



The State University
of **New York**

For construction contracts greater than \$20,000

East Gym Addition -
General Construction

C071086A

April 17, 2024

Volume I

Binghamton University
4400 Vestal Parkway East
Binghamton, New York 13902

Date: April 17, 2024

Project Number: **C071086A**
 Project Name: **East Gym Addition – General Construction**
 Agency/Div. Code: **28020**

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 - a. OCSD-4 Office of contractor and supplier Diversity MWBE and SDVOB Utilization Plan *(required within seven days of the bid)*
 - b. OCSD-2 Office of contractor and Supplier Diversity Staffing plan *(required within seven days of the bid)*
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 - a. Offer Disclosure - Disclosure and Certification with respect to State Finance Law §§139-j and 139-k
6. Bonds and Certificate of Insurance *from SUNY Procedure Item #7554 "Construction Contracting Procedures"*
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Notice to Bidders and Newspaper Advertisement

The State University of New York at Binghamton University will receive sealed bids for project number **C071086A** titled **East Gym Addition – General Construction** until 2:30 p.m. local time **05/08/24** at Binghamton University, Purchasing, McGuire Building, where such proposals will be publicly opened and read aloud. The campus contact is William Hall (607) 222-3360. All work on this Contract is to be completed within **365** days after the date of the Notice to Proceed. A pre bid meeting is scheduled for **Thursday April 25, 2024 at 10:00 am** in conference room C of the Physical Facilities Building. Please visit Binghamton University’s website for parking instructions.

Bidding and Contract Documents may be examined free of charge at the following locations.

Builders Exchange of the Southern Tier, Inc.
15 Belden Street
Binghamton, New York 13903

Syracuse Builders Exchange
6363 Ridings Road
Syracuse, New York 13206

Eastern Contractors Association, Inc.
6 Airline Drive
Albany, New York 12205

Dodge Data & Analytics (Dodge Reports)
Documents can be viewed at
www.construction.com

Information and Bidding Documents for the Project can be viewed and ordered at the following designated website: www.nyplanroom.com

Bidding Documents may be viewed and bid packages may be purchased/downloaded from the designated website by prospective bidders. Prospective Bidders must purchase a bid set from nyplanroom.com to be considered a responsible bidder, even if Bidding Documents were viewed or obtained from a plan room or source other than the designated website in either electronic or paper format. The designated website and registered bidders will be updated periodically with addenda, lists of registered plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website.

Electronic copies of the Bidding Documents are available for order/download on the portal at nyplanroom.com. You must purchase an electronic bid package to be considered a responsible bidder. If you would also like to order a printed copy or have any other questions on how to obtain a bid package, please contact Dataflow at Binghamton@goDataflow.com or call at 607-772-2001. Bids must be submitted in duplicate in accordance with the instructions contained in the Information for Bidders. Security will be required for each bid in an amount not less than five (5) percent of the Total Bid.

It is the policy of the State of New York and the State University of New York to encourage minority business enterprise participation in this project by contractors, subcontractors and suppliers, and all bidders are expected to cooperate in implementing this policy.

The State University of New York reserves the right to reject any or all bids.

INFORMATION FOR BIDDERS

Section 1 Definitions

All definitions set forth in the Agreement are applicable to the Notice to Bidders, Information for Bidders and the Proposal, all of which documents are hereinafter referred to as the Bidding Documents.

Section 2 Issuance of Bidding and Contract Documents

Drawings and Specifications will be issued by the Consultant upon request after payment of the deposit specified in the Notice to Bidders.

- a. Two separately bound copies of the Proposal.
- b. Two separately bound copies of a Bid Bond.
- c. Two separately bound copies of the Offerer Disclosure of Prior Non-Responsibility Determinations
- d. Two separately bound copies of New York State Vendor Responsibility Questionnaire.
- e. Two separately bound copies of New York State Department of Taxation and Finance ST-220-CA Contractor Certification.
- f. Two separate copies of Affirmation And Disclosure and Certification with respect to State Finance Law Sections && 139-j and 139-k.
- g. Two separately bound copies of the SDVOB Utilization Plan.

Section 3 Proposals

- (1) Proposals must be submitted in duplicate on the forms provided by the University. They shall be addressed to the University in a sealed envelope, marked with the name and address of the bidder, the title of the Project and the Project number. The University accepts no responsibility for Proposals that may be delivered by any courier or other messenger service that does not contain all of the above-noted information on the outside of a sealed envelope. Facsimile or email copies of the Proposal will not be accepted.
- (2) All blank spaces in the Proposal must be filled in and, except as otherwise expressly provided in the Bidding Documents; no change is to be made in the phraseology of the Proposal or in the items mentioned therein.
- (3) Proposals that are illegible or that contains omissions, alterations, additions or items not called for in the Bidding Documents may be rejected as informal. In the event any bidder modifies, limits or restricts all or any part of its Proposal in a manner other than that expressly provided for in the Bidding Documents, its Proposal may be rejected as informal.
- (4) Any Proposal may be considered informal which does not contain prices in words and figures in all of the spaces provided or which is not accompanied by a bid security in proper form. In case any price shown in words and its equivalent shown in figures do not agree, the written words shall be binding upon the bidder. In case of a discrepancy in the prices contained in the Proposal forms submitted in duplicate by the bidder, the Proposal form which contains the lower bid shall be deemed the bid of the bidder; provided, however, the University at its election may consider the Proposal of such bidder informal.
- (5) If the Proposal is made by a corporation, the names and places of residence of the president, secretary and treasurer shall be given. If by a partnership, the names and places of residence of

- the partners shall be given. If by a joint venture, the names and addresses of the members of the joint venture shall be given. If by an individual, the name and place of residence shall be given.
- (6) No Proposal will be considered which has not been deposited with the University at the location designated in and prior to the time of opening of bids designated in the Bidding and Contract Documents or prior to the time of opening as extended by Addendum.
 - (7) Bids may be modified, withdrawn or canceled only in writing or by email notice received by the University prior to the time of opening of bids designated in the Bidding and Contract Documents. A written or email notice of modification, withdrawal or cancellation shall be marked by the bidder with the name and address of the bidder, the title of the Project and the Project number. Upon receipt by the University a duly authorized employee of the University, who shall note thereon the date and time of receipt and shall thereupon attach said written or email notice of modification, withdrawal or cancellation to the envelope submitted by the bidder pursuant to subdivision (1) of this
 - (8) Permission will not be given to modify, explain, withdraw or cancel any Proposal or part thereof after the time designated in the Bidding and Contract Documents for the opening of bids, unless such modification, explanation, withdrawal or cancellation is permitted by law and the University is of the opinion that it is in the public interest to permit the same.
 - (9) Items C, D, E, F, and G of Section 2, bidding and contract documents, must be submitted with the proposal and bid surety.

