. 100 sieve: 35%.
Maximum passing No. 200 sieve: 25%.

This grading shall be determined in accordance with ASTM Standard Specification C117 and C136.

2.04 WEED KILLER

- A. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this work by governmental agencies having jurisdiction.

2.05 TOPSOIL

- A. Where and if shown on the drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones, noxious weeds, sticks, brush, litter, and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources. Stockpiled topsoil may be used, provided it meets the requirements of these specifications. Additional topsoil from certified off-site sources shall be used, provided it meets the requirements of these specifications. Topsoil for lawn and planting operations shall be fertile, friable, natural loam containing a liberal amount of humus. It shall be free of admixtures and subsoil and shall be reasonably free of noxious weed, seed, lumps, plants, or their roots, and completely free of stones, sticks, and other extraneous matter, and shall not be used for planting operations while in a frozen or muddy condition. After spreading to a uniform depth of 6" minimum, all topsoil shall be raked to remove all extraneous matter. Raked topsoil shall conform to the mechanical analysis specified below and shall be free of stones, lumps, plants or their roots, sticks and similar debris, or any other undesirable material. Topsoil shall not be used in a muddy or frozen condition.
 - 1. All topsoil to be furnished shall be subject to the approval of the Architect. Furnish a certified analysis, made by a recognized authority, of any topsoil that may have to be furnished to complete the work of this section. Test reports shall match the format listed below.
 - 2. Topsoil shall have an acidity range of pH 5.0 to 7.0 and shall contain not less than 6 percent organic matter as determined by loss on ignition of moisture-free samples dried at 100 degrees centigrade. The mechanical analysis of the soil shall be as follows:

<u>Passing</u>	<u>Retained On</u>	<u>Percentage</u>
1" screen		100%
1" screen	¼" screen (gravel)	Not more than 3%
¼" screen	No. 100 USS mesh sieve (sand)	40%-60%
#100 USS	(Very fine sand, silt & clay)	40%-60%

- 3. Topsoil in which more than 60 percent of the material passing the USS No. 100 mesh sieve consists of clay as determined by the hydrometer or by the decantation method, shall not be used. All percentages are to be based on dry weight samples. The chemical and mechanical analysis shall state the above items in correct quantities.
- 4. The Architect reserves the right to take samples of the topsoil from time to time, whether delivered to or stored at the site. These samples will be analyzed for comparison with the Specifications. Should tests show that topsoil does not comply with the Specifications, the material may be rejected or such other remedy made as approved by the Architect in the form of the addition of humus or other supplemental materials.

5. The topsoil mixture materials shall be thoroughly mixed by hand or by rotary mixer to the satisfaction of the Architect.

2.06 OTHER MATERIALS

- A. Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. 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; together with earth and other materials encountered that are 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. 215C LC, and rated at not less than 115 HP flywheel power and 32,000-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.
 3. 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.
 4. 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. 973 or equivalent track-mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000 pound breakout force (measured in accordance with SAE J732).
 - a. Typical materials classified as rock are boulders 1/2 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
 - b. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
 5. Rock Excavation:
 - a. In the event that rock is encountered and is of a type that cannot be broken up and excavated by machine or moved into deep fill areas, blast as necessary, and remove and dispose of same off site.
 - b. Rock that can be broken up, excavated by machine, and/or moved into deep fill areas shall be reduced to a size not exceeding 6" prior to depositing in deep fill areas.
 - c. Definition: Whenever the word "removal" is used in connection with rock, it is to be construed to mean "blasting, excavating, and the removal of rock that cannot be broken up by machine and removed", as defined previously.
 - 1) As this facility is in session daily Monday through Friday and its surrounding neighbors

are contiguous, the preferred methodology of excavation and removal of rock is to be construed as "passive" in nature--meaning "drilling or any other passive means". The excavation contractor shall coordinate his/her work with the Owner's representative so as to perform that work with the least disruption to the Owner and the Owner's neighbors and with maximum intent to the safety of same. The preferred time of rock removal work shall take place when the Owner's facilities are vacated, thereby meaning after the close of school each day or on weekends, as long as these times are permitted by all State and Local Ordinances and are acceptable and coordinated with the School and its neighbors.

- d. Blasting shall conform strictly to all local and state laws, rules, and regulations applying thereto, and shall avoid excess noise and vibration. Steel mats shall be provided where necessary to prevent damage from flying fragments. Drill holes shall not be carried any further than necessary to remove the rock desired. The care, handling, and storing of explosives shall conform strictly to all local and state laws, rules, and regulations applying thereto. After concrete is set in place, no blasting shall be done except with the written permission of the Owner, and Architect.
- e. The Contractor may consider the utilization of "Super Bristar 2000", a non-explosive demolition agent as a means of rock removal for this project.
- f. General:
 - 1) Blasting shall be done as necessary for breaking rock for removal to depths, limits, and extent required for the construction of the building, site grading, and utility lines.
 - 2) Blasting shall be performed only by experienced, competent, licensed personnel under the direct supervision of an experienced, competent, licensed foreman.
- g. Precautions:
 - 1) Blasting shall be permitted only when proper and adequate precautions have been taken for the protection of personnel, work, and property.
 - 2) Caps, fuses, and other exploders shall in no case be stored in the same place in which explosives are stored.
 - 3) All operations involving delivery, handling, storage, and the use of explosives shall be conducted in accordance with applicable laws, statutes, and regulations of the State, Municipal, or other governing bodies having jurisdiction. Likewise, the blasting contractor shall secure and pay for all necessary permits on behalf of the excavation contractor/contractor and shall provide same to the Owner, and Architect prior to scheduling the work. Open rock and rock in trenches shall be removed to a depth of 8" below required grades.
- h. Do not perform rock excavation work until material to be excavated has been cross sectioned and classified by the Contractor's qualified independent geotechnical testing laboratory and associated soils engineer (employed and paid by the Contractor), and as approved by Architect/Engineer.
- i. Rock payment lines are limited to the following:
 - 1) Three feet outside of concrete work for which forms are required, except footings.
 - 2) Two feet 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 feet minimum trench width.
- 4) Outside dimensions of concrete work where no forms are required.
- 5) To bottom of all footings which, as designed, are minimum 1'-8" below finished floor and are to bear on undisturbed rock of 8 T.S.F. bearing capacity minimum. This capacity to be verified by Contractor's geotechnical testing laboratory and associated soils engineer.
- 6) Under slabs on grade, 6 inches below bottom of concrete slab.
- 7) Work indicated herein under these rock payment lines is part of this Contractor's base bid.

3.02 STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. The Contractor shall safely support and maintain adjacent and abutting property and structures and shall maintain the work safe to life, limb, and property.
- C. Barriers, sheet piling, bracing, and the like shall be installed where required to maintain the excavation and the banks in a safe and stable condition.
- D. Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen is required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.
- E. Slope sides of excavations to 1:1 or flatter or to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- F. Shoring and bracing: Provide materials for shoring and bracing, such as 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.
- G. All temporary sheet piling, bracing, shoring, and other protective work shall be removed after the necessity for same ceases to exist, in the opinion of the Architect, and before backfilling.
- H. All work removed or damaged through the installation or removal of the temporary protective work or through improper protection work shall be replaced or repaired in an approved manner at no cost to the Owner.
- I. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the work.

3.03 DEWATERING

- A. 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 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.
- B. Surrounding soil shall not be disturbed or removed during pumping operations.
 - C. Water shall be disposed of by pumping to a point directed by the Architect without damage to adjacent property.
 - D. The Contractor shall provide, operate, and maintain adequate equipment to keep the excavations free from water so that the excavating, concrete work, membrane waterproofing, and all other work in the excavations will be performed in the dry.
 - E. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

3.04 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.05 EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.
- B. Contractor shall prepare building and sidewalk areas to underside of floor slab plus or minus 1/2". Under no circumstances shall any material other than approved on-site material, or specified imported controlled structural fill be used for filling within a depth of 10" inches below building and sidewalk slabs on grade or within a depth of 12" beneath all column or wall support footings. Imported controlled structural fill shall also be utilized in all areas supporting earthen or other load carrying structures where organic soil materials are encountered subsequent to the removal of said organic soil materials.
- C. Excavations for footings and foundations: Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work. Piers, concrete slabs, and footings shall be benched a minimum of 2" into rock at sloping rock conditions as indicated on the drawings where no excavation is required.
- D. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction, and for inspection. Do not disturb bottom of excavations intended for bearing surface.
- E. Unsuitable Material: All unsuitable material below the grading plane shall be excavated and removed and the space filled with granular material as specified herein.

1. Unsuitable materials are those soils that exhibit characteristics that make them unsuitable for the direct support of the pavement structure, such as organic silt, elastic clays and silts, topsoil, frost susceptible soils, etc. Unsuitable materials shall be removed to the depth directed by the Soils Engineer and the Construction Manager when applicable.
 2. The excavation and disposal of unidentified unsuitable material below the grading plane shall be paid on the basis of the Conditions of the Contract relative to Changes in the Work.
 3. The granular fill material will be used in the fill sections within the paving area. No additional payment will be made for placing this material in the fill areas.
- F. Unsuitable material will be legally disposed of off site.

3.06 EXCAVATION FOR PAVEMENTS, SLOPES, DITCHES, ETC.

- A. The work under this item shall consist of the following in accordance with the plans, specifications, addenda, bid proposal, and requirements herein: excavating for pavement, slopes, ditches, and all other work incidental to the excavation for the pavement, including disposing of unsuitable and surplus material, preparing the subgrade, compaction, grading, slopes and shoulders, and all other work needed to complete the item.
- B. Cut surface under pavements to comply with cross sections, elevations, and grades as indicated.
- C. Drainage and Site Maintenance: During construction, the site shall be maintained in such condition that it will be adequately drained at all times.
- D. Unsuitable Material: All unsuitable material below the grading plane shall be excavated and removed and the space filled with granular material as specified herein.
1. Unsuitable materials are those soils that exhibit characteristics that make them unsuitable for the direct support of the pavement structure, such as organic silt, elastic clays and silts, topsoil, frost susceptible soils, etc. Unsuitable materials shall be removed to the depth directed by the Soils Engineer and the Construction Manager when applicable.
 2. The excavation and disposal of unidentified unsuitable material below the grading plane shall be paid on the basis of the Conditions of the Contract relative to Changes in the Work.
 3. The granular fill material will be used in the fill sections within the paving area. No additional payment will be made for placing this material in the fill areas.
- E. Unsuitable material will be legally disposed of off site.
- F. The Contractor shall store topsoil, embankment soils, and other materials, and/or to excavate beyond the limits of the contract and slope easements. The cost of stockpiling and rehandling shall be included in his base bid price.
- G. All soils that are classed as suitable for the direct support of the pavement (non-organic and non-frost susceptible soils) shall be scarified to a loose depth of ten (10) inches and recompact to 95% of the maximum density at the optimum moisture content of the soils determined by ASTM D-1557. The moisture content at the time of compaction shall not be greater than one (1) percent nor less than two (2) percent by weight of dry soil of the optimum moisture content. Dry soils shall be moistened and thoroughly mixed to the required moisture content. Wet soils shall be dried by aerating the required moisture content.
1. The cost of adding moisture, drying, and compaction shall be included in the Contractor's base

bid price.

- H. Subgrade in excavated areas for new pavement shall be compacted to the density specified below. Soils not conforming to this density shall be scarified or loosened to a depth of ten (10) inches, water added in the amount necessary, and the material recompacted to provide the required density.
 - 1. Compaction control will be provided as follows: The subgrade in excavated areas shall be compacted to at least ninety-five (95) percent of the maximum density as determined by the "Test for Moisture Density Relations of Soils using a 10 lb. Rammer and 18 inch Drop", ASTM D-1557 as currently revised. Samples of subgrade materials for testing purposed shall be taken at frequent intervals daily. From these tests, corrections and changes in moisture content will be made and compaction continued until required densities are achieved.
- I. The Contractor shall check the work under this Item with templates, slope boards, or other devices satisfactory to the Soils Engineer. The completed work shall conform to the plans within the following tolerances.
- J. For pavement subgrade, the surface shall vary no more than three-quarter ($\frac{3}{4}$) inch from a ten (10) foot straight edge applied to the surface, and the actual grade of the subgrade shall not vary more than one (1) inch from plan elevation.

3.07 TRENCH EXCAVATION FOR PIPES AND CONDUIT

- A. Excavate trenches to uniform width, sufficient wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both side of pipe or conduit.
- B. Accurately cut trenches for pipe or conduit that is to be installed to designed elevations and grades to line and grade from 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill and compact in maximum 6" layers measured loose to the top of the trench.
- C. Excavate trenches and conduit to a 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 lines.
 - 1. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.
 - 2. For pipes or conduit less than 6" 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° (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensuring continuous bearing of pipe barrel on bearing surface.
 - 4. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects.
 - 5. When the void is below the sub-grade for the utility bedding, use suitable earth materials and compact to the relative density of 95 percent (in accordance with ASTM D698).

6. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated to a relative density of 92 percent (in accordance with ASTM D1557).
 7. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.
- D. The local utility companies shall be contacted before excavation shall begin. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous uniform bedding.
- E. All trench excavation side walls greater than 5 feet in depth shall be sloped, shored, sheeted, braced, or otherwise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.
- F. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.
- G. Trench width requirements below the top of the pipe shall not be less than 12" nor more than 18" wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit, or cable shall be at least practical width that will allow for proper compaction of trench backfill.
- H. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances:
1. Water mains: 50" to top of pipe barrel.
 2. Sanitary Sewer: Elevations and grades as indicated on drawings (48" minimum cover).
 3. Storm Sewer: Depths, elevations, and grades as shown on drawings.
 4. Electrical Conduits: 30" minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or the local utility company requirements, whichever is deeper.
 5. TV Conduits: 18" minimum to top of conduit or as required by the local utility company, whichever is deeper.
 6. Telephone Conduits: 30" minimum to top of conduit, or as required by the local utility company, whichever is deeper.
 7. Gas Mains and Service: 30" minimum to top of pipe, or as required by the local utility company, whichever is deeper.
 8. Where utilities are under a concrete structure slab or pavement, the minimum depth need only be sufficient to completely encase the conduit or pipe sleeve, and electrical long-radius rigid metal conduit riser, provided it will not interfere with the structural integrity of the slab or pavement.

9. Where the minimum cover is not provided, encase the pipes in concrete as indicated. Provide concrete with a minimum 28-day compressive strength of 2,500 psi.

I. Excavating for Appurtenances:

1. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
2. Over-depth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete at no additional cost to the Owner.
3. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.

3.08 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

3.09 BACKFILL AND FILL

- A. All excavations shall be backfilled as promptly as the work permits but not before concrete has attained its full design strength and not until completion of the following:
 1. Acceptance of construction below finish grade, including, where applicable, damp-proofing and water-proofing.
 2. Inspecting, testing, approving, and recording locations of underground utilities.
 3. Removing concrete formwork.
 4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
 5. Removing trash and debris within excavated areas.
 6. Placement of horizontal bracing on horizontally supported walls.
- B. No frozen material shall be used. Backfill shall be placed in uniform horizontal layers of approximately 8" in depth. Each layer shall be moistened during compaction. Compaction shall be done in a manner approved by the Architect and shall be continued until fill is solid and no settlement will occur.
- C. When sheeting, shoring, and bracing is removed, all voids shall be filled with sound materials and thoroughly tamped.
- D. Backfill operations shall be made to the new surface grades as shown on the drawings.
- E. No backfill shall be placed covering other work until after such work has been inspected and approved. Any backfilling placed on earth that has caved in and covered other work before same has been inspected and approved shall be removed when so directed.
- F. Excess material, if any, and all rubbish shall be removed from the site or otherwise disposed of as may be directed by the Architect.
- G. General: Place soil material in layers to required subgrade elevations, for each area classification

listed below, using materials specified herein.

1. Under grassed areas, use satisfactory excavated or borrow material.
2. Under walk sand pavements, use subbase material.
3. Under steps, use subbase material.
4. Under foundations, use controlled structural fill material.
5. Under building slabs, use granular material or on site sub grade material if determined acceptable by the Architect or Soils Engineer.
6. Under piping, conduit, and equipment, use subbase materials where required over rock bearing surface unless otherwise indicated. Shape excavation bottom to fit bottom 90° of cylinder.

3.10 CONTROLLED STRUCTURAL FILL OR MATERIAL

- A. Location: Imported controlled structural fill shall be used when necessary to provide proper soil bearing capacity:
1. Under all proposed buildings and sidewalks and at least 5 feet beyond the limits of the proposed buildings to a depth as required by foundation design where sidewalks are not part of the scope of building work.
 2. Under all footings (continuous or spread) to a depth of at least 12 inches, or as required by foundation design.
 3. For all load carrying structures which are situated in areas of soft organic soil deposits subsequent to the removal of said soft organic soil deposits.
 4. Sand shall be used as bedding for all drainage and sewerage utilities, unless groundwater problems are encountered or anticipated that may require the use of crushed stone.

3.11 SUB BASE FILL OR MATERIAL

- A. Location: The subbase fill may be used in all fill areas where controlled structural fills specified for buildings are not required due to soil conditions, as long as the requirements listed in Section 2.03A are met. Under no circumstances shall subbase material be in directed contact with structural support component, or in support of any of the proposed utilities.
- B. Backfill trenches with concrete where trench excavations pass with 18" of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.
1. Concrete is specified in Division 03.
 2. Do not backfill trenches until test and inspections have been made and backfilling is authorized by Contracting Officer. Use care in backfilling to avoid damage or displacement of pipe systems.
- C. Provide 4" thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.
- D. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Inspection testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete formwork.
4. Removal of shoring and bracing and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities or leave in place if required.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.12 PLACEMENT AND COMPACTION

- A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
 1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- B. Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand operated tampers.
- C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Place backfill and fill materials evenly adjacent to structure, piping or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.
- F. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed if soil density test indicate inadequate compaction.
 1. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density, in accordance with ASTM D 1557 (Modified Proctor):
 - a. Under footings, compact subgrade and subbase material to at least 95% maximum dry density.

- b. Under structures, building slabs and steps, and pavements, compact top 12" of subgrade and each layer of backfill or fill material to at least 95% maximum dry density.
- c. Under lawn or unpaved areas, compact top 6" of subgrade and each layer of backfill or fill material to a MAXIMUM of 85% maximum dry density.
- d. Under synthetic turf, compact top 6" of subgrade and each layer of backfill or fill material to at least 90% maximum dry density.
- e. Under walkways, compact top 6" of subgrade and each layer of backfill or fill material to at least 95% maximum dry density.

G. Moisture Control:

- 1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface during or subsequent to compacting operations.
- 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
- 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests.

3.13 FILLING AND BACKFILLING

A. Filling and backfilling work shall include, but is not limited to, the following:

- 1. Contractor shall place and compact bank-run sand and gravel from approved imported sources consisting of clean bank-run gravel or sandy gravel, free from organic material, loam, wood, trash, snow, ice, and other objectionable material, well graded within the following limits:

Maximum retained on 3/4" sieve:	30%.
Maximum retained on No. 4 sieve:	50%.
Maximum passing 100 sieve:	25-30%.
Maximum passing 200 sieve:	5%.

No material larger than 2-1/2" to 4" sieve size by weight. When available, on-site material may be used in place of imported controlled structural fill with the Soils Engineer's approval.

- 2. Compaction of bank-run gravel under footings, foundation, under slabs on grade, and in building areas shall be to 95% of maximum density in accordance with ASTM Test Designation D1557.
- 3. Granular material where required under footings and foundations shall conform to material and gradations previously specified and shall be determined in accordance with ASTM Standard Specifications C117 and C136.
- 4. Filling--Imported Controlled Structural Fill: Compaction of the controlled imported structural fill shall be performed at a moisture content 3% drier than optimum as determined in the lab. It shall be placed in uniform layers not exceeding 10 and/or 12 inches thick after compaction. Each lift shall be compacted to not less than 95% of the maximum dry density determined within the lab as modified proctor density and shall be monitored by the soils engineer using the applicable ASTM standard for testing. Each lift shall have a minimum of 2 feet density test per 500 square yards, one located in the area of the propose column and the second located

under a continuous wall footing. More frequent testing may be required at the discretion of the Soils Engineer based on the extent of filling on any given day or should any area become suspect.