Section 4 Examination of Bidding and Contract Documents

- (1) Prospective bidders shall examine the Bidding and Contract Documents carefully and, before bidding, shall make written request to the Consultant (with a copy thereof to the University) for an interpretation or correction of any ambiguity, inconsistency or error therein which should be discovered by a reasonably prudent bidder. Such interpretation or correction as well as any additional Contract provision the University shall decide to include will be issued in writing by the Consultant as an Addendum, which will be sent to each person recorded as having received a copy of the Bidding and Contract Documents from the Consultant, and which also will be available at the places where the Bidding and Contract Documents are available for inspection by prospective bidders. Upon such emailing or delivery and making available for inspection, such Addendum will become a part of the Bidding and Contract Documents and will be binding on all bidders whether or not the bidder receives or acknowledges the actual notice of it. Prospective bidders are responsible for ensuring that all addenda have been incorporated into the bid. The requirements contained in all Bidding and Contract Documents shall apply to all Addenda.
- (2) Only the written interpretation or correction so given by Addendum shall be binding. Prospective bidders are warned that no trustee, officer, agent or employee of the University or the Consultant is authorized to explain or interpret the Bidding and Contract Documents by any other method, and any such explanation or interpretation, if given, must not be relied upon.

Section 5 Computation of Bid

- (1) In computing their bids, bidders are not to include the sales and compensating use taxes of the State of New York or of any city and county in the State of New York for any supplies or materials which are incorporated into the completed Project as the University is exempt from such taxes.

- (2) Unit prices may be inserted in the Proposal by the University or the bidder at the discretion of the University. Any unit prices listed in the Proposal by the University are based upon the Consultant's appraisal of a fair cost for the work involved. Such listed prices will be binding upon both the bidder and the University unless the bidder wishes to change any of such unit prices by crossing out the listed unit price and inserting a revised unit price. Such revised unit price shall not be binding upon the University unless it accepts the same, in writing, before it issues a Notice of Award. In the event the Proposal contains blank spaces for unit prices or the bidder revises any stated unit price, the amount of such unit prices for additions shall not vary by more than 15 percent from the prices inserted by the bidder for deductions, and, if the variance of such prices exceeds 15 percent, the University may adjust the deduction price inserted by the bidder so that it is only 15 percent lower than the addition price inserted by the bidder. In addition, the University may adjust any unit price filled in by a bidder to an amount agreeable to both the bidder and the University or it may reject any unit prices.
- (3) Alternates, if any, listed in the Proposal shall be accepted in the order indicated and will be used in combination with the Base Bid to determine the low bidder. Unit prices will not be used to determine the low bidder.
- (4) If a tie bid should occur the University reserves the right to use one of the following methods to determine the successful bidder. For tie bids between two contractors the University representative shall flip a coin, both affected contractors must be present for the coin toss. For tie bids between three or more contractors the University representative shall pull names from a bowl, hat or other container. The affected contractors must be present for the drawing.

Section 6 Payment of Bid Security

- (1) Each Proposal must be accompanied by the required amount of the bid security, which is 5% of the Total Bid, in the form of a bank draft or certified check, payable at sight to the University and drawn on a bank authorized to do business in the United States, or by a Bid Bond, on a form approved by the University, duly executed by the bidder as principal and having as surety thereon a surety company or companies, approved by the University, authorized to do business in the State of New York as a surety. Attorneys-in-fact who execute a Bid Bond on behalf of a surety must affix thereto a certified and effectively dated copy of their power of attorney.
- (2) The University will return, without interest, bid securities in accordance with the following procedure:
 - a. To all bidders except the apparent three (3) lowest bidders within two (2) working days after the opening of bids.
 - b. To any bidder submitting a Bid Bond as a replacement for a previously provided bank draft or certified check, within two (2) working days after the University's approval of such Bid Bond.
 - c. To the apparent three (3) lowest bidders, unless their bid security was previously returned, within two (2) working days after delivery to the University by the successful bidder of the executed Agreement and required Bonds, or within two (2) working days of the University's rejection of all bids or within two (2) working days after the expiration of forty-five (45) calendar days after the bid opening, whichever event shall occur first.
 - d. Bid Bonds, due to their nature, will not be returned.

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- (3) The University reserves the right to deposit bid security drafts or checks pending final disposal of them.

Section 7 Qualifications of Bidders

- (1) A bidder must demonstrate, to the satisfaction of the University, that it has successfully completed three (3) contracts similar in size, scope and complexity to this contract within the last five (5) years.
- a. For scope and complexity, similar work is defined as seeking a qualified contractor to renovate approximately a 75,000 square foot addition to north of the existing east gym. The addition is steel framed with all trades bid with separate contracts. This is for the General Construction portion of the work, as further described in the General Requirements, Description of Work.
 - b. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
 - c. The above three projects shall be submitted on Attachment A of the Proposal (Form 7554-07), "List of Completed Similar Construction Projects" (the List). If the List is not provided or is missing information, and/or is found to have erroneous information or information that is no longer current, a Proposal may be rejected as not responsive. If requested by the University, the bidder may be permitted to add missing information, modify and/or explain erroneous information or information that is no longer current on the List. Modifications and/or explanations of the List must be received within 48 hours of receipt of the University's request.
- (2) All prospective bidders must demonstrate to the satisfaction of the University that they have the skill and experience, as well as the necessary facilities, ample financial resources, ability to manage staff and subcontractors effectively, ability to anticipate and plan construction work for optimal progress, ability to create, strive for and maintain working environments and relationships that are constructive, communicative and cooperative, organization and general reliability to do the work to be performed under the provisions of the Contract in a satisfactory manner and within the time specified.
- (3) Each bidder must demonstrate to the satisfaction of the University that it has working capital available for the Project upon which it is bidding in an amount equal to 15 percent of the first \$100,000 of the amount of its Base Bid plus 10 percent of the next \$900,000 plus 5 percent of the remainder of its Base Bid. Working capital is defined as the excess of current assets over current liabilities. The University defines current assets as assets which can be reasonably expected to be converted into cash within a year, and current liabilities as debts which will have to be paid within a year.
- (4). The University may make such investigation as the University deems necessary to determine the ability of any bidder to perform the Work. Bidders shall furnish to the University all information and data required by the University, including complete financial data, within the time and in the form and manner required by the University. The University reserves the right to reject any bid if the evidence submitted by or an investigation of such bidder fails to satisfy the University that such bidder is properly qualified to carry out its obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

- (5) At the time of the bid opening, all bidders and subcontractors, domestic and foreign, must be in compliance with New York State business registration requirements. Contact the NYS Department of State regarding compliance.

Section 8 Submission of Post-Bid Information

- (1) Within forty-eight (48) hours after the opening of bids, each of the apparent three lowest bidders, unless otherwise directed by the University or otherwise provided in the Bidding and Contract Documents, shall submit to both the University and the Consultant:

- a. Evidence of a completed New York State Uniform Contracting Questionnaire (Vendor Responsibility Questionnaire For-Profit Construction (CCA-2)). Either email confirmation that the bidder's CCA-2 is current and certified in the New York State VendRep System (VendRep) within the last six months from the bid date, or deliver a certified paper format CCA-2, including all attachments, to the University.

The University recommends that vendors file the required CCA-2 online via the VendRep. To enroll in and use the VendRep, see the VendRep Instructions at https://www.osc.state.ny.us/vendrep/info_vrsystem.htm or go directly to the VendRep online at <https://portal.osc.state.ny.us>. To request assistance, contact the Office of the State Comptroller's ("OSC") Help Desk at 866-370-4672 or 518- 408-4672 or by email at ciohelpdesk@osc.state.ny.us.

The paper format CCA-2 and accompanying definitions are available on the OSC website at the following location:

http://www.osc.state.ny.us/vendrep/forms_vendor.htm

- b. A working plan and schedule showing clearly, in sequence and time-scale, all significant activities of the work. The working plan and schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates for the anticipated time of commencement and completion of the work and its significant phases and activities and the interrelationship between such significant activities and other items pertinent to the work. This requirement is in addition to and not a substitute for the schedule requirements of section 3.02 (Time Progress Schedule) of the Agreement. Although the working plan and schedule submitted shall not be used in determining the lowest responsible bidder, failure to submit the working plan and schedule may result in the rejection of the Proposal as not responsive.
- c. The names and addresses of the bidder's proposed subcontractor for the Asbestos Abatement work of any value, and proposed subcontractors for Electrical Work, the Heating, Ventilating and Air-Conditioning Work and the Plumbing Work for each of said work categories valued at \$100,000 or more.
- i. For each proposed subcontractor named, provide a completed "List of Completed Similar Construction Projects (the List)." If the List is not provided or is missing information, and/or is found to have erroneous information or information that is no longer current, a proposed subcontractor may be rejected. If requested by the University, the bidder may be permitted to add missing information, modify and/or explain erroneous information or information that is no longer current on the List; modifications and/or explanations of the List must be received promptly after receipt of

- the University's request.
- ii. Only one proposed subcontractor should be named for each of such trades. Proposed subcontractors of the bidder may not be changed except with the specific written approval of the University.
 - iii. The naming of the bidder itself for any of such work is not acceptable and may result in rejection of the bidder unless the bidder can demonstrate to the University that it has successfully completed or substantially completed three (3) contracts similar in size, scope and complexity for the designated work within the last five (5) years. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
 - iv. The bidder will be required to establish, to the satisfaction of the Consultant and the University, the reliability and responsibility of each of their said proposed subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to each of such proposed subcontractors' respective trades. By submission of the "List of Completed Similar Construction Projects," a proposed subcontractor must be able to demonstrate that they have successfully completed or substantially completed three (3) contracts similar in size, scope and complexity for the designated work within the last five (5) years. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
 - v. For each of the proposed subcontractors, the bidders must submit to the University, within seven (7) calendar days after the bid opening, evidence of a completed New York State Uniform Contracting Questionnaire (Vendor Responsibility Questionnaire For-Profit Construction (CCA-2)). Either email confirmation that the subcontractor's CCA-2 is current and certified in the New York State VendRep System (VendRep) within the last six months from the bid date, or deliver a certified paper format CCA-2, including all attachments, to the University.
 - vi. In the event that the University and the Consultant reject any of said proposed subcontractors, the bidder, within two (2) working days after receipt of notification of such rejection, shall again submit to the University and the Consultant the name of another proposed subcontractor in place of the one rejected and it will be required to establish to the satisfaction of the University and the Consultant the reliability and responsibility of said proposed subcontractor; When naming another proposed subcontractor, the bidder must promptly submit the proposed subcontractor's completed "List of Completed Similar Construction Projects" and their completed CCA-2.
 - vii. The bidder will not be permitted to submit another proposed subcontractor if it designated itself for any of the aforesaid categories of work.
 - viii. Proposed subcontractors of the bidder, approved by the University and the Consultant, must be used on the work for which they were proposed and approved and they may not be changed except with the specific written approval of the University.
- d. A breakdown of the amount of the bidder's Proposal. Such breakdown shall be prepared in accordance with industry standards. No bidder shall be barred from revising, in the

Contract breakdown required under the provisions of Section 4.08 of the Agreement, the various amounts listed in the bid breakdown required under the provisions of this Section. The amount set forth in said bid breakdown will not be considered as fixing the basis for additions to or deductions from the Contract consideration.

- (2) Except for Contracts of \$100,000 or less, within seven (7) calendar days after the opening of bids, unless otherwise directed by the University, the three low bidders shall submit to the University for its approval, a Minority and Women-owned Business Enterprise Utilization Plan ([Form 7557-107](#)).
- (3) Except for contracts of \$100,000 or less, within seven (7) calendar days after the opening of bids, the three low bidders shall submit to the University for its approval, an Equal Employment Opportunity Statement and EEO Staffing Plan ([Form 7557-108](#)) to ensure equal employment opportunities without discrimination because of race, creed, color, sex or national origin. Such Statement and plan should demonstrate the bidder's intent to comply with the provisions of Article VI of the Agreement. The EEO plan should include the methods that the bidder will use to address nondiscrimination and affirmative action so that minorities and women will be included in the work force. The Equal Employment Opportunity ("EEO") Policy Statement that shall contain, but not necessarily be limited to, a provision that the bidder, as a precondition to entering into a valid and binding Contract with the University, shall during the performance of the Contract, agree to the following:
 - a. It will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability or marital status, will undertake or continue existing programs of affirmative action to ensure that minority group membership and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on the Contract.
 - b. It shall state in all solicitations or advertisements for employees that, in the performance of the Contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.
 - c. At the request of the University, it shall request each employment agency, labor union or authorized representative of workers, with which it has collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the bidder's obligations herein.
 - d. After the award of the contract, it shall submit to the University a work force utilization report, in a form and manner required by the University, of the work force actually utilized on the Contract, broken down by specified ethnic background, gender and Federal occupational categories or other appropriate categories specified by the University.
- (4) The above information and such other information as the University or the Consultant may request or obtain will be used by the University in determining the reliability and responsibility of the bidder and any proposed subcontractors. Each bidder must comply promptly with all requests by the University and the Consultant for information and must actively cooperate with the University and the Consultant in their efforts to determine the qualifications of the bidder and any proposed subcontractors. Failure to comply with the latter may result in the rejection of the Proposal as not

responsive. All information required to be furnished to the University under this Section shall be sent to the State University at {insert address or email address}.