5. Filling--Subbase Fill: Compaction of all subbase fill, either imported or on-site, shall be compacted at a moisture content 1-1.5% drier than optimum as determined in the lab. The subbase fill shall be placed in uniform layers not exceeding 8 inches in depth when uncompacted. Each lift shall be compacted to not less than 95% of its maximum dry density determined in the lab as modified standard for testing. At least two field density test shall be performed per lift within the area being filled on any given day beneath buildings provided the lift areas do not exceed 500 square yards.

3.14 TRENCH BACKFILLING

- A. Criteria: Trenches shall not be backfilled until required tests are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfill trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.
- B. Backfilling: After pipe or conduit has been installed, bedded, and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts. Compact to minimum density of 95 percent of optimum density in accordance with ASTM D698 (or 92 percent of optimum density in accordance with ASTM D1557).
- C. Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- D. Compaction Testing: Independent testing laboratory shall perform test at intervals not exceeding 200'-0" of trench for the first and every other 8" lift of compacted trench backfill and furnish copies of test results as specified.

3.15 MATERIALS FOR FILL UNDER CONCRETE SLABS ON GRADE

- A. Contractor is to establish building pad at underside of floor slab, plus or minus 1/2".
- B. Prior to placing fill fine grading materials on building pad, existing pad fill shall be leveled and recompacted.
- C. Fill materials under concrete slabs on-grade in building areas, under sidewalks, pads, concrete aprons, etc., are to be the sieve analysis previously shown for controlled structural fill.
- D. Compaction of fill shall be as previously set forth. When compacting fill with mechanical compactor against foundation walls, pits, loading dock, etc., Contractor shall provide complete protection against damage to said installations.
- E. There is to be a layer of no less than 6" of clean suitable bank run sand fill below all slabs on grade. On site material may be acceptable and its usability is to be verified via soils reports. The Contractor's bid is to be based on the use of on site material for use under slabs unless indicated otherwise within the Construction Documents.
- F. 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 that is 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 a satisfactory value.

3.16 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
 2. Walks: Shape surface of areas under walks to line, grade, and cross section, with finish surface not more than 1/2" above or below required subgrade elevation.
 3. Shape the surface or areas scheduled to be under pavement to line, grade, and cross section, with finished surface not more than 0.05 feet above or below the required subgrade elevation.
- C. Grading Surface or Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10-foot straight edge.
- D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.17 PAVEMENT SUB BASE COURSE

- A. General: Subbase course consist of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.
 1. Refer to other Division 32 sections for paving specifications.
- B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
- C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneously with the compaction and rolling of each layer of subbase course.
- D. Placing: Place sub base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
 1. When a compacted subbase course is indicated to be 6" thick or less, place material in a single layer. When indicated to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.18 FOOTING AND BUILDING SLAB SUB BASE COURSE

- A. General: Subbase course consists of placement of subbase material, in layers of indicated thickness, over subgrade surface and/or granular fill to support concrete building slabs as indicated on drawings.
- B. Placing: Place material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.
 - 1. When a compacted subbase course is indicated to be 6" thick or less, place material in a single layer. When indicated to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.19 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service and the Construction Manager (when applicable) to inspect and approve each subgrade and fill layer before further backfill and construction work is performed.
 - 1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ATM D 2167 (rubber balloon method), as applicable.
 - 2. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gauges in accordance with ASTM D3017.
 - a. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work, on each different type of material encountered, and at intervals as directed by the Contracting Officer.
 - 3. Footing Subgrade: Per each stratum of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested stratum when acceptable to the Construction Manager (if applicable) and the Architect.
 - 4. Paved Areas and Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, perform one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.
 - 5. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.
 - 6. If it is determined by the Construction Manager (if applicable), the Architect, the Owner, and/or Independent geotechnical testing laboratory and associated soils engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.20 EROSION CONTROL

- A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction or if the project is of sufficient size to require one, refer to the Storm Water Prevention and Protection Plan included elsewhere herein.

3.21 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.22 CERTIFICATION

- A. Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Architect a written report from a soil engineer certifying that the compaction requirements have been obtained and the type or classification of fill material placed.

3.23 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. All rubbish and other excavated material, which in the opinion of the Architect is not suitable for fill or grading, shall be removed and legally disposed of away from the premises.
- B. Approved excavated material shall be spread on the site in locations as directed by the Architect.
- C. Excavated material in excess of that required for all filling, backfilling, and rough grading shall become the property of the Contractor and shall be removed from the premises and legally disposed of.
- D. Removal from the School's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off the School's property.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 310001 – SITE WORK GENERAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL:

- A. Applicable provisions of the “Conditions of the Contract” shall govern the work of this section and under Division 31, 32 & 33.

1.02 SCOPE/SUMMARY:

- A. The Drawings and Specifications are intended to provide for a complete and ready for operation installation. However, both the Drawings and Specifications are for the 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 Contractor shall furnish, install, and place in workmanlike manner all equipment, accessories, supports, fittings, and all other material needed for the complete installation.
- B. Before submitting his proposal, the 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.
- C. The site work scope shall include providing all plant facilities, labor, materials, tools, equipment, appliances and supervision necessary or incidental to complete site work, including, but not limited to, the following:
 - 1. Surveying and layout work
 - 2. Preliminary work
 - 3. Demolition
 - 4. Clearing and grubbing
 - 5. Striping and stockpiling existing topsoil
 - 6. Protection
 - 7. Removal and disposal
 - 8. Rough grading, excavating, filling, backfilling and dewatering
 - 9. Excavating, trenching, and backfilling for utility systems including gas, water, electric, telephone, storm and sanitary lines.
 - 10. Sediment and erosion control procedures as may be required.
 - 11. Storm water drainage systems, catch basins and manholes
 - 12. Site improvements, including but not limited to, fencing, curbing, striping, signage, guardrails, paving, lighting, retaining walls and miscellaneous related work.
 - 13. Landscape work
 - 14. Finish grading and paving
 - 15. Site work water mains, electric and gas services
 - 16. Sanitary sewer systems, including manholes and exterior grease traps
 - 17. Concrete work in connection with site preparation and development
- D. Perform all work in accordance with all applicable local, state, and federal codes, laws, and ordinances.
- E. Sediment and erosion control procedures shall be performed as required and in conformance with Specification Section 312500; and for LEED Certified projects, in accordance with the requirements of LEED SS Prerequisite 1

- F. If the project is of a size and scope that requires a Storm Water Pollution Prevention Plan (SWPPP) refer to additional documentation provided elsewhere herein and conform to its requirements in conjunction with and as related to this section.

1.03 GENERAL PROVISIONS:

A. Verifying Existing Conditions:

1. The 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 Architect, in writing, prior to 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 Architect unless written notice has been filed by the Contractor.

a. Cooperation:

- 1) When a project involves construction on an existing occupied site, 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 existing building and shall be so arranged that its installation and operation will conform with and facilitate the early installation of work.
- 2) The 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 building's operation.
- 3) The Contractor shall be responsible for the distribution and information concerning his work as required for the prompt installation and coordination with other trades.

b. Accessibility and Clearances:

- 1) The Contractor shall inform himself fully regarding peculiarities and limitations of space for the installation of the materials and equipment under Division 31, 32 & 33. He shall verify all dimensions and conditions in the field. No extra compensation will be allowed because of differences between actual dimensions and the sizes shown on the Drawings.
- 2) The Contractor shall see that equipment and apparatus necessary to be reached from time to time for operation and maintenance are made easily accessible.
- 3) Although the location of items may be shown on the Drawings in a specific place, the construction may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such case, the Contractor shall call the Architect's attention to same before installing the work and shall be guided by the Architect's instruction.

1.04 PRELIMINARY WORK:

- A. Before starting the work, make a thorough inspection of the work area to determine the physical condition of natural features and adjacent improvements to remain.
- B. Provide complete mark out/tone out of existing utilities for coordination of proposed work. Repair any damage that occurs to existing utilities to remain at no additional cost to the owner.
- C. Notify all authorities owning utility lines running to or on the property. Protect and maintain all utility lines that are to remain on the property and cap those that are not required in accordance with the

instructions of the utility companies or local authorities having jurisdiction over them.

PART 2 - PRODUCTS

This part not used.

PART 3 – EXECUTION

3.01 PROTECTION:

- A. The 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.
- B. Provide protection necessary to prevent damage to existing building(s), concrete, pavement, utilities or vegetation indicated on the Contract Documents to remain. Box or otherwise protect from damage all trees, shrubs, lawns, etc. which are to be preserved. Trees shall be kept free from guy lines. Remove all protection when work is completed and when authorized to do so by the Architect.
- C. Protect improvements on adjoining properties and on Owner's property.
- D. Restore damaged improvements to original condition as acceptable to Architect and/or Owner.
- E. Protect the property, adjoining properties, wetlands, etc. from damage by soil erosion by installing silt fences and hay bales or as indicated in the projects Storm Water Pollution Prevention Plan, if one is applicable.
- F. Conduct site operations to ensure minimum interference with parking lots, roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct parking lots, streets, walks, or other occupied or used facilities without permission from the Owner and/or authorities having jurisdiction.
- G. Provide traffic control as required, in accordance with the New York State Department of Transportation "Manual of Uniform Traffic Control Devices" and the local jurisdiction traffic safety requirements.
- H. Streets, roadways, parking lots, etc. shall be thoroughly cleaned and/or swept on a daily basis.

3.02 CLEARING and GRUBBING:

- A. Clear and grub in the areas of the proposed building, paved areas and/or site improvements in preparation for rough grading and new construction.
- B. Completely remove all trees, shrubs, stumps, roots, vegetation, growth, paving, boulders, rocks, rubbish, and all other material interfering with the installation of new construction or not suitable for rough or finished grading, except trees or shrubs directed or indicated to remain.
- C. Remove all roots 1" in diameter or larger. Remove all boulders and rocks larger than 3" in largest dimension.
- D. Remove all topsoil, peat, and soils containing a high degree of organic matter. (Coordinate with Item 3.03 below)

- E. Remove all soft clay soils and rubbish fills.
- F. Excavation resulting from the removal of trees, roots, and the like shall be filled with suitable on-site material or imported fill as approved by the Architect/Engineer. Place fill material in horizontal layers not exceeding 8" loose depth, and thoroughly compacted per fill requirements.

3.03 STRIPPING and STOCKPILING EXISTING TOPSOIL:

- A. Existing topsoil and sod on the site within area designated on the drawings shall be stripped to whatever depths encountered to prevent intermingling with underlying subsoil or other objectionable material. Cut heavy growths of grass from areas before stripping.
- B. Free the topsoil of stones, roots, brush, rubbish, clay or other unsuitable materials/objects over 2" in diameter and remove the latter from the premises before stockpiling the topsoil.
- C. Care shall be taken not to contaminate the topsoil with clay or other unsuitable materials and remove the latter from the premises before stockpiling the topsoil.
- D. Stockpile topsoil in storage piles where indicated or permissible within site staging perimeter (coordinate with Architect and/or Construction Manager). Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Excess topsoil shall be removed from the site by the Contractor unless specifically noted otherwise on the drawings.
- E. Refer to soil erosion and sediment control drawing, if included, for additional details.

3.04 DEMOLITION:

- A. Existing structures (where indicated), concrete and paving on the site (where indicated), including all existing/discovered inactive cesspools, cisterns, wells, foundation materials shall be completely demolished and all debris removed from the site. Excavation resulting from the removal sub-surface structures, foundations/footings shall be filled with suitable on-site material or imported fill as approved by the Architect/Engineer. Place fill material in horizontal layers not exceeding 8" loose depth, and thoroughly compacted per fill requirements.
- B. Remove existing above grade and below grade improvements and abandoned underground piping or conduit as shown on the drawings or necessary to permit construction and other work.
- C. All work shall be executed in such a manner as not to endanger the safety of the workmen or the public. All barriers and precautionary measures shall be erected as required.

3.05 REMOVAL and DISPOSAL:

- A. Dispose of all debris resulting from the work of this section. Haul off site and dispose of legally.
- B. Do not burn rubbish, organic matter, etc. on the site.
- C. Do not bury concrete, rock, stumps/roots, etc. on the site.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 310002 – STAKE OUT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all plants, labor, tools, appliances, equipment, materials, and services required for the work indicated on the drawings and specified for this section.

PART 2 - MATERIALS

2.01 PRODUCTS

- A. Not applicable to this section.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall employ a competent registered (New York State) surveyor to lay out the work and to establish all points, lines, and grades necessary for the proper execution of the work. The surveyor shall contact the Owner's representative before laying out the work at the site in order to coordinate the proper alignment of the work.
- B. The Contractor shall have his engineer or surveyor place a sufficient quantity of stakes so that the location of all items to be installed can be clearly determined. This portion shall also be coordinated with the Owner's representative before commencing work.
- C. At the completion of the work, the Contractor must submit to the Owner's representative a signed certification of the accuracy of the vertical elevations and horizontal locations of the work in relation to the contract plans. This must take the form of "as-built" drawings (a transparency of the contract plans may be used) and shall bear the signature and registration number of a registered New York State surveyor hired by or in the employ of the Contractor. This will be strictly enforced so that the Owner may have an accurate record of the completed work.
- D. Should any discrepancy be found between points, lines, or grades shown on the drawings and actual conditions found in the field, the Contractor shall immediately notify the Owner's representative of such discrepancy, and the Contractor will not proceed with the work affected thereby until he has received the necessary instructions from the Landscape Architect or his representative.
- E. The Contractor shall carefully maintain any benchmarks, monuments, and other reference marks, and, if disturbed or destroyed, replace as directed. All markers, permanent stakes, and any other reference marks used in the layout shall be left in place as directed by the Owner's representative.

END OF SECTION

DIVISION 31 – EARTHWORK
SECTION 311000 – SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions in the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Under this Section, the Contractor shall clear, grub, demolish and remove all items as shown on the plans, and as encountered during work. The Contractor shall remove trees, shrubs, boulders, debris, waste material, pavements, footings, drainage utilities and other items as shown on plans or encountered during grading operations, and as directed by the Engineer including but not limited to the following:
 - 1. Protecting existing trees and vegetation to remain.
 - 2. Removing trees and other vegetation.
 - 3. Stripping topsoil and disposing of excess or stockpiling surplus as noted on the drawings or directed by the Engineer.
 - 4. Clearing and grubbing site of trees, shrubs, grass, and other vegetation, including stumps, roots, and debris.
 - a. Fill depressions caused by cleaning and grubbing.
 - 5. Removing above-grade site improvements.
 - 6. Disconnecting, capping or sealing, and abandoning site utilities in place.
 - a. Arranging to Shut Off Utilities: By Contractor.
 - 7. Disconnecting, capping or sealing, and removing site utilities.
 - 8. Legally disposing demolished and waste materials off Owner's property.
- B. The Contractor shall furnish, install, maintain and remove temporary construction and sediment control fencing in accordance with Specification Section 312500.
- C. The Contractor is required to inspect the site prior to bidding and shall accept it in its present condition and maintain the site during the construction period.

1.03 RELATED SECTIONS

- A. Section 310000 – Earthwork
- B. Section 310001 – Site Work General Provisions
- C. Section 310002 – Stake Out

- D. Section 312500 – Erosion and Sediment Controls
- E. Section 312510 – Temporary Tree and Plant Protection

1.04 REGULATORY REQUIREMENTS

- A. Herbicides: Comply with the rules and regulations of the Department of Environmental Conservation Title 6, Chapter 4 Quality Services, Parts 320 through 329.
- B. Owner approval in writing is required prior to applying herbicides.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Tree Pruning Compound: Waterproof, antiseptic, elastic and free of kerosene, coal tar, creosote, and other substances harmful to plants.
- B. Herbicides: A chemical or a combination of chemicals which, according to the manufacturer's label, will kill stumps and roots. Deliver herbicides to the site in original manufacturers containers indicating type and percentage of chemical, and application instructions.

PART 3 - EXECUTION

3.01 SUMMARY

- A. Clearing and grubbing shall include removal of trees, shrubs, groundcover plantings and their complete root systems, in accordance with the plans, specifications and directions of the Engineer.
- B. All materials removed under this section shall be properly and legally disposed of off site at the expense of the Contractor.
- C. The Contractor shall keep the site clear of all refuse and rubbish that may accumulate from his operations, and shall maintain such places in a neat condition.
- D. All debris or other material necessary to be disposed of shall be placed in dumpsters and shall not be dumped or placed within the limits of the site.
- E. The Contractor shall remove and dispose of all items of work as required to complete all work in accordance with the plans, specifications and directions of the Engineer.
- F. Keep staging area and material storage within the Limit of Work line unless otherwise approved by the Owner.
- G. The Contractor shall restore all pavements, grass, fences and other items disturbed during construction to match existing conditions to the satisfaction of the Owner.
- H. The Contractor is apprised that the construction site is located in a residential and commercial area and that vehicular and pedestrian traffic must be protected and controlled in and around the project site at all times.
- I. The Contractor shall verify with each of the utility agencies owning or controlling any services or appurtenances which may be affected by the work sufficiently in advance of demolition to permit ample time to do so such work as they deem necessary. This notification must be made prior to

the commencement of demolition and removal of the appurtenances. The Contractor shall cooperate with local authorities and utility companies in protecting such services and appurtenances as may be exposed to hazard during the work.

- J. All necessary permits required by the owner, utility companies, or other interested authorities shall be obtained by the Contractor before starting any work. These permits and the terms thereof shall be the sole responsibility of the Contractor who shall pay all fees and make all arrangements with the interested authorities. The Contractor shall furnish the Engineer with signed copies of the necessary permits.

3.02 PREPARATION

A. Protection:

1. Prevent damage to buildings, pavement, pipes, conduits, poles and other structures above and below ground that are adjoining or included in the contract area. Repair damage resulting from the contractor's negligence.
2. Clearly mark out limit of removals for review by the Engineer.
3. Protect existing trees and shrubs not to be removed. Cut back to point of branching all broken branches and skinned areas. Treat exposed wood with tree pruning compound.
4. Store materials and equipment in cleared areas away from tree roots. Prevent employees and equipment from trampling over woodland, existing planting, and established lawns.

3.03 REMOVALS

- A. Remove all living or dead tree and shrub growth where indicated or specified.
- B. Top and limb all trees before felling, unless otherwise approved by the Engineer.
- C. Cut all stumps 6 inches above ground. Apply a herbicide to the stumps and root area in accordance with the manufacturer's application instructions. Mix a red or yellow dye with the herbicide for identification purposes.
- D. Chip out stumps to a depth of not less than 6 inches below finished grade. Backfill stump holes with topsoil.

3.04 PRUNING

- A. Prune trees where indicated of undesirable wood with the resulting crown shaped to the natural habit of the tree. Remove all diseased and dead branches, and branches interfering with healthy growth. Scar trace bark wounds as directed. All cuts shall be cleanly made with sharp tools, flush with the parent trunk or limb. Paint cuts over 3 inches in diameter with tree pruning compound.

3.05 CLEAN UP

- A. Remove and dispose of all logs, tree trimmings, and debris from the property. Leave Work area in a neat uncluttered condition.

END OF SECTION

DIVISION 31 - EARTHWORK

SECTION 312301 - 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-foot-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 01 45 33 and Special Inspection Notes and Schedule of Special Inspections in the drawings.