Section 9 Award of Contract

- (1) The award of the Contract shall be made to the bidder submitting the lowest bid that is responsive to the solicitation and who, in the sole opinion of the University, is qualified to perform the work. The University shall determine the lowest bid by adding to or deducting from the Base Bid of the bidders the additive or deductive alternates, if any, the University elects to accept after the opening of the Proposals. Alternates will be accepted in the order they are set forth in the Proposal. The unit prices set forth in the Proposal for additions to or deductions from the work shall not be considered in determining the lowest bid.

The lowest base bid shall not exceed the amount of funds then estimated by the University as available to finance the contract. If the lowest bidder exceeds such amount, the University may reject all bids, or may award the contract on the base bid combined with deductive alternates applied in the order they are set forth in the Proposal as produces the net amount which is within the available funds.

- (2) The right is reserved, if, in the University's judgment, the public interest will be promoted thereby, to reject any or all Proposals, to waive any informality in any Proposal received or to afford any bidder an opportunity to remedy any deficiency resulting from a minor informality or irregularity. Without limiting the generality of the foregoing:
- a. A Proposal may be rejected as not responsive if the bidder fails to furnish the required bid security or to submit the data required with or after its Proposal and this Information for Bidders.
 - b. A Proposal may be rejected as not responsive if the bidder cannot show to the satisfaction of the University: (i) that it has the necessary qualifications and capital; or (ii) that it owns, controls or can procure the necessary plant and equipment to commence the work at the time prescribed in the Contract and thereafter to prosecute and complete the work at the rate, or within the time specified; or (iii) that it is not already obligated by the performance of so much other work as is likely to delay the commencement, prosecution or completion of the work contemplated by the Contract.
 - c. A Proposal will be rejected as not responsive if it does not provide for the completion of the work by the date of completion specified in the Proposal.
- (3) The University also expressly reserves the right to reject any Proposal as not responsive if, in its opinion, considering the work to be performed, the facts, as to the bidder's business or technical organization, plant, financial and other sources of business experience compared with the work bid upon, justify rejection.
- (4) The award of the Contract shall not be construed as a guarantee by the University that the plant, equipment and the general scheme of operations and other data submitted by the bidder with or after its Proposal is either adequate or suitable for the satisfactory performance of the work.

Section 10 Required Bonds and Insurance

- (1) Unless otherwise agreed to by the University, within ten (10) working days after the receipt of Letter

- of Intent, the Contractor shall procure, execute and deliver to the University and maintain, at its own cost and expense:
- a. A Performance Bond and a Labor and Material Bond, both of which bonds shall be on the form prescribed by the University and in an amount not less than 100 percent of the total amount of the Contract awarded to the Contractor by the University said bonds must be issued by a surety company approved by the University and authorized to do business in the State of New York as a surety.
 - b. Attorneys-in-fact who execute said Bonds on behalf of a surety must affix thereto a certified and effectively dated copy of their power of appointment.
- (2) Prior to the commencement of work the Successful Bidder will provide, at its sole cost and expense, Certificates of Insurance in accordance with Section 5.06 and 5.07 of the Construction Agreement, which shall remain in force throughout the term of the agreement, or any extension thereof. Such Certificates of Insurances shall be from an insurance company licensed by the New York State Department of Insurance with a rating of at least "A-" as published with Standard & Poor's, and a liability insurance policy with limits no less than **\$2,000,000** per claim. If during the term of the policy, the carrier's rating falls below "A-", the liability insurance must be replaced no later than the renewal date of the policy with an insurer acceptable to the State of New York. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured. The policy shall designate the State University of New York as the loss payee and shall contain a provision that the State University of New York shall receive at least thirty (30) days' notice prior to material change, cancellation or expiration of any such policy.
- (3) **Workers Compensation Insurance & Disability Benefits Coverage**
All employees of the Successful Bidder shall be adequately and properly covered by Workers' Compensation Insurance and Disability Benefits coverage for all work related to the resultant contract. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured and are to be written by recognized and well-rated insurance companies authorized to transact business in the State of New York. The Successful Bidder shall deliver certificates of such coverage, or proof that such coverage is not required, in the required format, as required by the Workers' Compensation Board, to the following when the agreement is signed by the parties and thereafter not less than thirty (30) days prior to material change or cancellation of such coverage.
- (4) Proof of insurances with the specific coverage and limits required in Article V of the Agreement. Acceptable documents are:
- a. Proof of NYS Worker's Compensation is only accepted on the C-105.2 or U-26.3 form.
 - b. Proof of Disability insurance is only accepted on the DB-120.1 form. Use the link below for a description of the required forms for Workers Compensation and Disability:
<http://www.osc.state.ny.us/agencies/guide/MyWebHelp/Content/XI/18/G.htm>
 - c. All other proof of insurance must be on the Acord 25 Certificate of Liability Insurance form.
- (5) A 120-day schedule
- a. After receipt of the Letter of Intent but before receipt of the Contract is Awarded, the Contractor, unless otherwise directed by the University, shall update the working plan and schedule previously submitted in accordance with the Information for Bidders to define the contractor's planned operations during the first 120 days and submit it to the

University and the Consultant for their acceptance. The updated working plan and schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates. When updated, such plan and schedule shall be sufficiently detailed to show clearly, in sequence, all salient features of the work of each trade including: the anticipated time of commencement and completion of such work and the interrelationship between such work, submission of Shop Drawings and Samples for approval, approval of Shop Drawings and Samples, placing of orders of materials, fabrication and delivery of materials, installation and testing of materials, contiguous or related work under other contracts, and other items pertinent to the work. The Notice to Proceed may be withheld until this schedule is received and is deemed responsive to the project requirements.

- b. After Contract Award, but before processing second progress payment application, the Contractor, unless otherwise directed by the University, shall submit to the University and the Consultant for their acceptance its proposed working plan and project time schedule for all the work covered by the Contract, and shall include activities for preparation and submission of all Shop Drawings and Samples. Said proposed working plan and schedule shall be prepared in accordance with the form and requirements set forth in the preceding paragraph.