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 so as 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. 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.
- 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 placement and compaction of subbase, place vapor retarder sheeting with longest dimension parallel with direction of 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 PAVEMENT 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 31 23 01

DIVISION 31 – EARTHWORK

SECTION 312317 – TRENCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions in the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Excavating trenches for utilities and utility structures.
 - 2. Bedding.
 - 3. Backfilling and compacting to subgrade elevations.
 - 4. Sheeting and Shoring.
 - 5. Dewatering.
 - 6. Compacting backfill material.
- B. Related Sections include the following:
 - 1. Section 310000 – Earthwork
 - 2. Section 312500 – Erosion and Sediment Controls
 - 3. Section 312318 – Rock Removal
 - 4. Section 331000 – Water Systems
 - 5. Section 333000 – Sanitary Sewerage
 - 6. Section 334000 – Storm Drainage Utilities

1.03 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand- Cone Method.
 - 3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 6. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 7. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.04 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.
- B. Utility Structures: Manholes, catch basins, inlets, valve vaults, hand holes, and other utility access structures as indicated on Drawings.
- C. Trench Terminology:
 - 1. Foundation: Area under bottom of trench supporting bedding.
 - 2. Bedding: Fill placed under utility pipe.
 - 3. Haunching: Fill placed from bedding to center line of pipe.
 - 4. Initial Backfill: Fill place from center line to 6 to 12 inches above top of pipe.
 - 5. Final Backfill: Fill placed from initial backfill to subgrade.

1.05 SUBMITTALS

- A. Submissions shall be in accordance with Section 013300 – Submittal Procedures and as modified below.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of New York.
- C. Dewatering Plan if required: Describe methods of dewatering and disposal of water.
- D. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- E. Samples: Submit to testing laboratory, in air-tight containers, 10-pound sample of each type of fill.
- F. Materials Source: Submit name of imported fill material suppliers.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 014523 – Tests, Inspections and Special Inspections.

1.07 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.08 COORDINATION

- A. Section 013000 – Special Procedures and Provisions: Coordination and project conditions.
- B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Subsoil Fill: Clean natural soil with a plasticity index of 15 or less that is free of clay, rock, or gravel

lumps larger than 2 inches in any dimension; debris; waste; frozen material; and any other deleterious material that might cause settlement. Suitable material excavated from the site may be used as subsoil fill under optimummoisture conditions.

- B. Granular Fill: Clean sand, slightly silty sand, or slightly clayey sand having a Unified Soil Classification of SW, SP, SP-SM or SP-SC.
- C. Foundation Stone: Clean course aggregate Gradation No. 57.
- D. Bedding and Haunching Material.
 - 1. Rigid Pipe: Granular Fill.
 - 2. Flexible Pipe: Foundation Stone.
- E. Bedding for Structures: Foundation Stone.
- F. Initial Backfill to 6 inches Minimum Above Utility:
 - 1. Rigid Pipe: Subsoil Fill.
 - 2. Flexible Pipe: Foundation Stone.
- G. Final Backfill to Subgrade:
 - 1. Under Pavement: Granular Fill.
 - 2. Under Landscape: Subsoil Fill.

2.02 ACCESSORIES

- A. Geotextile Fabric: Non-woven, non-biodegradable.
- B. Concrete: Concrete conforming to Section 033000 – Cast-In-place Concrete Work.
 - 1. Compressive strength of 3,000 psi at 28 days.
 - 2. Air entrained.
 - 3. Water cement ratio of 0.488 with rounded aggregate and 0.532 with angular aggregate.
 - 4. Maximum slump of 3.5 inches for vibrated concrete and 4 inches for non-vibrated concrete.
 - 5. Minimum cement content of 564 lbs per cubic yard for vibrated and 602 lbs. per cubic yard for non-vibrated concrete.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Call local utility line information service indicated on Drawings not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, rock outcropping, and other features remaining as portion of final landscaping.
- D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating

equipment and vehicular traffic.

- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.02 LINES AND GRADES

- A. Excavate to lines and grades indicated on Drawings.
 - 1. Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.03 TRENCHING

- A. Excavate subsoil required for utilities.
- B. Remove lumped subsoil, boulders, and rock up of 1/3 cubic yard, measured by volume. Remove larger material as specified in Section 31 23 18.
- C. Perform excavation within 48 inches of existing utility service in accordance with utility's requirements.
- D. Do not advance open trench more than 200 feet ahead of installed pipe.
- E. Remove water or materials that interfere with Work.
- F. Trench Width: Excavate bottom of trenches maximum 16 inches wider than outside diameter of pipe or as indicated on Drawings.
- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- H. Maintain vertical faces to an elevation equal to 12 inches above top of pipe.
 - 1. When Project conditions permit, side walls may be sloped or benched above this elevation.
 - 2. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this Section.
- I. Support Utilities and Structures:
 - 1. Keep trench width at top of trench to practical minimum to protect adjacent or crossing utility lines
 - 2. Support utilities crossing trench by means acceptable to utility company.
 - 3. Do not interfere with 45-degree bearing splay of foundations.
 - 4. Provide temporary support for structures above and below ground.
- J. When subsurface materials at bottom of trench are loose or soft, excavate to firm subgrade or to depth directed by Engineer.
 - 1. Cut out soft areas of subgrade not capable of compaction in place.
 - 2. Backfill with foundation stone and compact to density equal to or greater than requirements for subsequent backfill material.

- K. Trim Excavation: Hand trim for bell and spigot pipe joints where required. Remove loose matter.
- L. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- M. Place geotextile fabric over trench foundation stone prior to placing subsequent bedding materials.

3.04 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures, and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work unless approved by Engineer.
- D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- E. Repair damage to new and existing Work from settlement, water, or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.05 SURFACE WATER CONTROL

- A. Control and remove unanticipated water seepage into excavation.
- B. Provide ditches, berms, and other devices to divert and drain surface water from excavation area as specified in Section 312500 – Erosion and Sediment Controls.
- C. Divert surface water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

3.06 DEWATERING

- A. Design and provide dewatering system to permit Work to be completed on dry and stable subgrade.
- B. Operate dewatering system continuously until backfill is minimum 2 feet above normal ground water table elevation.
- C. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.
 - 1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
 - 2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- D. Modify dewatering systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.
- E. Discharge ground water and seepage water within excavation areas through filter bags or into settling basins prior to pumping water into drainage channels and storm drains.
- F. Remove dewatering and surface water control systems after dewatering operations are

discontinued.

3.07 BEDDING, HAUNCHING AND INITIAL BACKFILL

- A. Place bedding full width of trench to the depth indicated on Drawings and compact to 95 percent maximum density. Excavate for pipe bells.
- B. Install utility pipe and conduit in accordance with the respective utility section.
- C. Support pipe uniformly along entire length of pipe.
- D. Carefully place haunching material to center of pipe, rod and tamp material to fill voids and provide uniform support of pipe haunches. Compact to 90 percent maximum density.
- E. Carefully place initial backfill to 6 inches above top of pipe or to depth indicated on Drawings. Compact to 95 percent maximum density.

3.08 FINAL BACKFILLING TO SUBGRADE

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place fill material in continuous layers and compact in accordance with schedule at end of this Section.
- D. Employ placement method that does not disturb or damage utilities in trench or foundation perimeter drainage.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Do not leave more than 50 feet of trench open at end of working day.
- G. Protect open trench to prevent danger to the public.

3.09 DISPOSAL OF EXCESS MATERIAL

- A. Dispose of excess material offsite and legally.
- B. Furnish Engineer with certificate of disposal site or agreement from private property owner.

3.11 FIELD QUALITY CONTROL

- A. Section 014523 – Tests, Inspections and Special Inspections: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557 or AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

- E. Frequency of Tests: Two tests per lift for every 1000 feet of trench.

3.12 PROTECTION OF FINISHED WORK

- A. Section 017000 – Contract Closeout: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.13 SCHEDULE OF COMPACTION

- A. Under Pavement and Slabs:
 - 1. Granular Fill in maximum 8-inch loose lifts.
 - 2. Compact to minimum 95 percent maximum density except the top 12 inches.
 - 3. Compact top 12 inches to minimum 95 percent maximum density.
- B. Under Landscape Areas:
 - 1. Subsoil Fill in maximum 8-inch loose lifts.
 - 2. Compact to minimum 90 percent maximum density.
- C. In Unstable or Unsuitable Trench Foundation Areas:
 - 1. Foundation Stone in maximum 12-inch loose lifts.
 - 2. Compact to 98 percent maximum density.

END OF SECTION

DIVISION 31 – EARTHWORK
SECTION 312318 – ROCK REMOVAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions in the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Removing identified and discovered rock during excavation.
 - 2. Expansive tools to assist rock removal.
 - 3. Explosive tools to assist rock removal.
- B. Related Sections include the following:
 - 1. Section 310000 – Earthwork

1.03 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 495 - Explosive Materials Code.

1.04 DEFINITIONS

- A. Rock: Solid mineral material with volume in excess of 1/3 cubic yard or solid material that cannot be removed with 3/4 cubic yard capacity excavator without drilling or blasting.

1.05 SUBMITTALS

- A. Submissions shall be in accordance with Section 013300 – Submittal Procedures and as modified below.
- B. Shop Drawings: Indicate proposed method of blasting, delay pattern, explosive types, and type of blasting mat or cover. Indicate intended rock removal method.
- C. Survey Report: Submit survey report on conditions of buildings near locations of rock removal.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with NFPA 495.
- B. Seismic Survey Firm: Licensed company specializing in seismic surveys with five years documented experience.
- C. Explosives Firm: Company specializing in explosives for disintegration of rock with five years documented experience.

1.07 PROJECT CONDITIONS FOR USE OF EXPLOSIVES

- A. Conduct survey and document conditions of buildings near locations of rock removal prior to blasting; photograph existing conditions identifying existing irregularities.
- B. Advise owners of adjacent buildings or structures, in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations.
- C. Obtain seismic survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.08 SCHEDULING

- A. Schedule Work to avoid disruption to occupied buildings nearby and conform to local laws and regulations pertaining to blasting times.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Conform to NFPA 495.
- B. Explosives, Delay Devices, and Blast Mat Materials: Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.
- C. Mechanical Disintegration Compound: Grout mix of materials that expand on curing.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 013000 – Special Procedures and Provisions: Coordination and project conditions.
- B. Verify site conditions and note subsurface irregularities affecting Work of this Section.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.03 ROCK REMOVAL BY MECHANICAL METHOD

- A. Excavate and remove rock by mechanical method.
 - 1. Drill holes and use expansive tools, wedges, and mechanical disintegration compound to fracture rock.
- B. Cut away rock at bottom of excavation to form level bearing.
- C. Remove shaled layers to provide sound and unshattered base for footings and foundations.
- D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 16 inches wider than pipe diameter.
- E. Remove excavated materials from site.

- F. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 310000 – Earthwork.

3.04 ROCK REMOVAL BY EXPLOSIVE METHODS

- A. When rock is uncovered requiring explosives method for rock disintegration, notify Architect/Engineer prior to executing as follows.
 - 1. Provide seismographic monitoring during progress of blasting operations.
 - 2. Drill blasting holes within 12 feet of finished slope.
 - 3. Disintegrate rock and remove from excavation.
 - 4. Remove rock at excavation bottom to form level bearing.
 - 5. Remove shaled layers to provide sound and unshattered base for footings and foundations.
 - 6. In utility trenches, excavate to 6 inches below invert elevation of pipe and 16 inches wider than pipe diameter.
 - 7. Remove excavated material from site.
 - 8. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 310000 – Earthwork.
- B. Notify affected parties 72 hours in advance of using explosives including:
 - 1. Home owners.
 - 2. Schools
 - 3. Fire department.
 - 4. Rescue.
 - 5. Emergency management.
 - 6. Local Law Enforcement department.
 - 7. Department of Transportation.
 - 8. Railroads

3.05 FIELD QUALITY CONTROL

- A. Section 014523 – Tests, Inspections and Special Inspections: Field inspecting, testing, adjusting, and balancing.
- B. Request visual inspection of foundation bearing surfaces by Architect/Engineer and inspection agency before installing subsequent work.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 312500 – EROSION AND SEDIMENT CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor, as a part of the site development, is responsible for the installation and maintenance of erosion and sedimentation control measures necessary to prevent the transportation of sediments to off-site areas. As such, he shall provide all labor, materials, equipment, tools and incidentals required to assure adequate environmental protection including implementation of all erosion and sediment control measures and site restoration measures as shown, specified and required to complete the Work. For projects that require a specific stormwater pollution prevention plan (SWPPP), see related information provided by others and incorporated within the contract documents.
2. Includes the installation, maintenance, adjustments, dismantling, removal and disposal of all soil erosion and sediment control measures required by the Project.*
3. Includes the disposal by the Contractor of all sediment and erosion control materials removed in legal fashion at an off-site location of the Contractor's choice.
4. Includes the control of dust by the application of water, or other means acceptable to the Architect/Engineer. *Use of Calcium Chloride is prohibited.*

* The specific methods and materials employed in the installation and maintenance of erosion control measures shall conform to the *New York State Stormwater Management Design Manual* and the *New York Standards and Specifications for Erosion and Sedimentation Control*.

- ###### **B. For all Projects and for LEED Certified Projects: Soil and Erosion Control Measures must meet the requirements of LEED SS Prerequisite 1 by conforming to the Best Management Practices of the U.S. Environmental Protection Agency (EPA) Document No. EPA 832/R-92-005 (September 1992), Storm Water Management for Construction Activities, Chapter 3, or local erosion and sedimentation controls standards and codes, whichever is more stringent. The SWPPP/environmental plan shall meet the following objectives:**

1. Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protection of soil stockpiles, utilizing jute mesh or erosion control blanket material.
2. Prevent sedimentation of storm sewer or receiving streams.
3. Prevent polluting the air with dust and particulate matter.

C. Coordination:

1. The Contractor shall review requirements and procedures under other sections as specified in D below and coordinate with the Work that is related to this Section.
2. The Contractor shall comply with applicable NYSDEC regulations.

3. The Contractor shall comply with applicable NYCDEP regulations for protection of New York City lands.
4. The Contractor shall comply with Stormwater Pollution Prevention Plan Report, if one has been provided for this project.
5. If the project is of a size and scope that requires a stormwater pollution prevention plan (SWPPP), refer to additional documentation provided elsewhere herein, and conform to its requirements in conjunction with and as related to this Section.

D. Related Sections:

1. Section 015000 – Temporary Facilities and Controls
2. Section 013563 – LEED Requirements
3. Section 310000 – Earthwork
4. Section 310001 – Site Work General Provisions
5. Section 329200 – Turf and Grasses

1.02 APPLICABLE REGULATIONS

- A. In the performance of the Contract, the Contractor and any Subcontractors shall comply with all applicable Federal, State, and local municipal laws and regulations concerning environmental protection and erosion and sediment control.
- B. The Contractor shall comply with the following design standards and guidance documents:
 1. *Construction Activity Erosion and Sediment Control Measures: "New York Standards and Specifications for Erosion Control", published by the Empire State Chapter of the Soil and Water Conservation Society. (The Blue Book).*
 2. *Post-Construction Stormwater Control Practices, for water quality/quantity controls: "New York State Stormwater Management Design Manual", prepared by Center for Watershed Protection, for NYSDEC.*
 3. *New York City Department of Environmental Protection, The Applicant's Guide to Stormwater Pollution Prevention Plans and Crossing, Piping or Diversion Permits, prepared by NYCDEP Bureau of water Supply Quality and Protection, Engineering and Operations Division, August 2002.*
 4. *New York State Stormwater Management Design Manual.*
 5. *New York State Dept. of Transportation (NYSDOT) Standard Specifications Construction & Materials, January 2, 1990 & Latest Editions & Addenda.*
- C. The Contractor shall comply with NYSDEC SPDES General Permit No. GP-02-01 for Stormwater Discharges from construction activity.

The Contractor shall maintain a copy of each of these documents readily available for continuous reference thereto. The Contractor shall also keep a copy of Stormwater Pollution Prevention Plan, if one exists for this project, on site for continuous reference hereto.

1.03 SUBCONTRACTORS

- A. Compliance with the provisions of this Section by Subcontractors shall be the responsibility of the Prime Contractor.

1.04 SUBMITTALS

- A. **LEED Submittals: Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 013563 "LEED Requirements". (For LEED Certified Projects only)**
- B. All submissions shall be made in accordance with the provisions of Section 013300.
- C. Certification Statement – When a SWPPP is provided, all Contractors and Subcontractors shall submit a signed and sealed copy of the following certification statement on company letterhead before undertaking any construction activity at the site identified in the Stormwater Pollution Prevention Plan:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Stormwater Pollution Prevention Plan for the construction site identified in such Stormwater Pollution Prevention Plan as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

- D. The certification must include the name and title of the person providing the signature in accordance with the General Permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date of the certification is made.
- E. For projects without a SWPPP, prior to commencement of the Work, the Contractor shall submit to the Architect/Engineer, in writing, an Environmental Plan. The plan must be prepared by a NYS licensed Professional Engineer. The Environmental Plan shall describe proposed methods and schedules for environmental protection, restoration, and erosion and sediment control. At a minimum, the Environmental Plan elements must conform to the requirements and procedures shown and specified, and to the NYSDEC and NYCDEP regulations. It shall describe the Contractor's compliance with the requirements and procedures, as well as modifications or additions necessitated by specific site conditions or construction/restoration schedules.
 - 1. As a minimum, the Contractor's Environmental Plan shall contain:
 - a. The construction schedule including projected dates of clearing, construction, and restoration.
 - b. A description of the sequence of operation and environmental precautions to be employed during construction of the site improvements.
 - c. Erosion control measures to be implemented prior to completion of restoration.
 - d. A drawing or series of drawings indicating width of the temporary work limits, extent of clearing and grubbing, location of stockpile and storage areas, location of hay bales and other erosion control devices, and placement of dewatering settlement basins (if required by project scope).
 - e. Location of any disposal areas for excess excavated fill, subject to the approval of the Architect/Engineer. Disposal of materials shall be at approved and licensed landfills.
 - f. Procedures for the preservation of existing vegetation, where practical, and restoration including, where appropriate, stone stabilization of stream banks and beds, fertilizing, seeding, and mulching, and soil stabilization matting such as jute netting.

- F. The Contractor shall revise and resubmit the Plan until it is approved by the Architect/Engineer.
- G. Material Submittals: Provide detailed material submittals, and as available, technical manufacturer's product data, for all items listed under 2.01 below.

PART 2 - MATERIALS

2.01 GENERAL

- A. Vegetated surface restoration products shall conform to the applicable requirements of Sections 329200 and 329300.
- B. Soil Erosion and Sediment Control Materials:
 - 1. **Silt fence** shall conform to NYSDOT Section 209-2.08 ("Soil Erosion & Sediment Control-Silt Fence") requirements. A silt fence assembly shall consist of silt fence geotextile fabric, jute mesh, burlap fabric, excelsior blankets, setting posts, and fasteners and may include mesh support/plastic netting consistent with the NYSDOT Standard. Note: Geotextile fabric, unless otherwise noted, shall meet the requirements of NYSDOT 207-2 Materials, Geotextile Stabilization, Strength Class 1.
 - 2. **Hay bales** shall be full size, unbroken and not rotted, and shall meet the requirements of NYDOT 209-2.04.
 - 3. **Gravel bags** shall be fabricated from reinforced woven geotextile and shall include ties. No burlap bags shall be allowed. Coarse aggregate shall meet the gradation requirements of size designation #1 or #2 of table 703-4 from NYSDOT specifications and shall be used as the fill material. Each gravel bag shall be individually tied and double bagged. The bag with fill material shall be inversely inserted into the second bag in order to prevent leaking.
 - 4. **Mulch** shall be straw or wood fiber mulch and shall meet the requirements of NYSDOT 209-2.01.
 - 5. **Construction Entrances** shall consist of a geotextile fabric, crushed stone, RCA or gravel and if necessary, a drainage pipe to maintain ditch flow.
 - a. Geotextile shall meet the requirements of NYSDOT 207-2 Materials, Geotextile Stabilization, Strength Class 1.
 - b. Crushed Stone, RCA or Gravel shall be 150 mm of coarse aggregate material meeting the gradation requirements of size designation #3 on Table 703-4.
 - c. The Contractor shall provide a drainage pipe sized with sufficient capacity to carry ditch flow.
 - d. The construction entrance shall be maintained by the Contractor in a condition which will prevent tracking or flowing of sediment onto the right-of-way. All sediment spilled, dropped, washed, or tracked onto the right-of-way shall be removed immediately. In the event the entrance is no longer performing properly (i.e. the entrance aggregate becomes clogged with sediment), the contractor shall top-dress the entrance with additional coarse aggregate material.
- C. Dust Control Materials: Water shall be potable and shall be obtained from an off-site source. Use of calcium chloride is prohibited.

- D. Temporary water for truck washdown and dust control shall be provided by and be the complete responsibility of the General Contractor. Tire wash locations shall be as indicated on Construction Implementation Plans; where not indicated, on CIP, the General Contractor shall supply his proposed location(s) for washdown and written methodology.
- E. Soil Stockpile Protection: Provide either 14 ga. geotextile silt fence fabric material, jute mesh, or soil erosion control blankets (similar or equal to R-1 Excelsior Series by Western Landscape and Geotextile Supply Corp., 5065 Colorado Boulevard, Denver, Colorado, 80216 - ph. (720) 941-3833.

PART 3 - EXECUTION

3.01 PROHIBITED CONSTRUCTION PROCEDURES

- A. Prohibited construction procedures include, but are not limited to:
 - 1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or at unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, any wetlands, or any surface waters.
 - 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, or any wetlands.
 - 4. Damaging vegetation adjacent to or outside of the access road or the right-of-way.
 - 5. Disposal of trees, brush, and other debris in any stream corridors, any wetlands, any surface waters, or at unspecified locations.
 - 6. Permanent or unspecified alternation of the flow line of the stream.
 - 7. Open burning of project debris.
 - 8. Applying any pesticides, including defoliants, desiccants, and plant regulators, in any wetlands containing significant stands of high vigor spartina alterniflora (saltmarsh cordgrass), zizania aquatica (wild rice), typhasp (cattail), and scirpus americanus (common threesquare).
 - 9. Applying pesticides whose residues and metabolic products persist in the environment over extended periods of time.
 - 10. Use of chemicals for dust control, including calcium chloride.
 - 11. Use of asphaltic mulch binder.

3.02 EMERGENCY VEHICLE ACCESS

- A. The Prime Contract(s) shall provide temporary access to all Fire, Police, Ambulance, Hospital, or other emergency vehicles, where his construction procedures or activities directly impact the access to the Owner's facilities. Arrangements for temporary access shall be fully coordinated directly with the affected emergency department, the municipality which they serve and the Contractor.

3.03 CONSTRUCTION DETAILS

- A. Verify existing conditions prior to start of work each day. This is an active site that is in constant ongoing use. Control of dust, erosion and sediment is of extreme importance.
- B. Erect soil erosion and sediment control measures as shown on the plans, and at all locations of existing drainage along adjacent streets at all locations of existing on-site drainage, at newly installed drainage, along site driveways that are down-gradient from the items of work, and as directed by the Architect, Engineer and/or Construction Manager.
- C. Implementation and maintenance shall be acceptable to the NYSDEC Division of Water.
- D. Approved Silt Fence shall be erected at all locations where storm water flow will cause erosion. The more appropriate of manufacturer's instructions or plan details shall be followed in order that the installation perform in a satisfactory manner. Silt Fence shall only be removed after up-slope areas have been stabilized to avoid danger of washouts with deposition of soil and debris on adjacent areas.
- E. Approved Hay Bales or gravel bags shall be installed around all existing drainage structure castings on site and along adjacent streets that may be impacted by the Work, or as directed by the Engineer. Hay Bales shall only be removed after up-slope and up-gradient areas draining to the line of Hay Bales have been stabilized to avoid danger of washouts with deposition of soil and debris on adjacent areas.
- F. Approved Dust Control shall be performed on any day that dust from the work site may be blown into any portion of the project site or onto any portion of the surrounding roads and property adjacent to the work site. In the event that dust from the Contractor's operations becomes built-up off of the work site in any quantity, and at any location noted herein, the Contractor shall be required to take actions to correct this condition.
- G. The Contractor shall install a Stabilized Construction Exit Pad (see detail and location on the plans, or in accordance with standard construction practice and as located on site via start of work. Location to be coordinated with the Owner's Representative. The Contractor shall be responsible for insuring that all vehicles exiting the site cross over the Exit Pad in an effort to prevent soil and other debris from the site from being deposited on off-site roadways. The Contractor shall be responsible for maintaining the efficiency of the Pad stone such that it accomplishes the task intended. In the event that crossing over the Exit Pad alone does not remove soil and debris from the vehicles, the Contractor shall provide equipment, personnel, etc., as needed, to wash the soil and debris from the vehicles using water.

3.04 SITE ACCESS AND CLEARING

- A. Extent of Clearing and Grubbing: The Contractor shall confine all clearing and grubbing to that portion of the work limits absolutely essential for the construction and installation of the structures and appurtenances, particularly in the vicinity of stream corridors, surface waters, mature trees and steep slopes.
- B. Schedule of Clearing: All clearing schedules shall be arranged to provide a minimum practical exposure (in both extent and duration) of soils in order to prevent erosion. As much of the ground cover root structure as is practical shall be left in place to minimize the length of right-of-way or work limit in which construction will be initiated within ten working days.

3.05 STOCKPILING OF MATERIAL

- A. After vegetation has been removed, the Contractor shall strip any topsoil from the area to be excavated and stockpile it for future use. At the completion of the work, the Contractor shall legally

remove all excess fill from the site at his own cost.

- B. When excavating trenches, the Contractor shall separate suitable backfill material from unsuitable material for use as backfill.
- C. Items A & B above shall be done in conjunction with work conducted under 310000 - "Earthwork".
- D. Where topsoil or subgrade material is to be stored, a suitable means of protecting excavated material from wind and water erosion shall be employed. Erosion control methods may include one or more of the following: mulching, sprinkling, silt fencing, hay bales or erosion blankets.

3.06 PROTECTION OF TREES AND SHRUBS

- A. The Contractor shall make very effort not to damage adjoining trees and shrubs, other than those he is permitted to cut, within or adjacent to the line of the excavation.

3.07 DEWATERING

- A. Turbid water pumped from excavations or working or processing water containing oils or sediments shall be diverted to sediment traps shown in drawings prior to discharge. Extra caution shall be taken when discharge may be directed towards any surface water, stream corridor or wetland area.

3.08 EROSION CONTROL

- A. The Contractor shall use necessary methods to minimize erosion within working limits and access roads. Methods of preventing erosion shall include the use of hay bales, silt fence, sediment traps, filter fabric, mulch, and jute or excelsior blankets, as conditions require. Erosion and sediment control methods shall be employed during site clearing, construction, immediately following clearing and backfilling and at the time of final restoration.
- B. All erosion and sediment control practices shall be in place until construction is completed and/or the area is stabilized.
- C. The Contractor shall provide special attention to areas where slopes are 15 percent or greater. In general, staked hay bales shall be used to minimize erosion on slopes. In steeper areas, staked hay bales and filter fabric shall be used downslope from construction. Jute netting or other means of protection shall be used on exposed slopes until vegetation or other permanent restoration measures are in place.
- D. Minimum hay bales, silt fence, sediment traps installation requirements may be shown on the Drawings; if not shown, they shall be provided in accordance with design standards and standard construction practice.

3.09 NOISE CONTROL

- A. Noise levels occurring during sediment and erosion control work shall not exceed limits specified by local and state regulations.

3.10 SEDIMENT & EROSION/SEDIMENTATION CONTROL

- A. Erosion Control Measures shall include the following:
 - 1. The proposed erosion control shown on the plans shall be installed prior to the start of construction. Additional erosion control may be necessary, based upon field conditions that may develop as construction progresses, and as may be required by the local conditions.

- a. Existing vegetation to remain shall be protected and remain undisturbed.
- b. Clearing and grading shall be scheduled so as to minimize the size of exposed areas and length of time that areas are exposed.
- c. The length and steepness of cleared slopes shall be minimized to reduce runoff velocities and quantities.
- d. Runoff shall be diverted away from clear slopes.
- e. Sediment shall be trapped on-site.

Specific methods and materials employed in the installation and maintenance of erosion control measures shall conform to the *New York State Guidelines for Urban Erosion and Sedimentation Control*.

2. Sedimentation barriers (silt fence, hay bales, or approved equal) shall be installed prior to any grading work along the limits of disturbances and shall be maintained for the duration of the work. No sediment from the site shall be permitted to wash onto adjacent properties or roads. Where sedimentation barriers are required adjacent to streams, ponds or tidal areas, the silt fence is to be supported by a temporary metal post and chain link fence.
3. Graded and stripped areas and stockpiles shall be kept stabilized through the use of temporary seeding or sod as required.
4. Seed mixtures shall be in accordance with the Soil Conservation Service recommendations.
5. Soils stockpiled on individual lot as a result of excavation for foundations shall be placed to increase the distance these soils must travel to reach the drainage system.
6. Drainage inlets installed as part of the project shall be protected from sediment buildup through the use of sedimentation barriers, sediment traps, etc. as required.
7. Proper maintenance of erosion control measures is to be performed as indicated by the periodic inspection after a rainfall event totaling 0.5 inches of rainfall or greater or during a 14-day inspection program occurring throughout the period of the construction. Maintenance measures include, but are not limited to, cleaning of sediment basins or traps, cleaning and repair of berms and diversions and cleaning and repair of inlet protection.
8. Appropriate means shall be used to control dust during construction. A stabilized construction entrance shall be maintained to prevent soil and loose debris from being tracked onto local roads. In addition, a water source is to be maintained adjacent to this entrance for the purpose of washing debris from truck tires. The construction entrance shall be maintained until the site is permanently stabilized.
9. Sediment barriers and other erosion control measures shall remain in place until upland disturbed areas are permanently stabilized.
10. All 1:2 and 1:3 slope areas will be protected against erosion during construction and permanent ground cover shall be such that erosion will be prevented. Necessary measures shall include, but not be limited to, hay bales, silt fence, silt trap/basins, jute mesh, anchored straw mulch, hydroseeding, sod, etc. and shall be maintained for the duration of the construction as well as following the completion of construction until such time that the proposed plantings have become acclimated/established as determined by the authority having jurisdiction.

B. The plans shall also address the following environmental issues the Contractor shall be responsible

for addressing during construction:

1. Pollution prevention measures to be instituted to prevent litter, construction chemicals, and construction debris from becoming pollutant sources in storm water discharges from the site.
2. Provide a description of the method of storing waste materials on-site and a description of controls to be employed to reduce pollutants from these materials, including storage practices to minimize exposure of materials to storm water with a spill prevention and response plan.
3. The installation of a portable sanitary system or a system established in a field office trailer is to be maintained through the term of the project.
4. All soils stockpiled on the site for future use shall be covered to limit dust pollution and run-off of fines with rain.
5. Site clearing wood chips to be stockpiled for mulch shall be stockpiled in an area away from proposed construction and surrounded by silt fencing.
6. The Contractor shall be responsible for keeping adjacent roadways free of debris washed from the construction site. A street sweeper shall be employed to remove all soil and debris from roadways as often as may be required.
7. All construction debris shall be removed from the site within the same day, or kept in a manner to prevent it from leaving the site with storm runoff or blown from the site by winds.
8. All refuse shall be placed within a covered container for future disposal.
9. The Contractor shall be responsible for the disposal of all excess concrete dumped on the site. Furthermore, the Contractor shall designate a location for washing delivery trucks. This area is to be configured to insure that wash water does not runoff the site to either private property or public roadways. Subsequent to the completion of concrete activities, this area is to be excavated and material to be removed from the site. Suitable soils are to be brought to restore this area.
10. The Contractor shall be responsible for installing catch basin inserts into any and all County-owned catch basins connected to positive drainage systems, which are located adjacent to the project area or located within 100' of the project area. It is the responsibility of the Contractor to maintain these inserts during the period of the construction in accordance with the manufacturer's recommendation. At the end of all site work, including the development of individual sites, new media is to be installed and the devices are to be dedicated to the County. All structures are required to have an 80% Total Suspended Solids Removal or as may be specified in the New York State Design Manual. However, if it is determined that the catch basins lying within these limits do not connect to positive systems, and function solely as leaching basins, the Contractor will be responsible for cleaning each at the conclusion of all site work. This does not prevent the County from issuing a request to clean these facilities if it has been determined that the Contractor's activities have adversely affected their normal function.

C. Sequence of Construction Activities:

1. Install silt fence, sediment traps, and hay bale filters as a part of initial phase of work to ensure maximum silt retention on site.
2. Mass grade the site, keeping disturbed areas to a minimum at all times. Seed and mulch sides of swales, mounds and ponds, immediately upon completion.

3. Control mud accumulation on all streets surrounding the project site by installing stone surface at each location where construction traffic leaves the site. Keep dust to a minimum, by utilizing sprinkling, vegetative cover, spray-on adhesives, or other approved methods.
4. Maintain all filters and traps during construction to prevent any blockages from accumulated sediment. Clean sediment traps, filters and fencing after each storm event as well as on a weekly basis. Replace all materials that are clogged or ineffective.
5. Remove temporary erosion control and sediment controls only when sufficient growth of ground cover is established to prevent further erosion.

D. Monitoring:

1. Monitor soil erosion practices at least weekly to determine the effectiveness of the installation and any repairs which may be required. Keep a detailed log of these observations and remedies taken.
2. Clean out siltation filters when siltation reduces capacity by 20 percent. Material removed may be dried and used as embankment material only, in areas approved by the Architect/Engineer.

3.11 DUST CONTROL

- A. Dust control shall be achieved by wetting, sweeping, and temporary mulching. *The use of chemicals for dust control, including calcium chloride, will not be permitted.*

3.12 STABILIZATION

- A. The Contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:
1. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.
 2. Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

3.13 MULCHING

- A. Where slopes exceed 15 percent or as directed by the Architect/Engineer, mulch in the form of staked jute netting or other material approved by the Architect/Engineer must be installed and maintained until an adequate vegetative cover is established.

3.14 FILL MATERIALS

- A. All fill materials shall be stockpiled away from wetland areas and water bodies and surrounded with an overlapping, anchored hay bale barrier.

3.15 SILT DISPOSAL

- A. All silt that has accumulated behind hay bale barriers or silt fences shall be removed from the site after it has had sufficient time to dry, and before the hay bales or fences are removed.

3.16 INSPECTION REQUIREMENTS (FOR PROJECTS REQUIRING A SWPPP)

- A. Soil erosion and sediment control shall be inspected by a Civil Engineering firm retained independently by the Owner specifically for soil erosion control inspection and all controls shall be maintained during the life of the project, including winter shutdown, etc. Such inspection and maintenance shall continue until after project is complete.
- B. All inspections shall be completed within one calendar day. Inspection reports shall be issued within 5 working days from day of inspection. Within 3 calendar days after receipt of the inspection reports, the Contractor shall:
 - 1. Repair or rebuild the control measures to function as originally intended.
 - 2. Remove sediment deposition which reached one half the height of the control measure. All sediment deposits shall be considered unsuitable material and disposed of in accordance with NYS DOT Spec. 203-3.08, Disposal of Surplus Excavated Materials. Material shall be disposed of away from wetland, water courses or other bodies of water.
 - 3. Torn or punctured silt fence fabric may be repaired by the placement of a patch, on the upstream side, consisting of an additional layer of fabric over the damaged area, or replacement of the damaged section.
- C. Site inspections shall be conducted by a Civil Engineering firm retained by the Owner specifically for soil erosion control inspection at least every seven (7) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. During each inspection, the following information shall be recorded:
 - 1. On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
 - 2. Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization.
 - 3. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period.
 - 4. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume (for example, 10 percent, 20 percent, 50 percent).
 - 5. Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water.
 - 6. The Contractor shall correct all deficiencies that are identified with the implementation of the Stormwater Pollution Prevention Plan.
- D. The Contractor shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the Contractor shall certify in the site log book that the

Stormwater Pollution Prevention Plan meets all Federal, State and local erosion and sediment control requirements.

- E. The Contractor shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

3.17 SYSTEM MAINTENANCE (FOR PROJECTS THAT DO NOT REQUIRE A SWPPP)

- A. The Contractor shall conduct regular and routine inspections of the installation and erosion control measures throughout the progression of the work, supplementing and restoring site conditions as necessary to maintain the site.

3.18 SYSTEM REMOVAL AND SITE RESTORATION

- A. Restoration Area: All surfaces which have been disturbed or damaged by the Contractor's operations, including streambanks, slopes, dewatering, stockpiling, and equipment storage areas, shall be restored to the condition at least equal to that in which they were found immediately prior to the beginning of construction, or improved as indicated in the Contract Documents. Suitable materials and methods shall be used for such restoration. Grass shall be re-seeded with types compatible with particular areas involved and in conformance with Section 329200. The Contractor shall restore all damaged surfaces outside the work limits.
- B. Restoration Schedule: Permanent restoration of vegetative cover shall be initiated only during optimal planting seasons as delineated in Section 329200. At other times, temporary restoration measures shall be implemented and followed by permanent restoration when the first optimal planting season occurs.
- C. Restoration of vegetation shall be in conformance with Sections 329200 and 329300.

3.19 WINTER MAINTENANCE (FOR PROJECTS THAT REQUIRE A SWPPP)

- A. See the following page for specific requirements.

END OF SECTION

STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION



Definition & Scope

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources.

Conditions Where Practice Applies

This standard applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

Design Criteria

1. Prepare a snow management plan with adequate storage for snow and control of melt water, requiring cleared snow to be stored in a manner not affecting ongoing construction activities.
2. Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.
3. A minimum 25 foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.
4. Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.
5. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.
6. Sediment barriers must be installed at all appropriate

perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

7. Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.
8. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three (3) days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.
9. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.
10. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil should be stabilized at the end of each work day unless:
 - a. work will resume within 24 hours in the same area and no precipitation is forecast or;
 - b. the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.
11. Use stone paths to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

Maintenance

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", all bare exposed soil must be stabilized by established vegetation, straw or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under a winter shutdown.

DIVISION 31 – EARTHWORK

SECTION 312510 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions in the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction, and the general protection and delineation of nearby wetlands.
- B. Related Sections include the following:
 - 1. Section 311000 – Site Clearing for removing existing trees and shrubs.

1.03 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.
- D. Wetland Protection Limits: Area in surrounding wetlands to be protected from impacts during construction and indicated on Drawings.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Existing Conditions: Documentation of existing trees, plantings, and wetlands indicated to remain and be protected, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or videotape.

1.05 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Erection of sheds or structures.
 - 4. Impoundment of water.
 - 5. Excavation or other digging unless otherwise indicated.
 - 6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

7. Do not direct vehicle or equipment exhaust toward protection zones.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil
 1. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of the following:
 1. Type: Ground or shredded hardwood
 2. Size Range: 3 inches maximum, ½ inch minimum
 3. Color: Natural
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:
 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft; remaining flexible from minus 60 to plus 200 deg. F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.
 - a. Height: 4 feet
 - b. Color: High-visibility orange, nonfading

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

- A. Locate and clearly identify wetlands, trees, shrubs, and other vegetation to remain. Tie a 1-inch blue-vinyl tape around each tree trunk at roughly 54 inches above the ground, for all perimeter trees 4-inch caliper and larger, or as ordered by the Landscape Architect or Engineer. Flag the limits of all wetlands within 20 feet of the construction limits.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.03 WETLAND, TREE, AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of tree- and plant-protection zones, and a minimum of 1-foot outside of wetland-protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect, Owner, and Owners Representative. Under no circumstances will disturbance of wetlands be acceptable.
- C. Maintain protection-zone fencing in good condition as acceptable to the Owner's Representative and remove when construction operations are complete, and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

3.04 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 310000 – Earthwork.