Section 11 Minority and Women-Owned Business Enterprises

- (1) Pursuant to New York State Executive Law Article 15-A, the University recognizes its obligation under the law to promote opportunities for maximum feasible participation of certified Minority and Women-Owned Business Enterprises and the employment of minority group members and women in the performance of University contracts.
- (2) For purposes of this solicitation, the University hereby establishes an overall goal of **30%** for MWBE participation, **10%** for Minority-Owned Business Enterprises ("MBE") participation and **20%** for Women-Owned Business Enterprises ("WBE") participation (based on the current availability of qualified MBEs and WBEs). For additional information please refer to the MWBE requirements outlined in the Prospective Bidders Notice ([Form 7557-121b](#)) and Exhibit A-1.
- (3) For guidance on how the University will determine a Contractor's "good faith efforts," refer to 5 NYCRR §142.8.
- (4) Please note the forms identified in the Prospective Bidders Notice ([Form 7557-121b](#)) must be submitted within seven days of the bid opening. Required forms include the MWBE-EEO Policy Statement ([Form 7557-104](#) or equivalent), the MWBE Utilization Plan ([Form 7557-107](#)) and the EEO Staffing Plan ([Form 7557-108](#)).
- (5) Upon contract award and prior to contract execution the selected awardee will enter its Statewide Utilization Management Plan (SUMP) and document its good faith efforts to achieve the applicable MWBE participation goals by submitting evidence through the New York State Contract System, which can be viewed at: <http://ny.newnycontracts.com>, provided however, that the selected awardee may arrange to provide such evidence via a non-electronic method by contacting the SUNY Office of Diversity, Equity, and Inclusion.
- (6) Any modifications or changes to the MWBE Utilization Plan after the Contract award and during the term of the Contract must be reported on a revised MWBE Utilization Plan and submitted to the University. The University will review the submitted MWBE Utilization Plan and advise the Bidder

of the University's acceptance or issue a notice of deficiency within 30 days of receipt.

- (7) If a notice of deficiency is issued, Awardee agrees that it shall respond to the notice of deficiency within seven (7) business days of receipt by submitting to SUNY [address phone and fax information], a written remedy in response to the notice of deficiency. If the written remedy that is submitted is not timely or is found by SUNY to be inadequate, SUNY shall notify the Awardee and direct the Awardee to submit, within five (5) business days, a request for a partial or total waiver of MWBE participation goals on [Form 7557-114](#). Failure to file the waiver form in a timely manner may be grounds for disqualification of the bid or proposal.

SUNY may disqualify a Bidder as being non-responsive under the following circumstances:

- i. If a Bidder fails to submit a MWBE Utilization Plan;
- ii. If a Bidder fails to submit a written remedy to a notice of deficiency;
- iii. If a Bidder fails to submit a request for waiver; or
- iv. If SUNY determines that the Bidder has failed to document good faith efforts.

Section 12 Equal Employment Opportunity Requirements

- (1) Pursuant to Article 15 of the Executive Law (the "Human Rights Law"), and all other State and Federal statutory and constitutional non-discrimination provisions, the Bidder will not discriminate against any employee or applicant for employment because of race, creed, color, sex, religion, national origin, military status, sexual orientation, gender identity or expression, age, disability, predisposing genetic characteristics, domestic violence victim status, familial status or marital status. The Bidder shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest. The Bidder will state in all solicitations or advertisements for employees that, in the performance of this Contract, all qualified applicants will be afforded equal employment opportunities without discrimination.
- (2) The Bidder will undertake, or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and, if awarded a Contract pursuant to this solicitation, will make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force during its legal engagement with SUNY.
- (3) By submission of a bid or proposal in response to this solicitation, the Bidder agrees with all of the terms and conditions of SUNY Exhibit A including Clause 12 - Equal Employment Opportunities for Minorities and Women and acknowledges that, if the Bidder is awarded a Contract, The Contractor is required to ensure that it and any subcontractors awarded a subcontract over \$25,000 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor, shall undertake or continue programs to ensure that minority group members and women are afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. For these purposes, equal opportunity shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, termination, and rates of pay or other forms of compensation. This requirement does not apply to: (i) work, goods, or services unrelated to the Contract; or (ii) employment outside New York State.
- (4) The Bidder further agrees, where applicable, to submit with the bid a staffing plan ([Form 7557-108](#)) identifying the anticipated work force to be utilized on the Contract and, if awarded a Contract, will,

upon request, submit to SUNY a workforce utilization report identifying the workforce actually utilized on the Contract if known. Forms are available in SUNY Procurement Policies and Procedures Document 7557 online at: http://www.suny.edu/sunypp/documents.cfm?doc_id=611.

Please Note: Failure to comply with the foregoing requirements may result in a finding of non-responsiveness, non-responsibility and/or a breach of the Contract, leading to the withholding of funds, suspension or termination of the Contract or such other actions or enforcement proceedings as allowed by the Contract.

Section 13 Executive Order 162 (EO162)

- (1) Governor Cuomo's Executive Order 162 requires state contractors to disclose data on the gender, race, ethnicity, job title, and salary of employees performing work on state contracts.
- (2) Bidder agrees to submit Workforce Utilization Report ([Form 7557-110](#)) and to require the same information to be submitted by any of their subcontractors on the state contract, in such format as shall be required by SUNY on a monthly basis for all construction contracts and quarterly basis for all other contracts during the term of the contract. Empire State Development has provided specific details on this requirement at <https://esd.ny.gov/doing-business-ny/mwbe/mwbe-executive-order-162>.

Section 14 Executive Order 177 (EO177)

- (1) The New York State Human Rights Law, Article 15 of the Executive Law, prohibits discrimination and harassment based on age, race, creed, color, national origin, sex, sexual orientation, gender identity, disability, marital status, military status, or other protected status.
- (2) The Human Rights Law may also require reasonable accommodation for persons with disabilities and pregnancy-related conditions. A reasonable accommodation is an adjustment to a job or work environment that enables a person with a disability to perform the essential functions of a job in a reasonable manner. The Human Rights Law may also require reasonable accommodation in employment on the basis of Sabbath observance or religious practices.
- (3) Generally, the Human Rights Law applies to: (i) all employers of four or more people, employment agencies, labor organizations and apprenticeship training programs in all instances of discrimination or harassment; (ii) employers with fewer than four employees in all cases involving sexual harassment; and (iii) any employer of domestic workers in cases involving sexual harassment or harassment based on gender, race, religion or national origin.
- (4) In accordance with Executive Order No. 177, prior to contract award, selected Awardee must submit a certification that it does not have institutional policies or practices that fail to address harassment and discrimination as described above. SUNY is electing to obtain the certification with the bid documents to avoid unnecessary delay in the contract award process. All Bidders must sign and submit the certification attached to this IFB, SUNY [Form 7554-20](#).