3.05 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Do not paint cut root ends
 - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 4. Cover exposed roots with burlap and water regularly.
 - 5. Backfill as soon as possible according to requirements in Division 31 Section "Earth Moving."
 - 6. Root Pruning at Edge of Protection Zone: Prune roots 12 inches outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

3.06 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
 - 1. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
 - 2. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

3.07 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the tree- or plant-protection zone.

- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the tree- or plant-protection zone.
 - 1. Minor Fill within Tree- or Plant-Protection Zone: Where existing grade is 5 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single un-compacted layer and hand grade to required finish elevations.

3.08 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect, Owner, and Owner's Representative. Under no circumstances will disturbance of wetlands be acceptable.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.
 - 2. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect or Owner's Representative.

3.09 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 320116 – COLD MILLING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Under this Section, the Contractor shall provide material, labor, and equipment necessary to mill, shape and remove existing bituminous pavements in accordance with the plans and specifications and directions of the Engineer.
- B. The work shall consist of cold milling the existing pavement to the depths as noted on the plans. Cleaning of the pavement and tack costing prior to overlaying new pavement, shall also be part of the work.
- C. All millings shall be removed from the work areas and become the property of the Contractor.

1.02 RELATED SECTIONS

- A. Section 320117 – Pavement Repair and Resurfacing
- B. Section 321216 – Asphalt Paving
- C. Section 321723 – Pavement Markings
- D. Section 321723.11 – Pavement Markings (Thermoplastic)
- E. Section 321723.12 – Pavement Markings (Pre-formed Reflectorized)

1.03 SUBMITTALS FOR REVIEW

- A. Submittals shall be in accordance with Section 013300.
- B. Contractor shall furnish documentation and certification that the milling machine to be used is capable of removing the desired thickness of pavement.

PART 2 – PRODUCTS

2.01 MILLING MACHINE

- A. Milling machines shall be power operated, self propelled machines capable of removing the desired thickness of existing pavement. The machine shall have sufficient power, traction and stability to accurately maintain depth of cut and slope.
- B. Milling machines shall be capable of producing a finished profile and cross slope to within 1/4" of that required and shall produce a uniform surface texture free from gouges and ridges greater than 3/8" in depth.
- C. Milling machines shall have an integral loading system or sufficient equipment shall be provided to accomplish complete removal of milled material at a rate equivalent to the milling rate.
- D. Vacuum trucks, street sweepers or power brooms shall be used to clean the milled surfaces. The machine shall be equipped with a means to control dust and other particle matter created by the cutting action.
- E. All material removed during the milling process, including foreign debris within or on the pavement shall become the property of the Contractor and removed from the site and disposed of in a legal

matter at his/her expense.

PART 3 – EXECUTION

3.01 GENERAL

- A. Profile and cross slope shall be controlled by a taut reference string line. The reference elevation and string line shall be established by the Contractor and subject to the approval on the Engineer.
- B. The existing slope and pitch of the parking area shall be maintained.
- C. Areas not accessible to the milling machine, such as around curbs or fences, may be removed with a small milling machine, handwork or other approved method.
- D. Contractor shall remove, store, replace fence and fabric as required to operate milling equipment, where required.
- E. All milled material, including that removed by other means, shall be immediately removed from the milled surfaces and adjacent surfaces.
- F. Surfaces shall be cleaned of all fines and dust prior to the placement of tack coats, or pavement courses.
- G. Milled surfaces to be overlaid shall receive a bituminous tack coat immediately prior to placement of overlay.
- H. Damage to milled surfaces, such as raveling, fuel spillage or any contaminants, which would prohibit a good bond with new asphalt shall be repaired or re-milled by the Contractor in a manner approved by the Architect.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 320117 – PAVEMENT REPAIR AND RESURFACING

PART 1 – GENERAL

1.01 GENERAL

- A. These specifications are intended to meet the latest edition of the N.Y.S.D.O.T. standard specifications U.S. Edition Section 400. It is the responsibility of the contractor to verify if the portions stated herein are current. This may be done by visiting the N.Y.S.D.O.T. website at: https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2024_9_specs_usc_tc_vol2.pdf
- B. GC shall be responsible for all work to be provide in conformance with sections referred to herein or within specification sections found on the N.Y.S.D.O.T. website.
- C. Drawings and General Provisions of the Contract and Supplementary Conditions and Division 01 specification sections, apply to the work of this section.

1.02 SCOPE

- A. Under this work the Contractor shall repair deteriorated pavement sections, clean and seal joints and cracks and clean pavement for the installation of new work.
- B. New work shall be defined as any combination of the following:
 - 1. Repair of asphalt pot holes and deteriorated sections of pavement.
 - 2. New pavement markings
 - 3. Seal coat
 - 4. Asphalt overlay

1.03 RELATED SECTIONS

- A. Section 014523 – Tests, Inspections, and Special Inspections Quality Assurance Plan
- B. Section 033000 – Cast-In-Place Concrete
- C. Section 310000 – Earthwork
- D. Section 310001 – Site Work General Provisions
- E. Section 310002 – Stakeout
- F. Section 312500 – Erosion and Sediment Controls
- G. Section 321216 – Asphalt Paving
- H. Section 321216.11 – Asphalt Overlay
- I. Section 321723 – Pavement Markings
- J. Section 321723.11 – Pavement Markings (Thermoplastic)
- K. Section 321723.12 – Pavement Markings (Pre-formed Reflectorized)
- L. Section 334000 – Storm Drainage Utilities

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures.
- B. The Contractor shall submit an asphalt job mix formula indicating the project name, date, contractor name, asphalt type & plant. The mix shall be in conformance with section 02600 and Table 403-1 Composition of Hot Mix Asphalt Mixtures, shown in that section.

- C. The Contractor shall provide asphalt filler documentation proving that material will be obtained from one of the sources on the N.Y.S.D.O.T. approved materials list. Documentation shall also be provided that the filler meets the requirements of Table 702-2 Miscellaneous Asphalt Cements. A copy of the table can be found at the end of Part 2 of this section.
- D. The Contractor shall provide asphalt emulsions documentation proving material will be obtained from N.Y.S.D.O.T. approved source. Additionally documentation indicating if the material is anionic or cationic type, N.Y.S.D.O.T. material designation grade, and test data shall be provided.
- E. For the recycled concrete aggregate (RCA) the Contractor shall submit a sieve gradation for approval by the architect. Along with sieve, the Contractor shall submit documentation that the material to be provided will be obtained from a N.Y.S.D.E.C. registered or permitted construction and demolition (C & D) debris processing facility as specified in Section 360-16.1 of 6NYCRR Park 360 "Solid Waste Management Facilities." If blast furnace slag is to be used, provide beneficial use determination (BUD) prior to its use as specified in the 6NYCRR par 360-1.15, "Solid Waste Management Facilities."
- F. It shall be the Contractors responsibility upon the initial delivery of the materials and during subsequent deliveries, to take samples for testing as described In Section 1.06 Quality Assurance. If for any reason the Owner or Architect shall request the material be tested, the Contractor shall provide the samples free of charge. If requested the Contractor shall also perform, free of charge, core samples of the constructed work for testing. All test results will be copied to the Contractor for their record.
- G. Contractor shall provide written certification on their company letterhead that all installed asphalt was produced and installed in accordance with N.Y.S.D.O.T. specifications and guarantee work against structural and material defects for a period of one year from completion date.

1.05 QUALITY ASSURANCE (RCA SUB-BASE)

- A. The Contractor is responsible to establish and maintain required design, grades, lines and elevations including crown and cross-slope of sub base course.
- B. The Contractor shall be responsible for Quality Assurance as described in Section 321216 – 1.05 – Quality Assurance (RCA Subbase).

1.06 QUALITY ASSURANCE FOR HOT MIX ASPHALT (HMA)

- A. All materials for hot mix asphalt (HMA) production, such as, aggregates, PG binder, reclaimed asphalt pavement (RAP), mineral filler, or any other materials shall meet N.Y.S.D.O.T. requirements.
- B. The Contractor shall be responsible for hot mix asphalt (HMA) quality assurance is described in Section 321216 – 1.06 - Quality Assurance for Hot Mix Asphalt (HMA).

PART 2 – MATERIALS

2.01 ASPHALT TYPES

- A. Removal and Replacement: N.Y.S.D.O.T. Type 3 binder and N.Y.S.D.O.T. Type 6 top coat.
- B. Crack Repair: N.Y.S.D.O.T. type 5 asphalt shim.

2.02 ASPHALT FILLER

- A. Filler shall be asphalt cements and shall meet the requirements in Table 702-2 Miscellaneous Asphalt Cements found at the end of this section.
- B. The asphalt cement shall be homogenous, free from water, and shall not foam when heated.

2.03 ASPHALT EMULSIONS TACK COAT

- A. The emulsion shall be homogeneous and show no separation of asphalt, after thoroughly mixing, within 30 days after delivery, provided separation has not been caused by freezing. Emulsified asphalts held in storage tanks, drums or distributors for long periods are subject to settlement. The asphalt emulsion shall be agitated or circulated amply to ensure emulsion prior to testing. Material that has separated due to freezing is unacceptable at anytime. Asphalt emulsions shall meet the requirements shown in Table 702-5 Anionic Asphalt Emulsions and Table 702-6 Cationic Asphalt Emulsions both can be found at the end of this section.

PART 3 – EXECUTION

3.01 REMOVAL AND REPAIR OF DETERIORATED ASPHALT PAVEMENT SECTIONS

- A. Contractor shall remove and dispose of deteriorated section of HMA pavements to sound material to the extent indicated on the drawings, such that all excavated sides are vertical. Use a chipping hammer, a milling machine equipped with a means to suppress airborne particles, or other appropriate means. The perimeter of repair shall be saw cut at the full depth of the repair section. (Full depth shall mean pavement and 6" RCA subbase).
- B. Tamp or roll existing subgrade and/or subbase as required.
- C. Clean and dry all surfaces exposed from removal operation such that they are clean and free of dust and debris.
- D. Uniformly apply asphalt tack coat emulsion to these surfaces as described in Section 321216 – Part 3 - Execution.
- E. Place the HMA in the repair areas only when the ambient temperature is 45°F or greater. The minimum HMA placement temperature shall be 250°F.
- F. If the total depth of the patch is greater than 3 inches, compact the HMA in multiple lifts, thoroughly compact the lower lifts with a mechanical tamper.
- G. Use N.Y.S. type 3 for binder patch and type 6 for top course patch.
- H. For the top lift, thoroughly compact with a steel wheel roller or pneumatic roller. Slightly overfill the patch with HMA such that the resulting patch is dense, smooth, and no more than 1/4" inch above the existing surface.
- I. When placing the shim course to fill wheel ruts in existing pavement, each wheel path rut must be paved separately. This placement equipment will be a drag box configuration or approved equal having side forms. Use the equipment to spread and strike off the shim course material to a uniform width of approximately 4 feet. The intent of the operation is to fill the low area only and to place the material for the pavement's full lane width. The placement equipment wheels and/or other appurtenances must not interfere with the distribution and placement of the shim course material.

3.02 CRACK SEALING JOINTS & CRACKS

- A. For pavement that requires stress relieving repairs, repair as per N.Y.S.D.O.T. specification section 633-3.05 prior to joint or crack repair work.
- B. Contractor shall use a compressed air stream of at least 80 psi gauge measured at the source to clean all unsealed and inadequately sealed joints and cracks.
- C. Clean all joints and cracks in the pavement of all dirt and loose material to a depth equal to a minimum of twice the crack or joint width, by holding the cleaning jet one inch above the pavement surface. Old joint and crack sealer remaining after cleaning operations need not be removed.
- D. Contractor shall keep the joint and cracks clean until the sealing, filling and paving operations are complete.
- E. Joints and cracks less than ¼" are not required to be cleaned or sealed.
- F. Seal joints and cracks in the existing pavement from ¼" to 1" wide with an approved asphalt cement filler. To ensure that space will be available for expansion of the asphalt filler when HMA is paved over the joint or crack, do not fill the joint or crack completely to the surface. Blot with fine (as per N.Y.S.D.O.T. Section 703-01) aggregate if required to prevent tracking the bituminous material over the paved surface.
- G. Fill joints and cracks greater than 1" wide with N.Y.S.D.O.T. type 5 asphalt shim.

3.03 CLEANING AND PREPARATION OF PAVEMENT SURFACES FOR PAVEMENT MARKING

- A. The Contractor shall select the materials and equipment for cleaning and preparing pavement surfaces.
- B. When the work is conducted under traffic, the Contractor shall supply all necessary flags, markers, signs, and other devices to maintain and protect traffic.
- C. Whenever grinding, water blasting, dry sandblasting or other operations are performed, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.
- D. When removal and cleaning operations are complete, the Contractor shall first power broom and then blow off with compressed air the pavement to remove residue and debris resulting from the cleaning work.
- E. The Contractor shall conduct removal and cleaning work in such a manner as to minimize airborne dust, and similar debris so as to prevent a hazard to motor vehicle operation or nuisance to property.
- F. Care shall be taken to prevent damage to transverse and longitudinal joint sealers.
- G. Cleaning and surface preparation work shall be confined to the surface of existing pavement markings that are specified for removal on the plans or as directed by the Architect.
- H. Pavement markings shall be cleaned to the extent that 95% to 100% of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

3.04 CLEANING EXISTING PAVEMENT PRIOR TO ASPHALT OVERLAY

- A. Clean existing pavement and shoulder surfaces to be overlaid, including ruts and depressions, by the use of mechanical sweepers, hand brooms, or other means until the surfaces are free of all material which might interfere with the bond between the overlay material and existing surfaces.
- B. Remove all debris from the pavement surfaces and dispose of in an appropriate manner. Keep the pavement clean until the overlay operations are completed.

3.05 COMPLETION OF WORK

- A. Once repair, sealing and pavement cleaning and preparation are complete, refer to construction documents for additional scope.
- B. If additional work is required by the Contract refer to related sections for additional components.

END OF SECTION

TABLE 702-2 MISCELLANEOUS ASPHALT CEMENTS		
<u>MATERIAL DESIGNATION</u>	702-0700	
GRADES	18 - 60	
Test Requirements	Minimum	Maximum
Penetration, 77°F (25°C), 100 g, 5 second (AASHTO T 49)	18	60
Flash Point, COC, °F (AASHTO T 48)	393	-
Solubility in trichloroethylene, % (AASHTO T 44)	99.5	-
Softening Point, °F (AASHTO T 53)	130	167
Loss on Heating, 325°F (163°C), 5 hour, % (AASHTO T 47)	-	1.0
Penetration of Residue, % of Original (AASHTO T 49)	60	-
Ductility, 77°F (25°C), 5 cm/minute, cm (AASHTO T 51)	5	-
Typical Uses	Joint & Crack Filler	

TABLE 702-5 ANIONIC ASPHALT EMULSIONS

TYPE MATERIAL DESIGNATION	RAPID SETTING								MEDIUM SETTING								SLOW SETTING			
	702-3001		702-3002		702-3101		702-3102		702-3201		702-3301		702-3401		702-3402		702-3501		702-3601	
GRADE	RS-1		RS-1h		RS-2		HFRS-2		MS-2		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h	
Test Requirements	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Emulsion: Viscosity, Saybolt Furol, 77°F (25°C), second	20	100	20	100	-	-	-	-	100	-	100	-	100	-	50	-	20	100	20	100
Viscosity, Saybolt Furol, 122°F (50°C), second	-	-	-	-	75	400	75 ⁽¹⁾	400 ⁽¹⁾	100 ⁽¹⁾	400 ⁽¹⁾	100	400	-	-	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Demulsibility, 35 ml, 0.02 N, CaC12, %	60	-	60	-	60	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-
Cement Mixing Test, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0 (4)	-	2.0 (4)
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.1	-	0.1	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Residue by Distillation, %	55	-	55	-	63	-	63	-	65	-	65	-	65	-	65	-	57	-	57	-
Oil Distillate, Volume Total Emulsion, %	-	2	-	2	-	3	-	3	-	10	-	10	-	3	-	10	-	-	-	-
Residue from Distillation Test: Penetration, 77°F (25°C), 100 g, 5 second	100	200	40	90	100	200	100	200	100	200	100	200	40	90	200	-	100	200	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Float Test ² , 140°F (60°C), second	-	-	-	-	-	-	1200	-	-	-	120 0	-	120 0	-	120 0	-	-	-	-	-
Suggested Temperature Range: Mixing, °F	-	-	-	-	-	-	-	-	100	170	100	170	75	170	75	170	75	140	75	140
Spraying, °F	75	150	75	150	130	170	130	170	130	170	130	170	75	170	-	-	75	140	75	140
Typical Applications: ³	Spray Patch		Tack Coat for HMA		Surface Treatment				Base and Shoulder Stabilization, Cold Mixes, Shoulder Seal				Hot & Cold Mixes		Stockpile Patching Mix		Base and Shoulder Stabilization			

Notes:

1. This viscosity requirement at 122°F (50°C) applies to emulsion used for shoulder sealing.
2. Float Test AASHTO T50, except that the residue from distillation shall be poured immediately into the float collar at 500°F (260°C).
3. These typical applications are intended only as a guide for selecting the proper emulsion grade.
4. The cement mixing test is waived if this grade of emulsion is used for stabilization.

TABLE 702-6 CATIONIC ASPHALT EMULSIONS

TYPE	RAPID SETTING						MEDIUM SETTING				SLOW SETTING				QUICK SETTING	
	702-4001		702-4002		702-4101		702-4201		702-4301		702-4401		702-4501		702-4601	
MATERIAL DESIGNATION	CRS-1		CRS-1h		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h	
GRADE	CRS-1		CRS-1h		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h	
Test Requirements	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Emulsion:																
Viscosity, Saybolt Furol, 77°F (25°C), second	20	100	20	100	-	-	-	-	-	-	20	100	20	100	20	100
Viscosity, Saybolt Furol, 122°F (50°C), second	-	-	-	-	100	400	50	450	50	450	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Classification Test	Passes		Passes		Passes		---		---		---		---		---	
Particle Charge Test	Positive		Positive		Positive		Positive		Positive		Positive ⁽¹⁾		Positive ⁽¹⁾		Positive ⁽¹⁾	
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Cement Mixing Test, %	-	-	-	-	-	-	-	-	-	-	-	2.0 ⁽³⁾	-	2.0 ⁽³⁾	-	-
Residue by Distillation, %	60	-	60	-	65	-	65	-	65	-	57	-	57	-	62	-
Oil Distillate, Volume Total Emulsion, %	-	3	-	3	-	3	-	12	-	12	-	-	-	-	-	-
Residue from Distillation Test:																
Penetration, 77°F (25°C), 100 g, 5 second	100	250	40	90	100	250	100	250	40	90	100	250	40	90	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Suggested Temperature Range:																
Mixing, °F	-	-	-	-	-	-	100	170	100	170	75	150	75	150	75	150
Spraying, °F	75	140	75	140	130	170	130	170	130	170	75	150	75	150	-	-
Typical Applications:(²)	Spray Patch		Tack Coat for HMA		Surface Treatment		Cold Mixes				Base and Shoulder Stabilization				Quick-Set Slurry Seal	

Notes:

1. If the Particle Charge Test result is inconclusive, material having a maximum pH value of 6.7 will be acceptable.
2. These typical applications are intended only as a guide for selecting the proper emulsion grade.
3. The cement mixing test is waived if this grade of emulsion is used for stabilization.

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321216 – ASPHALT PAVING

PART 1 – GENERAL

1.01 GENERAL

- A. GC shall be responsible for all work to be provided in conformance with sections referred to herein.
- B. Drawings and General Provisions of the Contract and Supplementary conditions and Division 01 specification sections, apply to the work of this section.

1.02 SCOPE

- A. The work of this section applies to all recycled concrete aggregate (RCA) sub-base and hot mix asphalt items in the contract. The work shall consist of preparing the existing subgrade material to receive the new RCA sub-base, as well as furnishing, mixing, spreading and compacting the RCA sub-base, dense asphalt binder course and the asphalt top course to the lines, grades, and dimensions shown on the plans and as specified herein.
- B. Unless shown otherwise indicated on plans the new pavement system for roads and parking lots shall be as follows:
 - 1. Recycled concrete aggregate sub-base course shall be 6" thick (compacted)
 - 2. Dense asphalt binder course shall be 3 ½ inches (compacted), Type 3.
 - 3. Asphalt top course shall be 1 ½ inches thick, Type 6F3.
- C. Unless otherwise indicated on plans the pavement systems for tracks and tennis courts shall be as follows:
 - 1. Tracks:
 - a. Recycled concrete aggregate sub-base course shall be 6" thick (compacted).
 - b. Dense asphalt binder course shall be 2 ½ inches (compacted) thick, Type 3.
 - c. Asphalt top course shall be 1 ½ inches thick, Type 7.
 - 2. Tennis Courts:
 - a. Recycled concrete aggregate sub-base course shall be 6" thick (compacted), Type 1.
 - b. Dense asphalt binder course shall be 2 ½ inches (compacted) thick, Type 3.
 - c. Asphalt top course shall be 1 ½ inches thick, Type 7.
- D. Unless otherwise indicated on plans, asphalt play surfaces and walks shall be 2" Type 7 asphalt over 6" RCA.

1.03 RELATED SECTIONS

- A. Section 014523 – Tests, Inspections, and Special Inspections Quality Assurance Plan

- B. Section 033000 – Cast-In-Place Concrete
- C. Section 310000 – Earthwork
- D. Section 310001 – Site Work General Provisions
- E. Section 310002 – Stakeout
- F. Section 312500 – Erosion and Sediment Controls
- G. Section 320117 – Pavement Repair and Resurfacing
- H. Section 321216.11 – Asphalt Overlay
- I. Section 321723 – Pavement Markings
- J. Section 334000 – Storm Drainage Utilities

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures.
- B. For the recycled concrete aggregate (RCA) the Contractor shall submit a sieve gradation for approval by the architect. Along with sieve, the Contractor shall submit documentation that the material to be provided will be obtained from a N.Y.S.D.E.C. registered or permitted construction and demolition (C & D) debris processing facility as specified in Section 360-16.1 of 6NYCRR Part 360 “Solid Waste Management Facilities.” If blast furnace slag is to be used, provide beneficial use determination (BUD) prior to its use as specified in the 6NYCRR par 360-1.15, “Solid Waste Management Facilities.”
- C. For the asphalt binder and top course, the Contractor shall submit to the Architect for approval, the job mix formula with current date, job location, asphalt plant, and contractor name. The type of asphalt and course shall also be stated. The job mix formula sheet shall indicate the gradations of the aggregates to be used in the mix along with the PGB content.
- D. It shall be the Contractors responsibility upon the initial delivery of the materials and during subsequent deliveries, to take samples for testing as described In Section 1.06 Quality Assurance. If for any reason the Owner or Architect shall request the material be tested, the Contractor shall provide the samples free of charge. If requested the Contractor shall also perform, free of charge, core samples of the constructed work for testing. All test results will be copied to the Contractor for their record.
- E. Contractor shall provide written certification on their company letterhead that all installed asphalt was produced and installed in accordance with these specifications and guarantee work against structural and material defects for a period of one year from completion date.
- F. Interim and final as-built surveys; reference Quality Assurance section below and Specification Section 017839.

1.05 QUALITY ASSURANCE (RCA SUB-BASE)

- A. The Contractor is responsible to establish and maintain required design, grades, lines and elevations including crown and cross-slope of sub base course.
- B. An independent testing laboratory, selected and paid for by the Owner shall be retained to perform construction testing of the in place sub-base course, for compliance with the Contract Documents. The Contractor shall arrange for and schedule the testing. The sub-base course shall be checked for thickness and tolerance by rod and level readings on a 50 ft. grid or as directed by the Architect. Readings shall be to +0.05’ of design elevation that allow for asphalt thickness as shown on the Contract Documents. The Contractor shall at no cost to the Owner provide instruments personal and a suitable benchmark. Any deficiencies shall be corrected prior to proceeding with paving operations.
 - 1. Prior to paving parking lots or plaza areas greater than 10,000 sf, the contractor shall provide an interim topographical survey of the RCA Sub-base in the datum of the Construction

Documents for review for conformance by the Architect. Said survey is required to be performed a licensed land surveyor. Spot elevations on said survey shall be in complimentary locations to the Construction Drawings.

- C. The following tests shall be performed on the sub-base material ASTM 1557 or ASTM D698 compaction test to determine % of compaction and molding water content needed to achieve the required engineering properties of the sub-base.
- D. The following test shall be performed on the sub-base material ASTM D4318 determination of the liquid limit, plastic limit, and the plasticity index of soils.
- E. In place sub-base material shall be tested in accordance with ASTM D1556 to determine the in place density and unit weight of soils using a sand cone apparatus, or ASTM D2167 to determine the in place density and unit weight of the compacted sub-base.
- F. The sub-base material shall be compacted to not less than 98% of optimum density as determined by ASTM D698 or 95% as determined by ASTM D1557, unless otherwise indicated on the drawings.
- G. The in place sub-base material shall be tested for thickness and compaction for each 5,000 square feet for jobs up to 20,000 s.f. and for each 10,000 s.f. for jobs larger than 20,000 s.f.
- H. The independent testing laboratory shall prepare test reports that indicate test location, elevation data from a construction site benchmark, and test results. The Owner, Architect and Contractor shall all be provided with copies of reports within 96 hours of the time the test was performed. In the event that any test performed fails to meet these specifications, the Owner and the Contractor shall be notified immediately by the testing laboratory. It shall be the Contractor's responsibility to correct any non-conforming work at no additional cost to the Owner and pay for all additional testing by the independent testing laboratory to prove corrective work is in conformance with these specifications.

1.06 QUALITY ASSURANCE FOR HOT MIX ASPHALT (HMA)

- A. All materials for hot mix asphalt (HMA) production, such as, aggregates, PG binder, reclaimed asphalt pavement (RAP), mineral filler, or any other materials shall meet the requirements of Section 2.
- B. The Contractor shall be responsible for quality control (QC). QC is defined as all activities required to produce HMA that meets all specification requirements. The Contractor shall provide HMA and assume all responsibilities for all QC activities at the production facilities.
- C. Methods of Sampling and Testing
 - 1. All HMA material shall be sampled and the properties enumerated in these specifications shall be determined in accordance with the following methods, as currently revised.
 - a. Sampling mineral aggregates ASTM: D-75
 - b. Sampling bituminous mixtures ASTM: D-979
 - c. Sieve analysis of aggregates ASTM: C-136
 - d. Determination of bitumen content ASTM: D-1097
 - e. Specific gravity of coarse aggregate ASTM: C-127
 - f. Specific gravity of fine aggregate ASTM: C-128
 - g. Sieve analysis of mineral filler ASTM: D-546
 - h. Sampling bituminous materials ASTM: D-140
 - i. Liquid limit, plastic limit & plasticity index ASTM: D-4318
Or current applicable methods recommended by the American Association of State Highway Officials, and/or The Asphalt Institute.

- D. The PG binder will be accepted on the basis of PG binder suppliers certification. The Contractor shall provide a copy to the Architect.

PART 2 – MATERIALS

2.01 COMPOSITION OF MIXTURES (RCA)

- A. Recycled concrete aggregate sub-base.
1. Provide RCA which meets the specification material requirements and is within the Contractors capabilities to place and fine grade to the required tolerances.
 2. Furnish materials of at least 95%, by weight, of recycled portland cement concrete aggregate (RCA), and free from organic and other deleterious material. This material may contain up to 5% by weight asphalt and/or brick.
 3. Gradation for RCA shall conform to the following:

Sieve Size Designation	Percent Passing by Weight
4 inch	-
3 inch	100
2 inch	90 – 100
¼ inch	30 – 65
No. 40	5 – 40
No. 200	0 -10

4. Material will be accepted on the basis of magnesium sulfate soundness loss after four cycles of 20% or less. The required plasticity index of the material passing the No. 40 sieve is 5.0 or less.
5. A flat or elongated particle is defined herein as one which has its greatest dimension more than three times its least dimension. Provide material consisting of particles where not more than 30% by weight, of the particles retained on a ½ inch sieve are flat or elongated. Material with a percentage greater than 30 will be rejected.

2.02 COMPOSITION OF MIXTURES (HMA)

- A. The HMA plant mix will generally be composed of a mixture of aggregate and reclaimed asphalt pavement (RAP), filler if required, and PG binder. For any HMA required by the plans, formulate a job mix formula that satisfies the general limits of Table 1. A copy of this table can be found at the end of this section. See section 1.02B for system components. For type 6F3 mixture, determine the optimum asphalt content for the proposed gradation using the Marshall mix design method (50 blows). The resultant mixture shall meet the following Marshall properties.

<u>Mix Property</u>	<u>Type 6F3</u>
Air Voids %	3.0 – 5.0
Voids in Mineral Aggregate	14
Voids filled with Binder VFB, %	65 - 78

Contractor shall produce, deliver to the work site, and incorporate the mixture into the work within the mixing and placing temperature range imposed by Table 1 Composition of Marshall designed plant mixtures. The plant mixed material will be accepted after blending and mixing at the plant. The pavement courses will be accepted after all paving operations are completed and certified by the Contractor.

- B. Fine aggregate may consist of screenings, free from deleterious materials and manufactured from sources of stone, gravel, or slag.
- C. Coarse aggregate will consist of crushed stone, crushed gravel or crushed slag.
- D. When aggregates from approved natural fine sand sources are combined with coarse aggregates in the mixture, aggregate particles will meet additional requirements as follows:
 - 1. Particles in the No. 1A and No. 1 primary sizes will have a minimum of 85% by weight, of the particles with at least two fractured faces.
 - 2. Particles in the No. 2, No. 3 and No. 3A primary sizes will have a minimum of 75%, by weight, of the particles with at least one fractured face.
- E. Coarse aggregate type 6F3 conditions:
 - 1. Limestone or a blend of limestone and dolomite having an acid-insoluble residue content of not less than 20%
 - 2. Dolomite
 - 3. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
 - 4. Gravel, or a natural or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore trailings, slag or other similar materials meeting the following requirements:
 - a. (Type 6F3 Mixes) non-carbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes of materials of different specific gravities). Additionally, a minimum of 20% plus ¼ inch particles must be non-carbonate.
 - b. When coarse aggregate for these mixes are from more than one source or of more than one type of material, proportion and blend them to provide a uniform mixture.
- F. Performance Graded Binder. Unless the type of PG Binder is specified in the Contract Documents, use PG 64-22.
- G. Reclaimed asphalt pavement (RAP) shall meet the requirements of a superpave hot mix asphalt mixture design and mixture verification procedures.

TABLE 1 COMPOSITION OF HOT MIX ASPHALT MIXTURES												
Mixture	Base				Binder		Shim		Top3,4			
Requirements ¹	Type 1		Type 2		Type 3		Type 5		Type 6, 6F2, 6F3		Type 7, 7F2, 7F3	
Screen Sizes	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %
2 in	100	-	100	-	-	-	-	-	-	-	-	-
1 ½ in	90-100	-	75-100	±7	100	-	-	-	-	-	-	-
1 in	78-95	±5	55-80	±8	95-100	-	-	-	100	-	-	-
½ in	57-84	±6	23-42	±7	70-90	±6	-	-	95-100	-	100	-
¼ in	40-72	±7	5-20	±6	48-74	±7	100	-	65-85	±7	90-100	-
1/8 in	26-57	±7	2-15	±4	32-62	±7	80-100	±6	36-65	±7	45-70	±6
No. 20	12-36	±7	-	-	15-39	±7	32-72	±7	15-39	±7	15-40	±7
No. 40	8-25	±7	-	-	8-27	±7	18-52	±7	8-27	±7	8-27	±7
No. 80	4-16	±4	-	-	4-16	±4	7-26	±4	4-16	±4	4-16	±4
No. 200	2-8	±2	-	-	2-8	±2	2-12	±2	2-6	±2	2-6	±2
PGB Content % ²	4.0-6.0	0.4	2.5-4.5	0.4	4.5-6.5	0.4	7.0-9.5	0.4	5.4-7.0	NA	5.7-8.0	NA
Mixing & Placing Temp. Range, °F	250-325		225-300		250-325		250-325		250-325		250-325	
Description and Typical Uses	Dense Base: For general use		Open Base: For permeable base layer		Dense Binder: Intermediate layer for general use		Shim: Fine HMA mixture for shimming ruts and leveling		Top Course: Dense course for single course resurfacing of rural, suburban, and urban roadways			

1. All aggregate percentages are based on the total weight of the aggregate.
2. The asphalt content is based on the total weight of the mix. When using slag aggregates in the mix, increase the PGB content accordingly, a minimum of 25% for an all slag mix.
3. 6F2, 6F3, 7F2, 7F3 mix types require friction coarse aggregates, and are required for mainline driving surface courses.
4. For Type 6 and Type 7 (F9) aggregate requirements, Marshall design will not be required. These mix types are suitable where the State's requirements for f9 aggregate apply.
5. Introduce the PG Binder into the pug mill between 225°F and 350°F, or as recommended by the PG Binder supplier.

2.03 TACK COAT

- A. Tack coat shall meet the requirements of Table 2.

TABLE 2 – TACK COAT		
Test Requirements	Min	Max
Sieve Test, %	-	0.10
Residue by Distillation %	38	45
Oil Distillate, volume of total emulsion %	-	2
Test on Residue Distillation: penetration, 77°F (25°C), 100g, 5 second	40	90
Suggested spraying temp, °F	75	150

- B. Application of Emulsion Material

1. The asphalt emulsion contained in the distributor tank shall be homogenous. Emulsified asphalts held in storage tanks, drums, or distributors for long periods are subject to settlement. The asphalt emulsion shall be sufficiently agitated or circulated to ensure a homogenous emulsion prior to sampling or application.

PART 3 – EXECUTION

3.01 PREPARATION OF SUBGRADE

- A. The subgrade surface is the surface of the pavement section upon which the select materials and/or sub-base are placed. The Contractor shall be responsible to cut and fill subgrade as required to achieve design grades. The subgrade area shall be prepared in conformance with Section 310000. It shall be the Contractor's responsibility to properly place and compact all materials in the road section and to correct any deficiencies resulting from insufficient or improper compaction of such materials throughout the Contract period. The Contractor shall determine the type, size and weight of the compactor best suited to the work at hand, select and control the lift (layer) thickness, exert control over the moisture content of the material, and other details necessary to obtain satisfactory results. The subgrade shall be compacted to density in accordance with section 310000 – Earthwork, but not less than 95% of modified proctor maximum dry density.

3.02 RCA SUBBASE

- A. RCA subbase course shall be placed in conformance with Section 310000.
- B. Contractor shall place RCA in a single layer with a minimum compacted layer thickness of 6 inches.
- C. When the moisture content is within the limits for proper compaction, compact the material in accordance with the requirements of Section 310000.
- D. If the subbase course is disturbed by frost action prior to paving, re-compact the subbase.
- E. If, in the opinion of the Architect, the subbase is damaged or mixed with the subgrade or any other material due to the Contractor's operation the Contractor shall remove such material and replace it with the appropriate subbase at no additional cost to the Owner.
- F. Place subbase so that after compaction the top surface of the course does not extend more than ¼" above nor more than ¼" below true grade for the course at any location.

3.03 CONDITIONS FOR PLACEMENT OF ASPHALTIC MATERIALS

- A. Weather – Seasonal Limitations
 - 1. The mixing and place of hot-mix asphalt shall be performed only when weather conditions are suitable. When pools of water are observed on the base, mixing and placing of hot-mix asphalt shall not be permitted. The temperature of the surface on which hot-mix asphalt is placed shall be as per Table 3.
 - 2. Bituminous concrete pavement placed between November 30th and April 1st shall be subject to the following conditions and regulations:
 - a. Approval of the Engineer.
 - b. Compliance with Table 3 below.
 - c. Acceptance of full responsibility by the Contractor for all work so placed.
 - d. Providing for such guarantees and deposits as are required by Town regulations.
 - e. Guarantee of all work so placed for a period extending up to one year. A notification from the Engineer before the end of the last month of the calendar year following shall be deemed to be within the period of guarantee.

TABLE 3 TEMPERATURE AND SEASONAL REQUIREMENTS		
Nominal Compacted Lift Thickness	Surface Temperature (Minimum (Note 1))	Seasonal Limits
≤ 1 in.	50°F	(Notes 2 & 3)
1 in.<Thickness ≤ 3 in.	45°F	(Notes 2 & 3)
>3 in.	40°F	None

NOTES:

1. Measure all temperatures on the surface where the mixture is to be placed and the controlling temperature will be the average of three temperature readings taken at locations a minimum of 25 ft apart.
2. Unless otherwise authorized place Top Course only during the period of April 1st up to and including November 30th in the counties of Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, and the City of New York.
3. Unless otherwise authorized place Top Course only during the period of April 15th up to and including October 31st in all counties except as required in Note 2.

3.04 TACK COAT

- A. Apply a thin, uniform tack coat to surfaces of existing asphalt, Portland cement concrete layers including such areas as adjacent pavement edges, curbing, gutters, manholes, and other structures, immediately prior to place the HMA mixture against them.
- B. Apply tack coat on the contact surfaces between all HMA pavement lifts prior to placing HMA mixture regardless of time period between lifts. The only exception to this is the surface of permeable base courses. Paving over a tack coat should not commence until the emulsion has broken (goes from brown to black) or is tacky when touched.
- C. The tack coat shall be applied to a prepared clean pavement and in a manner to offer the least inconvenience to traffic and to reduce pickup or tracking of the bituminous material. Upon application the material shall be as uniformly spread across the width of the designated area.
- D. The tack coat shall not be applied on a wet pavement surface or when the pavement surface temperature is below the temperature requirements outlined in Table 3 Temperature and Seasonal Requirements. To avoid "boil-off" of the water, the asphalt emulsion shall not be heated above 195°F. The application rate shall be as determined in Table 4.

TABLE 4 TACK COAT APPLICATION RATES	
Surface Type	Application Rate (gallons per square yard)
New Hot Mix Asphalt	0.03 – 0.04
Milled Surfaces	0.05 – 0.06
Portland Cement Concrete	0.05 – 0.06
Vertical Surfaces (curbs, drainage structures, and appurtenances)	0.06-0.07

3.05 SPREADING AND FINISHING OF HMA

- A. Lay the mixture upon an approved clean, tack coated surface. The only exception to this is the surface of permeable base courses. Spread and strike off to the established grade and elevation. Use HMA paver(s) to distribute the mixture either over the entire width or over such partial width as may be practicable. Upon arrival at the site, the trucks will dump the mixture into the paver. Immediately spread and strike off to the required width and appropriate loose depth to obtain the required compacted thickness at completion of the work.

- B. When the initial pavement course is laid with automatic HMA pavers, guide the paver by a taut reference line positioned at or near the pavement centerline or edge. Erect and maintain the reference line. Support the reference line at approximately 25 foot intervals on tangent sections and at closer intervals on curves. Tension the line sufficiently to remove any sags. A moving reference of at least 30 ft. in length in lieu of a reference line may be used. The moving reference may be a floating beam, ski, or other suitable type such that the resulting pavement layer surface is sufficiently even. A short ski or shoe may also be used for the initial course if a satisfactory fixed reference such as a curb, gutter, or other fixed reference is adjacent to the pavement. When the proposed floating beam or the short ski does not produce the results similar to those obtained using a taut reference line, do not use these devices.
- C. Place subsequent pavement courses over the initial course using one of the above methods. In addition, any course in an adjacent lane may be used as the reference for the use of a short ski.
- D. The automatic screed controls will not be required where existing grades at roadway intersection or drainage structure must be met, for shoulders, temporary detours, behind curbs, or in other areas where its use is impractical.
- E. If there are less than 1500 square yards in the Contract, or the areas to be paved are small and scattered, the HMA mixture may be spread by hand methods. For these areas, dump and spread the mixture such that the compacted thickness meets the specified thickness in the plans.
- F. Prior to the beginning of rolling, check the loose mat, adjust any irregularities, and remove and replace all unsatisfactory material.