Section 15 Service Disabled Veteran Owned Business Enterprises

- (1) Consistent with the State University of New York's commitment to, and in accordance with, Article 17-B of the New York State Executive Law, contractors are required to ensure that good faith efforts are made to include meaningful participation by Service Disabled Veteran-Owned Business in SUNY's MWBE Program. The requirements apply to contracts in excess of \$100,000.

- (2) To ensure that SDVOB Enterprises are afforded the opportunity for meaningful participation in the performance of the University's contracts, and to assist in achieving the SDVOB Act's statewide goal for participation on state contracts the University hereby establishes an overall goal of 6% for SDVOB participation for this solicitation.
- (3) For additional information please refer to the SDVOB requirements outlined in the Prospective Bidders Notice ([Form 7564-121b](#)). Please note the SDVOB Utilization Plan ([Form 7564-107](#)) must be submitted within seven days of the bid opening.

Section 16 Encouraging Use of New York State Business Businesses in Contract Performance

- (1) New York State businesses have a substantial presence in State contracts and strongly contribute to the economies of the state and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders/proposers for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, protégés or other supporting roles.
- (2) Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged, to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.
- (3) Utilizing New York State businesses in State contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under the contract, thereby fully benefiting the public sector programs that are supported by associated procurements.
- (4) Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.
- (5) Information on the availability of New York State subcontractors and suppliers is available from: New York State Department of Economic Development, Procurement Assistance Unit, One Commerce Plaza, Albany, New York 12245, Phone: (518) 474-7756, Fax: (518) 486-7577.

Section 17 Single Contract Responsibility

This is a single bid general construction project. The Contractor submitting the bid is responsible for all work associated with this Project.

Section 18 Examination of Site and Conditions of Work

- (1) A pre-bid conference and project walk-through will be held with all contractors assembled on Thursday April 25, 2024 at 10:00 am in conference room C of the physical facilities building. No

individual or additional walk-throughs will be provided. Failure to attend a walk-through shall not be the cause for extra payment.

- (2) Each bidder must inform itself fully of the conditions relating to the construction of the project and the employment of labor on the project. Failure to do so will not relieve a successful bidder of their obligation to furnish all material and labor necessary to carry out the provisions of their contract. To the extent possible, the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

Section 19 General Terms and Conditions

- (1) The following items will be incorporated into, and made part of, the formal agreement: (1) the University's Invitation for Bid; (2) the Successful Bidder's proposal; (3) Exhibit A, Standard Contract Clauses; (4) Exhibit A-1, Affirmative Action Clauses; and, (5) Forms A and B Procurement Lobbying Forms.
- (2) In the event of any inconsistency in or conflict among the document elements of the agreement described above, such inconsistency or conflict shall be resolved by giving precedence to the document elements in the following order: (1) Exhibits A and A-1; (2) Forms A and B Procurement Lobbying Forms, (3) the Agreement; (4) this IFB; and (5) the Successful Bidder's proposal.

Section 19.1 Vendor Debriefing and Contract Award Protest Procedure

- (1) Upon being notified of their unsuccessful bids, unsuccessful bidders may request in writing a debriefing within 15 calendar days of such notice. The 15 day period starts once unsuccessful bidders are notified. Once a request is made by the bidder, the University must schedule a debriefing within a reasonable time of such request. Unless the campus and bidder mutually agree to use another method such as by telephone, video conference or another type of electronic communication the debriefing must be conducted in person with the bidder.
- (2) This procurement is subject to SUNY Procedure Item 7561, Contract Award Protest Procedure.

Section 19.2 Proposal Confidentiality

- (1) All proposals and qualifications submitted for the University's consideration will be held in confidence. However, the resulting contract is subject to the New York State Freedom of Information Law (FOIL). Therefore, if an Bidder believes that any information in its proposal constitutes a trade secret or should otherwise be treated as confidential and wishes such information not to be disclosed the Bidder shall submit with its proposal a separate letter to the designated contact. The letter shall specifically identify the page number(s), line(s) or other appropriate designation(s) containing such information, explaining in detail why such information is a trade secret and formally requesting that such information be kept confidential. Failure by an Bidder to submit such a letter will constitute a waiver by the Bidder of any rights it may have under Section 89(5) of the Public Officers' Law relating to protection of trade secrets.
- (2) The proprietary nature of the information designated confidential by the Bidder may be subject to disclosure if ordered by a court of competent jurisdiction. A request that an entire proposal be kept confidential is not advisable since a proposal cannot reasonably consist of all data subject to FOIL proprietary status.

Section 19.3 Information Security Breach and Notification Act

- (1) The Bidder shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa and State Technology Law, Section 208). The Bidder shall be liable for the costs associated with such breach if caused by its negligent or willful acts or omissions, or the negligent or willful acts or omissions of its agents, officers, employees or subcontractors.

Section 19.4 State Finance Law §§ 139-j and 139-k

- (1) State Finance Law §§139-j and 139-k imposes certain restrictions on communications between the University and a Bidder during the procurement process. During the restricted period the Bidder is restricted from making contacts to other than designated contact unless it is a contact that is included among certain statutory exceptions set forth in State Finance Law §139-j(3)(a). The restricted period is from the earliest notice of intent to solicit offers through final award and approval of the Contract.
- (2) University employees and their designated representatives are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a 4 year period the Bidder is debarred from obtaining government procurement contracts.

Section 19.5 State Finance Law §§ 139-l

- (1) Pursuant to N.Y. State Finance Law §139-l, every bid made on or after January 1, 2019 to the State of any public department or agency thereof, where competitive bidding is required by statute, rule or regulation, for work or services performed or to be performed or goods sold or to be sold, and where otherwise required by such public department or agency, shall contain a certification 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 N.Y. State Labor Law §201-g.
- (2) N.Y. State Labor Law §201-g provides requirements for such policy and training and directs the Department of Labor, in consultation with the Division of Human Rights, to create and publish a model sexual harassment prevention guidance document, sexual harassment prevent policy and sexual harassment training program that employers may utilize to meet the requirements of N.Y. State Labor Law §201-g. The model sexual harassment prevention policy, model sexual harassment training materials, and further guidance for employers, can be found online at the following URL: <https://www.ny.gov/combating-sexual-harassment-workplace/employers>.
- (3) Pursuant to N.Y. State Finance Law §139-l, any bid by a corporate bidder containing the certification required above shall be deemed to have been authorized by the board of directors of such bidder, and such authorization shall be deemed to include the signing and submission of such bid and the inclusion therein of such statement as the act and deed of the bidder.
- (4) If the bidder cannot make the required certification, such bidder shall so state and shall furnish with the bid a signed statement that sets forth in detail the reasons that the bidder cannot make the certification. After review and consideration of such statement, SUNY may reject the bid or

may decide that there are sufficient reasons to accept the bid without such certification.