3.06 COMPACTION OF HMA

- A. Immediately after the HMA mixture has been spread, struck off and surface irregularities adjusted, thoroughly and uniformly compact it by rolling. Roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving. Initially roll all courses with the roller traveling parallel to the centerline of the pavement beginning at each edge and working toward the center. Roll banked curves starting at the low side edge and working toward the super elevated edge.
- B. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from other causes, by the use of rakes and addition of fresh mixture as required. Exercise care in rolling so as not to displace the line and grade of the edges of the HMA mixture. To prevent adhesion of the mixture to the drum(s) and pneumatic tires, keep the drum(s) and the pneumatic tires properly moistened with water or water mixed with small quantities of detergent or other approved material. Any petroleum products or solvents having an adverse effect upon the HMA pavement will not be permitted for use.
- C. There shall be no visible defects, such as shallow ruts, ridges, roller marks, cracking, tearing, segregation, or any other irregularities as determined by the Architect, in the pavement when the rolling operation is complete. If these defects are present, correct these defects to the satisfaction of the Architect or remove & replace the pavement at no additional cost.
- D. Along forms, curbs, headers, walls and other areas not accessible to the rollers, thoroughly compact the mixture with mechanical tampers. On depressed areas, use a trench roller or a small vibratory roller. Cleated compression strips may also be used under the roller to transmit compression to the depressed area.
- E. Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is in any way defective with fresh HMA mixture which shall be compacted to conform with the surrounding area. Correct any area showing an excess or deficiency of HMA material to the satisfaction of the Architect.

F. Compaction shall be per Three Roller Compaction Train

1. Initially roll all HMA mixtures with an approved steel-wheel roller operating in a static mode. Overlap the previous roller passes by one-half the width of the roller.
2. Immediately following the initial rolling, roll the mat with an approved pneumatic rubber-tired roller. A minimum of 3 passes of the rubber-tired roller will be required. One pass is defined as one movement of the roller over any point of the pavement in either direction.
3. Immediately following the intermediate rolling, finish roll the mat with a steel-wheel roller to remove all shallow ruts, ridges, roller marks and other irregularities from the surface.
4. Use this compaction method only when the compacted thickness of the finished mat is 4 inches or less. Unless approved by the Architect, the roller speeds shall not exceed 3 mph. when paving multiple lanes simultaneously; increase the required number of rollers proportionately for each additional full lane width unless otherwise permitted by the Architect.

G. The required number of passes listed in Table 5, Number of Passes, is recommended and may be increased as necessary to achieve adequate density.

TABLE 5 NUMBER OF PASSES		
Pavement Courses	Three Roller Train (Static)	
	Steel Wheel Roller	Pneumatic Roller
Base (Open Graded Each Lift)	4	3
Base (Dense-Graded)	4	3
Binder (Dense-Graded)	2	3
Top (Dense-Graded All Types)	2	3

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321216.11 – ASPHALT OVERLAY

PART 1 – GENERAL

1.01 GENERAL

- A. These specifications are intended to meet the latest edition of the N.Y.S.D.O.T. standard specifications U.S. Edition Section 400. It is the responsibility of the contractor to verify if the portions stated herein are current. This may be done by visiting the N.Y.S.D.O.T. website at: https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2024_9_specs_usc_tc_vol2.pdf
- B. GC shall be responsible for all work to be provided in conformance with sections referred to herein or within specification sections found on the N.Y.S.D.O.T. website.
- C. Drawings and General Provisions of the Contract and Supplementary Conditions and Division 01 specification sections, apply to the work of this section.

1.02 SCOPE

- A. Under this section the Contractor shall provide and install asphalt overlay over existing asphalt pavement that has been repaired as specified in Section 320117.

1.03 RELATED SECTIONS

- A. Section 014523 – Tests, Inspections, and Special Inspections Quality Assurance Plan
- B. Section 033000 – Cast-In-Place Concrete
- C. Section 310000 – Earthwork
- D. Section 310001 – Site Work General Provisions
- E. Section 310002 – Stakeout
- F. Section 312500 – Erosion and Sediment Controls
- G. Section 320117 – Pavement Repair and Resurfacing
- H. Section 321216 – Asphalt Paving
- I. Section 321723 – Pavement Markings
- J. Section 321723.11 – Pavement Markings (Thermoplastic)
- K. Section 321723.12 – Pavement Markings (Pre-formed Reflectorized)
- L. Section 334000 – Storm Drainage Utilities

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures.
- B. For the asphalt, the Contractor shall submit to the Architect for approval, the job mix formula with current date, job location, asphalt plant, and contractor name. The type of asphalt and course shall also be stated. The job mix formula sheet shall indicate the gradations of the aggregates to be used in the mix along with the PGB content.
- C. It shall be the Contractors responsibility upon the initial delivery of the materials and during subsequent deliveries, to take samples for testing as described in Section 1.06 – Quality Assurance. If for any reason the Owner or Architect shall request the material be tested, the Contractor shall provide samples free of charge. If requested the Contractor shall also perform free of charge, core samples of the constructed work for testing. All test results will be copied to the Contractor for their record.

- D. Contractor shall provide written certification on their company letterhead that all installed asphalt was produced and installed in accordance with N.Y.S.D.O.T. specifications and guarantee work against structural and material defects for a period of one year from completion date.

1.05 QUALITY ASSURANCE FOR HOT MIX ASPHALT (HMA)

- A. All materials for hot mix asphalt (HMA) production, such as, aggregates, PG binder, reclaimed asphalt pavement (RAP), mineral filler, or any other materials shall meet N.Y.S.D.O.T. requirements.
- B. The Contractor shall be responsible for quality control (QC). QC is defined as all activities required to produce HMA that meets all specification requirements. The Contractor shall provide HMA and assume all responsibilities for all QC activities at the production facilities.
- C. Methods of Sampling and Testing
 - 1. All HMA material shall be sampled and the properties enumerated in these specifications shall be determined in accordance with the following methods, as currently revised.
 - a. Sampling mineral aggregates ASTM: D-75
 - b. Sampling bituminous mixtures ASTM: D-979
 - c. Sieve analysis of aggregates ASTM: C-136
 - d. Determination of bitumen content ASTM: D-1097
 - e. Specific gravity of coarse aggregate ASTM: C-127
 - f. Specific gravity of fine aggregate ASTM: C-128
 - g. Sieve analysis of mineral filler ASTM: D-546
 - h. Sampling bituminous materials ASTM: D-140
 - i. Liquid limit, plastic limit & plasticity index ASTM: D-4318

Or current applicable methods recommended by the American Associating of State Highway Officials, and/or the Asphalt Institute.

- D. The PG binder will be accepted on the basis of PG binder suppliers certification. The Contractor shall provide a copy to the Owner.

PART 2 – MATERIALS

2.01 ASPHALT EMULSION TACK COAT

- A. See Specification Section 320117 – Asphalt Repair, Crack Sealing & Cleaning/Preparation of Pavement Surface for Marking of these specifications.

2.02 HOT MIX ASPHALT OVERLAY

- A. Hot mix asphalt overlay shall be N.Y.S.D.O.T. type 6F3 in parking areas and type 7 when overlaying play areas. The overlay compacted thickness shall be two inches.

2.03 COMPOSITION OF MIXTURES (HMA)

- A. The HMA plant mix will generally be composed of a mixture of aggregate reclaimed asphalt pavement (RAP), filler if required, and PG binder. For any HMA required by the plans, formulate a job mix formula that satisfies the general limits imposed by N.Y.S.D.O.T. Table 403-1 Composition of Hot Mix Asphalt Mixtures latest version). A copy of this table can be found at the end of this section. For type 6F3 mixture, determine the optimum asphalt content for the proposed gradation

using the Marshall mix design method (50 blows). The resultant mixture shall meet the following Marshall properties.

<u>Mix Property</u>	<u>Type 6F3</u>
Air Voids %	3.0 – 5.0
Voids in Mineral Aggregate	14
Voids filled with Binder VFB, %	65 - 78

Contractor shall produce, deliver to the work site, and incorporate the mixture into the work within the mixing and placing temperature range imposed by Table 403-1 Composition of Marshall designed plant mixtures. The plant mixed material will be accepted after blending and mixing at the plant. The pavement courses will be accepted after all paving operations are completed and certified by the Contractor.

- B. Fine aggregate will consist of materials conforming to the requirements of Section 703-01 - Fine Aggregate of the N.Y.S.D.O.T. specifications. In addition, fine aggregate may consist of screenings, free from deleterious materials and manufactured from sources of stone, gravel, or slag meeting the requirements of N.Y.S.D.O.T. specification section 703-02, Coarse Aggregate.
- C. Coarse aggregate will consist of crushed stone, crushed gravel or crushed slag conforming to the N.Y.S.D.O.T. requirements of section 703-02, Except for Gradation.
- D. When aggregates from approved natural fine sand sources are combined with coarse aggregates in the mixture, aggregate particles will meet additional requirements as follows:
 - 1. Particles in the No. 1A and No. 1 primary sizes will meet the quality requirements of N.Y.S.D.O.T. specification section 703-02 and will have a minimum of 85% by weight, of the particles with at least two fractured faces.
 - 2. Particles in the No. 2, No. 3 and No. 3A primary sizes will meet the quality requirements of N.Y.S.D.O.T. section 703-02 and will have a minimum of 75%, by weight, of the particles with at least one fractured face.
- E. Coarse aggregate type 6F3 conditions:
 - 1. Limestone or a blend of limestone and dolomite having an acid-insoluble residue content of not less than 20%
 - 2. Dolomite
 - 3. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
 - 4. Gravel, or a natural or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore trailings, slag or other similar materials meeting the following requirements:
 - a. (Type 6F3 Mixes) non-carbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes of materials of different specific gravities). Additionally, a minimum of 20% plus ¼ inch particles must be non-carbonate.
 - b. When coarse aggregate for these mixes are from more than one source or of more than one type of material, proportion and blend them to provide a uniform mixture.

- F. Mineral filler if required in the mix to meet gradation requirements, shall conform to the requirements of the N.Y.S.D.O.T. specification section 703-08, Mineral Filler.
- G. Performance graded binder (PG Binder) shall meet the requirements of the N.Y.S.D.O.T. specification section 401-2.04, Performance Graded Binder. Unless the type of PG Binder is specified in the Contract Documents, use PG 64-22, or a PG Binder specified in Table 6-4, Performance Graded Binder section of Chapter 6 of the Comprehensive Pavement Design Manual.

TABLE 403-1 COMPOSITION OF HOT MIX ASPHALT MIXTURES												
Mixture	Base				Binder		Shim		Top3,4			
Requirements¹	Type 1		Type 2		Type 3		Type 5		Type 6, 6F2, 6F3		Type 7, 7F2, 7F3	
Screen Sizes	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %
2 in	100	-	100	-	-	-	-	-	-	-	-	-
1 ½ in	90-100	-	75-100	±7	100	-	-	-	-	-	-	-
1 in	78-95	±5	55-80	±8	95-100	-	-	-	100	-	-	-
½ in	57-84	±6	23-42	±7	70-90	±6	-	-	95-100	-	100	-
¼ in	40-72	±7	5-20	±6	48-74	±7	100	-	65-85	±7	90-100	-
1/8 in	26-57	±7	2-15	±4	32-62	±7	80-100	±6	36-65	±7	45-70	±6
No. 20	12-36	±7	-	-	15-39	±7	32-72	±7	15-39	±7	15-40	±7
No. 40	8-25	±7	-	-	8-27	±7	18-52	±7	8-27	±7	8-27	±7
No. 80	4-16	±4	-	-	4-16	±4	7-26	±4	4-16	±4	4-16	±4
No. 200	2-8	±2	-	-	2-8	±2	2-12	±2	2-6	±2	2-6	±2
PGB Content % ²	4.0-6.0	0.4	2.5-4.5	0.4	4.5-6.5	0.4	7.0-9.5	0.4	5.4-7.0	NA	5.7-8.0	NA
Mixing & Placing Temp. Range, °F	250-325		225-300		250-325		250-325		250-325		250-325	
Description and Typical Uses	Dense Base: For general use		Open Base: For permeable base layer		Dense Binder: Intermediate layer for general use		Shim: Fine HMA mixture for shimming ruts and leveling		Top Course: Dense course for single course resurfacing of rural, suburban, and urban roadways			

1. All aggregate percentages are based on the total weight of the aggregate.
2. The asphalt content is based on the total weight of the mix. When using slag aggregates in the mix, increase the PGB content accordingly, a minimum of 25% for an all slag mix.
3. 6F2, 6F3, 7F2, 7F3 mix types require friction coarse aggregates, and are required for mainline driving surface courses.
4. For Type 6 and Type 7 (F9) aggregate requirements, Marshall design will not be required. These mix types are suitable where the State's requirements for f9 aggregate apply.
5. Introduce the PG Binder into the pug mill between 225°F and 350°F, or as recommended by the PG Binder supplier.

PART 3 – EXECUTION

3.01 PREPARATION

- A. In preparation for overlay Contractor shall repair existing pavement in accordance with Section 320117.
- B. Contractor shall mill existing perimeter pavement not receiving overlay down to allow for a smooth consistent transition at intersections where new pavement meets old pavement. The milling shall be a minimum of 2'-0" wide.
- C. Contractor shall mill existing pavement around the perimeter of storm water inlets as required to maintain existing storm water runoff patterns.

- D. After repairing and cleaning of existing asphalt pavement contractor shall tack coat the entire asphalt area to receive asphalt overlay as described in Section 321216 – Part 3 – Execution.

3.02 CONDITIONS FOR PLACEMENT OF ASPHALTIC MATERIALS

A. Weather – Seasonal Limitations

1. The mixing and place of hot-mix asphalt shall be performed only when weather conditions are suitable. When pools of water are observed on the base, mixing and placing of hot-mix asphalt shall not be permitted. The temperature of the surface on which hot-mix asphalt is placed shall be as per Table 402-2.
2. Bituminous concrete pavement placed between November 30th and April 1st shall be subject to the following conditions and regulations:
 - a. Approval of the Engineer.
 - b. Compliance with Table 402-2 below.
 - c. Acceptance of full responsibility by the Contractor for all work so placed.
 - d. Providing for such guarantees and deposits as are required by Town regulations.
 - e. Guarantee of all work so placed for a period extending up to one year. A notification from the Engineer before the end of the last month of the calendar year following shall be deemed to be within the period of guarantee.

TABLE 402-2 TEMPERATURE AND SEASONAL REQUIREMENTS		
Nominal Compacted Lift Thickness	Surface Temperature (Minimum (Note 1))	Seasonal Limits
≤ 1 in.	50°F	(Notes 2 & 3)
1 in.<Thickness ≤ 3 in.	45°F	(Notes 2 & 3)
>3 in.	40°F	None

NOTES:

1. Measure all temperatures on the surface where the mixture is to be placed and the controlling temperature will be the average of three temperature readings taken at locations a minimum of 25 ft apart.
2. Unless otherwise authorized place Top Course only during the period of April 1st up to and including November 30th in the counties of Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, and the City of New York.
3. Unless otherwise authorized place Top Course only during the period of April 15th up to and including October 31st in all counties except as required in Note 2.

3.03 SPREADING AND FINISHING OF HMA

- A. Lay the mixture upon an approved clean, tack coated surface. The only exception to this is the surface of permeable base courses. Spread and strike off to the established grade and elevation. Use HMA paver(s) to distribute the mixture either over the entire width or over such partial width as may be practicable. Upon arrival at the site, the trucks will dump the mixture into the paver. Immediately spread and strike off to the required width and appropriate loose depth to obtain the required compacted thickness at completion of the work.
- B. When the initial pavement course is laid with automatic HMA pavers, guide the paver by a taut reference line positioned at or near the pavement centerline or edge. Erect and maintain the reference line. Support the reference line at approximately 25 foot intervals on tangent sections and at closer intervals on curves. Tension the line sufficiently to remove any sags. A moving reference of at least 30 ft. in length in lieu of a reference line may be used. The moving reference may be a floating beam, ski, or other suitable type such that the resulting pavement layer surface

is sufficiently even. A short ski or shoe may also be used for the initial course if a satisfactory fixed reference such as a curb, gutter, or other fixed reference is adjacent to the pavement. When the proposed floating beam or the short ski does not produce the results similar to those obtained using a taut reference line, do not use these devices.

- C. Place subsequent pavement courses over the initial course using one of the above methods. In addition, any course in an adjacent lane may be used as the reference for the use of a short ski.
- D. The automatic screed controls will not be required where existing grades at roadway intersection or drainage structure must be met, for shoulders, temporary detours, behind curbs, or in other areas where its use is impractical.
- E. If there are less than 1500 square yards in the Contract, or the areas to be paved are small and scattered, the HMA mixture may be spread by hand methods. For these areas, dump and spread the mixture such that the compacted thickness meets the specified thickness in the plans.
- F. Prior to the beginning of rolling, check the loose mat, adjust any irregularities, and remove and replace all unsatisfactory material.

3.04 COMPACTION OF HMA

- A. Immediately after the HMA mixture has been spread, struck off and surface irregularities adjusted, thoroughly and uniformly compact it by rolling. Roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving. Initially roll all courses with the roller traveling parallel to the centerline of the pavement beginning at each edge and working toward the center. Roll banked curves starting at the low side edge and working toward the super-elevated edge.
- B. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from other causes, by the use of rakes and addition of fresh mixture as required. Exercise care in rolling so as not to displace the line and grade of the edges of the HMA mixture. To prevent adhesion of the mixture to the drum(s) and pneumatic tires, keep the drum(s) and the pneumatic tires properly moistened with water or water mixed with small quantities of detergent or other approved material. Any petroleum products or solvents having an adverse effect upon the HMA pavement will not be permitted for use.
- C. There shall be no visible defects, such as shallow ruts, ridges, roller marks, cracking, tearing, segregation, or any other irregularities as determined by the Architect, in the pavement when the rolling operation is complete. If these defects are present, correct these defects to the satisfaction of the Architect or remove & replace the pavement at no additional cost.
- D. Along forms, curbs, headers, walls and other areas not accessible to the rollers, thoroughly compact the mixture with mechanical tampers. On depressed areas, use a trench roller or a small vibratory roller. Cleated compression strips may also be used under the roller to transmit compression to the depressed area.
- E. Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is in any way defective with fresh HMA mixture which shall be compacted to conform with the surrounding area. Correct any area showing an excess or deficiency of HMA material to the satisfaction of the Architect.
- F. Compaction shall be per Three Roller Compaction Train
 - 1. Initially roll all HMA mixtures with an approved steel-wheel roller operating in a static mode. Overlap the previous roller passes by one-half the width of the roller.

2. Immediately following the initial rolling, roll the mat with an approved pneumatic rubber-tired roller. A minimum of 3 passes of the rubber-tired roller will be required. One pass is defined as one movement of the roller over any point of the pavement in either direction.
 3. Immediately following the intermediate rolling, finish roll the mat with a steel-wheel roller to remove all shallow ruts, ridges, roller marks and other irregularities from the surface.
 4. Use this compaction method only when the compacted thickness of the finished mat is 4 inches or less. The roller speeds shall not exceed 3 mph. when paving multiple lanes simultaneously; increase the required number of rollers proportionately for each additional full lane width.
- G. The required number of passes listed in Table 403-2, Number of Passes, is recommended and may be increased as necessary to achieve adequate density.
- H. Seal joints between overlay and adjacent existing pavement with approved asphalt cement filler. Blot with fine aggregate (as per N.Y.S.D.O.T. Section 703-01) if required to prevent tracking the bituminous material over the paved surface.