- (5) All Bidders must sign and submit the certification attached to this IFB, SUNY [Form 7554-20](#).

Section 20 Additional Terms and Conditions

- (1) The terms and conditions of the State University of New York Construction Agreement (Form 7554-09) shall apply and is provided as an attachment to this IFB.
- (2) The resulting agreement shall be binding upon its execution by both parties and, if required by New York State law, upon the approval of the Attorney General and the Office of the State Comptroller.
- (3) The agreement may be revised at any time upon mutual consent of the parties in writing. Such written consent will not be effective until signed by both parties and, if required by New York State law, approved by the Attorney General and the Office of the State Comptroller.
- (4) The relationship of the Successful Bidder to the University shall be that of independent contractor.
- (5) Compliance with the post-employment restrictions of the Ethics in Government Act is required.
- (6) The submission of a proposal constitutes a binding offer to perform and provide said services.
- (7) In the event the Successful Bidder uses partners, subcontracts or subcontractors, the Successful Bidder will remain responsible for compliance with all specifications and performance of all obligations under the contract resulting from this IFB. For the resulting agreement, the Successful Bidder will be the prime contractor.
- (8) The University will not be liable for any costs associated with the preparation, transmittal, or presentation of any proposals or materials submitted in response to this IFB.
- (9) Public announcements or news releases regarding this IFB or any subsequent award of a contract must not be made by any Bidder without the prior written approval of SUNY.
- (10) The Successful Bidder is responsible for compliance with all applicable rules and regulations pertaining to cities, towns, counties and State where the services are provided, and all other laws applicable to the performance of the resulting contract. The Successful Offeror shall provide all necessary safeguards for safety and protection as set forth by the United States Department of Labor, Occupational Safety and Health Administration.
- (11) The Successful Bidder will be responsible for the work, direction and compensation of its employees, consultants, agents and contractors. Nothing in the resulting agreement or the performance thereof by the Successful Bidder will impose any liability or duty whatsoever on the University including, but not limited to, any liability for taxes, compensation, commissions, Workers' Compensation, disability benefits, Social Security, or other employee benefits for any person or entity.
- (12) In the event the Successful Bidder is required to be reimbursed for travel, Bidder shall be reimbursed at rates not to exceed the current NYS Schedule of Allowable Reimbursable Travel Expenses. Refer to the U.S. Government Administration Rates for Travel at: <http://www.gsa.gov>

- (13) In addition, the University reserves the right to:
- a. Not accept any and all proposals received in response to this IFB, waive requirements or amend this IFB upon notification to all bidders, waive minor irregularities or adjust or correct cost or cost figures with the concurrence of the bidder if mathematical or typographical errors exist.
 - b. To terminate any resulting contract for: (1) unavailability of funds; (2) cause; (3) convenience; (4) in the event it is found that the certification filed by the Bidder in accordance with State Finance Law §§139-j and 139-k are found to be intentionally false or intentionally incomplete; and if applicable, the Department of Taxation and Finance Contractor Certification Form ST-220CA was false or incomplete. Upon such finding the University may exercise its termination right by providing written notification to the Bidder in accordance with the written notification terms of the contract.
 - c. Request certified audited financial statements for the past three (3) completed fiscal years and/or other appropriate supplementation including, but not limited to, interim financial statements and credit reports.
 - d. Contact any or all references.
 - e. Request clarifications from Bidders for purposes of assuring a full understanding of responsiveness, and further to permit revisions from all Bidders determined to be susceptible to being selected for contract award, prior to award.
 - e. Advise Bidder of any objectionable employee(s) and/or subcontractor(s) and request their removal from the project. Such removal shall not be reasonably withheld by the Bidder.

Section 21 Requirements for Construction Activities To Address Public Health or Safety

- (1) The Bidder agrees it is responsible for complying with any and all requirements issued by federal, state or local entities, including but not limited to New York State Governor Office Executive Orders, New York State Department of Health rules, regulations and guidance, and other New York State or State University of New York laws, rules, regulations or requirements that may be issued and/or amended during the bidding and/or performance of work on this Project.
- (2) With respect to the COVID-19 pandemic, Bidder specifically acknowledges and agrees that the NYS Interim COVID-19 Guidance for Construction Projects is made a part of the contract work for this Project, as set forth in General Requirements. Bidder affirms that all costs and time associated with compliance with the current guidance are included in its bid. The current NYS Interim COVID-19 Guidance for Construction Projects is available at the following website: <https://forward.ny.gov/industries-reopening-phase#phase-one-construction>. Notwithstanding the foregoing, Bidder agrees to comply with the Guidance as it may be amended or superseded in the future.

PERMISSIBLE CONTACTS DURING THE RESTRICTED PERIOD ARE AS FOLLOWS:

Matthew Schofield, Director of Procurement, 607-777-4526, mschofie@binghamton.edu, fax 607-777-2338
John Gallent, Purchasing Assistant, 607-777-2036, jgallent@binghamton.edu, fax 607-777-2338
Rachel Talcott, Assistant Director of Finances, 607-777-3591, rtalcott@binghamton.edu, fax 607-777-6643
Johanne Ferraro, Capital Budget Specialist, 607-777-3341, jferraro@binghamton.edu, fax 607-777-6643
William Hall, Architect, 607-222-3360, whall@binghamton.edu, fax 607-759-7743

NAME OF BIDDER

ADDRESS OF BIDDER

**PROPOSAL
FOR**

Project Number: **C071086A**
 Project Name: **East Gym Addition – General Construction**

TO THE STATE UNIVERSITY OF NEW YORK:

1. **The Work Proposed Herein Will Be Completed Within the timeframe stated on page one of the Agreement.** In the event the bidder fails to complete such work by said date or dates, or within the time to which such completion may have been extended in accordance with the Contract Documents, the bidder agrees to pay the University liquidated damages in an amount equal to the values indicate in the Liquidated Damages Schedule below for each calendar day of delay in completing the work.