TABLE 403-2 NUMBER OF PASSES		
Pavement Courses	Three Roller Train (Static)	
	Steel Wheel Roller	Pneumatic Roller
Base (Open Graded Each Lift)	4	3
Base (Dense-Graded)	4	3
Binder (Dense-Graded)	2	3
Top (Dense-Graded All Types)	2	3

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321236 – PAVEMENT SEALING

PART 1 – GENERAL

1.01 SCOPE

- A. Under this section the Contractor shall seal coat pavement with GSB-88 ready to apply emulsified sealer/binder by Asphalt Systems, Inc. or approved equal.

1.02 RELATED SECTIONS

- A. Section 320117 – Pavement Repair and Resurfacing
- B. Section 321216 – Asphalt Paving
- C. Section 321723 – Pavement Markings
- D. Section 321723.11 – Pavement Markings (Thermoplastic)
- E. Section 321723.12 – Pavement Markings (Pre-formed Reflectorized)

1.03 SUBMISSIONS

- A. All submissions shall be made in accordance with section 013300 – Submittal Procedures.
- B. Contractor shall submit manufacturer’s product data and MSDS sheets.

1.04 QUALITY ASSURANCE

- A. Do not apply to wet or damp pavement surfaces. Do not apply during rainy or damp weather, or when rain is anticipated within 8 hours after application is complete. Pavement surface temperatures should be 55°F and rising before application. Do not apply on extremely windy days.
- B. Parking areas with slopes of more than 5% and roadways shall have sand applied at time of application at a rate of 0.3 to 0.7 lbs/sq. yd.

PART 2 – MATERIALS

2.01 EMULSIFIED SEALER BINDER

- A. In order to establish a standard of performance and quality, this specification is based on GSB-88 emulsified sealer binder as manufactured by Asphalt Systems Inc. (ASI). This does not preclude the contractor from submitting an “or equal.” Coal Tar based sealers will not be accepted.

- B. Sealer binder shall be a cationic stabilized emulsion of gilsonite ore and select plasticizers. Storage and handling shall be in accordance with manufacturers requirements

- C. **Specifications for GSB-88 Ready-to-Apply are as follows:**

Saybolt Viscosity at 77°F (25°C) ASTM 0-244.....	10 to 50 seconds
Residue by Distillation, or Evaporation.....	28% to 42% min.
Pumping Stability Test (2).....	Pass

- D. **Tests on Residue from Distillation, or Evaporation:**

Viscosity ASTM 275°F (135°C) ASTM 0-4402.....	1750 cts max.
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Solubility in 1,1,1 trichloroethylene ASTM 0-2042.....	97.5% min
Penetration ASTM 0-5.....	50 dmm max.
Asphaltenes ASTM 0-2007.....	15% min.
Saturates ASTM 0-2007.....	15% max.
Polar Compounds ASTM 0-2007.....	25% min.
Aromatics ASTM 0-2007.....	15% min.

1. pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, bituminous emulsions.
2. Pumping stability is tested by pumping 1 pint, (475 ml) of GSB-88 diluted 1 part concentrate to 1 part water, at 77°F (25°C), through a ¼ inch gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

PART 3 – EXECUTION

3.01 PAVEMENT REPAIR

- A. If repair is indicated, Contractor shall repair pavement as per Specifications Section 320117, prior to application of seal coat.

3.02 CLEANING & PREPARING

- A. Contractor shall thoroughly clean the entire area to be seal coated. The surface of the area to be seal coated must be free of vegetation, dirt, oil, and other foreign materials.
- B. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area being sealed with plastic or building felt and remove the covers each day.
- C. The Contractor shall select the materials and equipment for cleaning and preparing pavement surfaces.
- D. When the work is conducted under traffic, the Contractor shall supply all necessary flags, markers, signs, and other devices to maintain and protect traffic.
- E. Whenever grinding, water blasting, dry sandblasting or other operations are performed, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.
- F. When removal and cleaning operations are complete, the Contractor shall first power broom and then blow off with compressed air the pavement to remove residue and debris resulting from the cleaning work.
- G. The Contractor shall conduct removal and cleaning work in such a manner as to minimize airborne dust, and similar debris so as to prevent a hazard to motor vehicle operation or nuisance to property.
- H. Care shall be taken to prevent damage to transverse and longitudinal joint sealers.
- I. Cleaning and surface preparation work shall be confined to the surface of existing pavement markings that are specified for removal on the plans or as directed by the Architect.
- J. Pavement markings shall be cleaned to the extent that 95% to 100% of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

3.03 APPLICATION OF SEAL COAT ON SURFACES

- A. Application of seal coating over surfaces that were recently patched will need to be done 15 days after patch was complete to allow asphalt to cure. New paved surfaces will require at least 30 days of cure time prior to seal coating.
- B. Apply seal coating in a uniform manner to provide a constant, adherent coating. For bidding purposes; base on application rate of 0.15 gals/sy, one coat.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321723 – PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Under this work, the Contractor shall furnish and apply pavement marking paint at locations in accordance with the patterns indicated on the plans or as directed by the Architect, and in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and these specifications.
- B. This work shall also include the cleaning and preparation of pavement surfaces and the maintenance and protection of traffic markings during marking operations.

1.02 REFERENCE STANDARDS

- A. New York State Department of Transportation (NYSDOT)
- B. Manual on Uniform Traffic Control Devices (MUTCD)
- C. New York State Department of Environmental Conservation (NYSDEC)
- D. United States Environmental Protection Agency (USEPA)

1.03 RELATED SECTIONS

- A. Section 320117 – Pavement Repair and Resurfacing
- B. Section 321216 – Asphalt Paving
- C. Section 321216.11 – Asphalt Overlay

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 013300 – Submittal Procedures, and as modified below.
- B. Contractor shall submit manufacturer's product data and color samples for every type of paint that is being used. Data shall include application rate, product characteristics, performance characteristics, composition information and product description.
- C. For each paint being used, submit material safety data sheets.

PART 2 – MATERIALS

2.01 MATERIALS

- A. For purposes of establishing a standard of quality, traffic paint shall be Sherwin-Williams Company Baltimore, MD Hotline® Fast Dry Latex Waterborne Traffic Marking Paint - TM2152 (white), TM2153 (yellow), TM2221 (black), TM2222 (red), TM2224 (blue) and TM2226 (green), or Architect approved equal. Any paint on the NYSDOT approved list for pavement marking materials may be permitted as an equivalent with Architects approval.

- B. All paints shall conform to Federal, State, and local air pollution regulations including those for the control (emission) of volatile organic compounds (VOC) as established by the USEPA and the NYSDEC.

PART 3 – EXECUTION

3.01 APPLICATION CONDITIONS

- A. At the time of paint application, the pavement surface and ambient temperature shall not be less than 50°F, the relative humidity shall not exceed 85% and the pavement surface shall be cured and dry.
- B. Traffic paint shall not be applied during periods of rain or if the rain is imminent. Waterborne traffic paint shall not be applied if rain is expected within 4 hours after application.
- C. Paint shall be applied in strict accordance with the manufacturer's recommendations for use. In no case shall the paint be heated above 150°F.
- D. The Contractor shall be responsible for cleaning the pavement of dust, dirt and other foreign material which may be detrimental to the adhesion of the paint film in accordance with the manufacturer's requirements and to the satisfaction of the Owner and Architect.

3.02 APPLICATION

- A. All pavement markings and patterns shall be applied in accordance with manufacturer's instructions and placed as shown in the Contract Documents. Installation shall also be in accordance with the MUTCD and the NYS Uniform Code and shall be as follows:
 - 1. Parking stall stripes shall be 4" wide white except handicapped stalls and access aisles which shall be 4" wide blue.
 - a. Uniform symbol of accessibility shall be blue.
 - b. Hatching for handicap access aisles shall be 8" wide blue and set 3ft. on center.
 - c. Hatching for other non-handicap areas as shown on the plans shall be 8" wide white and set at 3ft. on center.
 - 2. Crosswalks shall have 8" wide white stripes at borders with 12" wide white lines perpendicular to boards and set 3ft. on center.
 - 3. Stop lines shall be 2ft. wide white stripe.
 - 4. Barrier lines shall be 4" wide yellow.
 - 5. Edge of lane lines shall be 4" wide white stripes.
 - 6. Directional arrows, letters, etc. shall be color and size as depicted on plans.
 - 7. GC shall contact the local Fire Marshall and provide fire zone markings as required.
- B. Certain products may require thermoplastic markings for certain specific components. If required, this will be indicated on the drawings.
- C. When pavement markings are applied under traffic, the Contractor shall provide all the necessary flags, signs, cones, shadow vehicles, flashing arrow boards, etc. to maintain and protect traffic, to

protect the work operation, and to protect the painted pavement markings until thoroughly dry and serviceable.

- D. The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of the normal flow of traffic shall not be allowed.
- E. The painted pavement markings shall be uniformly applied to the pavement surface at a 15 mil wet film thickness or as per manufacturer's recommendation. The applied pavement markings shall have clean-cut edges and true and smooth alignment.
- F. The Contractor shall repair and or replace any markings damaged during the performance of the work.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 322700 – SITE FURNISHINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete installation of the following items as shown on the Drawings and specified herein. Work under this Section includes, but is not limited to, the following:
 - 1. Flagpole.
 - 2. Benches and bike racks.
 - 3. Tree grates.
- B. Related Work Specified Elsewhere:
 - 1. Section 033000 – Cast-In-Place Concrete
 - 2. Section 310000 – Earthwork
 - 3. Section 099000 – Painting
- C. Refer to the Bid Proposal Form for Alternates that may affect the Work of this Section.

1.03 SYSTEM DESCRIPTION

- A. Accessibility Requirements:
 - 1. Provide site improvements to conform with the Americans with Disabilities Act Accessibilities Guidelines (ADAAG) and State and Local Regulations. These requirements supercede Technical Specifications in this section.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's current product literature for each manufactured product specified herein.
- B. Submit shop drawings for items included in this Section. Include types of materials, construction details, sizes and layout, and complete information on hardware and accessories.

1.05 QUALITY ASSURANCE

- A. Preliminary Coordination Conference: As soon as possible after award of site improvement work, meet with Installer, and installers of substrate construction and other related work including penetrating work such as playground equipment, the Architect, and the Owner.

1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule. Review requirements for inspections, tests, certifications, forecasted weather conditions, governing regulations, and proposed installation procedures.

PART 2 - PRODUCTS

2.01 ACCEPTABLE STANDARDS

- A. Where a model number is used on the Drawings, it refers to the manufacturer and product listed which is specified as the type, size, function, and quality required for this Project.
- B. The Architect will consider for acceptance products of other manufacturers provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Architect at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.
 1. Refer to the Instruction To Bidders and Substitution Request Form for additional requirements.

2.02 FLAGPOLE

- A. Commercial Groundset Flagpole: As manufactured by Pole-Tec Co., Inc., East Setauket, New York, (800) 633-6733; or Architect approved equal.
 1. Shall be cone tapered aluminum of machine made 6063-T6 seamless extruded aluminum tubing with a minimum wall thickness of .188 inch.
 2. The flagpole is to be ground set with a 44 foot overall length, with exposed height 40 feet with 8 inch outside butt diameter and 3-1/2 inch outside top diameter.
 3. Finish shall be a satin brush finish duranodic coating. Provide same color finish on exposed metal components and accessories.
 4. Flagpole is to have an internal halyard system, standard spun aluminum flash collar.

2.03 BENCHES AND BIKE RACKS

- A. Benches shall be Model C #B962416 as manufactured by Pavestone. Finish shall be exposed aggregate. Quantities shall be as indicated on C5.1, 5.2, and 5.3. Website is www.pavestone.com.
- B. Bicycle racks shall be provided (location per Owner), Model GR112 as manufactured by Madrax, (800) 448-7931. Color shall be per Architect from manufacturer's standard range.

2.04 TREE GRATES

- A. Tree Grates: Model number as indicated. Manufactured by Neenah Foundry Co.; phone 1-414/725-7000.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Flagpole: Install per manufacturer's instructions.

- B. Install new benches in strict accordance with manufacturer's recommendations and as located on the plans.
- C. Install tree grate as shown on Drawings.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 323113 – VINYL COATED CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY

- A. The work includes all labor, materials, equipment, and appliances necessary to furnish and install the various height chain link fences and gates as shown on the plans, detailed in the specifications, and directed by and to the approval of the District.

1.03 RELATED SECTIONS

- A. Section 033000 – Cast-In-Place Concrete
- B. Section 310000 – Earthwork
- C. Section 310001 – Site Work General Provisions
- D. Section 329200 – Turf and Grasses

1.04 SUBMITTALS

- A. Comply with the requirements of Section 013300 and as modified below.
- B. Manufacturer's Data:
 - 1. Submit copies of manufacturer's product data, specifications, installation instructions, and copy of manufacturer's warranty.
- C. Shop Drawings: Layout of items with dimensions, details, recommended footing details, finishes of components, and accessories.

PART 2 - MATERIALS

2.01 FENCE MATERIALS

- A. Fabric: The fabric shall have knuckled edges at the top and bottom and shall be fastened to the top rail, and bottom rail when provided, which shall be run through loop caps.
 - 1. PVC coating bonded and thermally fused to metallic coated steel core wire: ASTM F668 Class 2b, 7 mil thickness. Core wire tensile strength 75,000 psi. 2" diamond mesh, 9-gauge core wire with a diameter of 0.148" and a breakload of 1,290 lbs except where noted differently on the plans.
- B. Posts: Line, terminal (corner and end), and gate posts shall be a minimum of 3'-8" greater in length than the fabric height in order to be embedded in 3'-6" deep concrete footings.
 - 1. Line Posts: Line posts shall be 2.5 inch O.D. steel pipe, weight 3.65 lbs. per foot, copper bearing and hot dip galvanized; PVC-Coated finish in accordance with ASTM F1043;

supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. Complete with all necessary fittings.

2. Terminal Posts: End and corner posts shall be 3.0-inch O.D. steel pipe, weight 5.79 lbs. per foot, copper bearing and hot-dip galvanized; PVC-Coated finish in accordance with ASTM F1043; supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. Complete with all necessary fittings.
3. Gate Posts: Gate posts shall be copper bearing steel, hot-dip galvanized; PVC-Coated finish in accordance with ASTM F1043; supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. Complete with all necessary fittings. Conforming to the following sizes, except where noted differently on the plans:
 - a. Gate leaf up to 3 ft. wide: Schedule 40, 2.875" o.d., 5.79 lbs. per lineal foot.
 - b. Gate leaf over 3 ft. to 5 ft. wide: Schedule 40, 4.0" o.d., 9.10 lbs. per lineal foot.
 - c. Gate leaf over 5 ft. to 10 ft. wide: Schedule 40, 6.625" o.d., 18.97 lbs. per lineal foot.
- C. Gates: Gate frames shall be 2.0-inch O.D., copper bearing fabric to match the fence line. All frames shall be hot-dipped, galvanized 1.8 oz. zinc/s.f. uncoated surface, conforming to ASTM 120, Schedule 40. PVC-Coated finish in accordance with ASTM F1043; supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. All gates to be provided with necessary hinges and gate padlock fittings. Provide diagonal bracing when gate leaves are over 4'-0" wide.
- D. Bracing: Braces not less than 1 5/8-inch O.D., weighing not less than 2.27 lbs. per foot, or approved equivalent section, complete with 3/8-inch galvanized truss rod and turnbuckle, all PVC coated, shall be installed at all corner, end, and gate posts, and as required at changes of vertical grade.
- E. Post Tops: All posts shall be fitted with heavy malleable iron or pressed steel tops, PVC coated. Tops shall permit passage of top rails.
- F. Bottom Rail: Bottom shall be 1 5/8-inch O.D., copper bearing steel pipe, hot-dipped, galvanized, weight 2.27 lbs. per foot. PVC-Coated finish in accordance with ASTM F1043; supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. Bottom rail shall be installed between posts with appropriate fittings and accessories.
- G. Top Rail: Top rail shall be 1 5/8-inch O.D., copper bearing steel pipe, hot-dipped, galvanized, weight 2.27 lbs. per foot. PVC-Coated finish in accordance with ASTM F1043; supplemental color coating of 10-15 mils of thermally fused PVC in color as selected by the Architect. Top rail shall pass through the line post tops and form a continuous brace from end to end of each run of fence. Couplings shall be outside sleeve type and at least seven inches long; one coupling every five shall contain a heavy spring to take up expansion and contraction of the top rail.
- H. Truss Rods: Galvanized steel rods, 5/16" min. diameter.
- I. Tension (stretcher) bars: one piece lengths 2" shorter than fabric height, 3/16" x 3/4", hot dip galvanized, PVC coated.
- J. Wire ties and clips: 9-gauge galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge for rails and braces. Hog ring ties of 12 1/2 gauge for attachment of fabric to tension wire. All PVC coated
- K. Nuts and bolts are galvanized but not vinyl coated. Utilize PVC paint color coat nuts and bolts.

L. Fence Post Footings:

1. The line, corner, and end gate posts shall be as detailed on the plans. All concrete footings shall be 3,000 psi., air-entrained. Footings shall be crowned to shed water and protect posts at ground line.
 - a. If footings are not detailed on plans, they shall be provided with a diameter 4 times greater than the outside dimension of post, 3'-6" deep, or deeper as the post condition warrants.

2.02 TENNIS COURT WINDSCREEN

- A. Provide tennis court windscreens at full perimeter of tennis courts if the work of this section is related to tennis court construction as indicated on the drawings.
 1. Manufacturer: Douglas Industries, Eldridge, Iowa.
 - a. Model: VCP-9 Windscreen
 2. Fabric:
 - a. Open mesh vinyl-coated (50%) polyester with 70% windbreak, 320 x 200 tensile strength, 9 x 12 inch weave, 7 oz. per square yard. Color as selected by Architect.
 - b. 3 ply hems, vinyl coated polyester reinforced and double sewn with heavy duty polyester thread.
 - c. No. 2 brass grommets.
 - d. Douglas AVR reinforced, die-cut, heat sealed air vents.
 3. Fasteners:
 - a. Lightweight, self-locking plastic fasteners with 150lb. break strength, C-snaps, and lacing cord.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.02 CHAIN LINK FENCE FRAMING INSTALLATION

- A. Install chain link fence in accordance with ASTM F567 and manufacturer's instructions.
- B. Concrete Set Posts: Drill hole in firm, undisturbed earth to approximately 6" deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.
 1. Line posts shall be spaced at uniformly at approximately 8 ft. o.c., maximum of 10'-0" o.c., unless otherwise noted.

2. Terminal posts shall be located at each fence termination and change in horizontal or vertical direction of 30 degrees or more.
 - a. Install horizontal pipe brace at mid-height for fences 6' and taller, at first section on each side of terminal, corner, and gate posts. Firmly attach with appropriate fittings. Install diagonal truss rods at these points. Install braces and adjust truss rod, ensuring posts remain plumb.
- C. Check each post for vertical and top alignment and maintain in position during placement and finishing operation.
- D. Rails: Continuous top rails in 21 ft. sections. Bottom and mid rails (if required), single lengths between posts.
 1. Install mid-rails for fabric heights of 10 ft. and over.
- E. Gates: Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal. Adjust hardware for smooth operation.

3.03 CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on secure side and attach so that fabric remains in tension after pulling force is released. Leave approximately 1" between finish grade and bottom selvage. Attach fabric with 9 ga. galvanized PVC coated wire ties or clip to line posts at 12" on center and to rails, braces, and tension wire at 12" on center.
- B. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands spaced maximum of 15" on center.

3.04 ACCESSORIES

- A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.
- B. Fasteners: Install nuts on fence side opposite fabric side for added security.

3.05 CLEANING

- A. Clean up debris and unused material and remove from site.

3.06 RESTORATION

- A. Any areas of the project site that are disturbed by the work shall be restored to the condition in which they existed prior to this work.
- B. Grass areas disturbed by this work shall be restored with topsoil & seed.

END OF SECTION