LIQUIDATED DAMAGES SCHEDULE

<u>Contract Amount</u>	<u>Liquidated Damages</u>
Under \$100,000.....	\$100/day
\$100,000-\$499,999.....	\$200/day
\$500,000-\$999,999.....	\$300/day
\$1MM-\$1,999,999.....	\$400/day
\$2MM-\$3,499,999.....	\$500/day
\$3.5MM-\$5MM.....	\$700/day
Over \$5MM (to be determined by the University in each instance)	\$900/day

2. The bidder hereby declares that it has carefully examined all Bidding and Contract Documents and that it has personally inspected the actual location of the work, together with the local sources of supply, has satisfied itself as to all the quantities and conditions, and understands that in signing this Proposal, it waives all right to plead any misunderstanding regarding the same.
3. The bidder further understands and agrees that it is to do, perform and complete all work in accordance with the Contract Documents and to accept in full compensation therefore the amount of the Total Bid, modified by such additive or deductive alternates, if any, as are accepted by the University.
4. The bidder further agrees to accept the unit prices, if any, set forth in paragraph (5) of this proposal, except as the same may be modified pursuant to the provisions of Section (5) of the Information to Bidders, as full payment for the amount of the credit to the University for any deletions, additions, modifications or changes to the portion or portions of work covered by said unit prices.

5. **BID CALCULATION**

a. **BASE BID** (*does not include allowances*)

\$ _____
(in numbers)

(in words)

b. **ALLOWANCES:** In accordance with the Schedule I and Section 4.05 of Agreement, the bidder further agrees to the following additions to the Base Bid:

Work or Materials Description	Amount in Words	Amount in Figures

c. **TOTAL BID** (*base bid + allowances = total bid*)

\$ _____
(in numbers)

(in words)

d. **ALTERNATES:** In accordance with Section B of the General Requirements the bidder proposes the following additions to or deductions from the Total Bid for the alternates listed below:

Alternate Number	Add/Deduct	Amount in Words	Amount in Figures

e. **UNIT PRICES:** In accordance with Section (5) paragraph (2) of the Information to Bidders and Section 4.04 of the Agreement the bidder or the University may insert unit prices for the work or materials listed below for clarification.

Work or Materials Description	Amount in Words	Amount in Figures

6. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (a) 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; (b) unless otherwise required by law, the prices 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 (c) no attempt has been made or will be made by the bidder to induce any person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (a), (b) and (c) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where (a), (b), and (c) above shall have not been complied with, the bid shall not be considered for award nor shall any award be made unless the Campus President, or designee, or Vice Chancellor for Capital Facilities, or designee, determines that such disclosure was not made for purposes of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of this Section.

7. The bidder agrees that if awarded the Contract, it will commence work within (10) calendar days after date of receipt of a fully executed Agreement and that it will fully complete the work by the date stated herein.
8. The bidder acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein.

Addendum Number	Date	Addendum Number	Date
_____	___/___/___	_____	___/___/___
_____	___/___/___	_____	___/___/___
_____	___/___/___	_____	___/___/___

9. The bidder submits herewith bid security in an amount not less than five (5) percent of the Total Bid. In the event that (a) the bidder's Total Bid is the lowest one submitted and the bidder does not timely provide the Post-Bid Information required by the Information for Bidders or (b) this Proposal is accepted by the University and the bidder shall refuse or neglect, within ten (10) calendar days after date of receipt of Agreement, to execute and deliver said Agreement in the form provided herein, or to execute and deliver a Performance Bond and a Labor and Material Bond in the amounts required and in the form prescribed, the bidder shall be liable to the University, as liquidated damages, for the amount of the bid security or the difference between the Total Bid of the bidder and the Total Bid of the bidder submitting the next lowest bid, whichever sum shall be higher, otherwise the total amount of the bid security will be returned to the bidder in accordance with the provisions set forth in the Information for Bidders. The University may apply the bid security in full or partial payments, as the case may be, of said liquidated damages and in the event the bid security is less than the amount of liquidated damages to which the University is entitled, the bidder shall pay the difference, upon demand, to the University.
10. The bidder certifies that all wood products that are to be used in the performance of this Contract shall be in accordance with the Specifications and provisions of Section 167 b. of the State Finance Law which Section prohibits the purchase and use of tropical hardwoods.
11. The bidder affirms that it understands and agrees to comply with the procedures of the Fund relative to permissible contacts as required by Sections 139-j(3) and 139-j-(6)(b) of the State Finance Law.
12. The bidder certifies that all information provided or to be provided to the University in connection with this procurement is, as required by Section 139-k of the State Finance Law, complete, true and accurate.

Dated ____ / ____ / ____

Firm's Federal ID Number or
Social Security Number as applicable _____

Legal name of person, partnership, joint venture or corporation:

By _____
(signature)

Title _____

ACKNOWLEDGMENT FOR THE PROPOSAL

THE LEGAL ADDRESS OF THE BIDDER

Telephone No. _____ Facsimile No. _____

If a Corporation

Name	Address
_____ PRESIDENT _____	
_____ SECRETARY _____	
_____ TREASURER _____	

If a Partnership

Name of Partners	Address
_____	_____
_____	_____
_____	_____

If a Joint Venture

Name of Members	Address
_____	_____
_____	_____
_____	_____

If an Individual

Name of Individual	Address
_____	_____

Attachment A – List of Completed Similar Construction Projects

Bidder Name:

Project No.:

<p>Bidders must provide three (3) example projects completed in the past five (5) years in which the Bidder served as the prime contractor. Example projects must be of similar size, scope and complexity to the project currently being bid, as further described in the Description of Work. Each project must include the Owner/Agency, Award Date, Contract Amount, Date Completed, Contact Person, Telephone number of the contact, Architect and/or Engineer's Name, Contract Number, Contact Email, and the Project Title and a brief scope description. Reference contacts may be used to verify project size, scope, dollar value, percentages and quality of performance.</p>						
1.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
2.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
3.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
Completed By:				Phone Number: Email: Date:		

State University of New York
Construction Agreement

Contract Number: _____

This Agreement (referred to alternately as "Agreement" or "Contract") made as of the _____ day of May, 2024, for Contract Number _____ by and between STATE UNIVERSITY OF NEW YORK, a corporation organized and existing under the laws of the State of New York, with its principal office located at State University Plaza, 353 Broadway, Albany, New York 12246, on behalf of State University of New York at Binghamton located at 4400 Vestal Parkway East, Binghamton, New York 13902 hereinafter referred to as "University" and _____ having its principal office located at _____, and a Federal ID or Social Security No. of {insert number}, hereinafter referred to as "the "Contractor."

WITNESSETH:

The parties hereto agree that the Contractor shall:

(a) furnish and perform all work of every kind required and all other things necessary to complete in the most substantial and workmanlike manner the construction of

C071086A
East Gym Addition – General Construction
At Binghamton

in strict accordance with the Contract Documents; and

(b) complete all work necessary for substantial completion by **within 365 days after the date of the Notice to Proceed** or within the time to which such completion may have been extended in accordance with the Contract Documents;

(c) in the event it fails to substantially complete all the work on time, pay to the University liquidated damages in accordance with the liquidated damages schedule listed on page one of the contractors proposal for each calendar day of delay of substantially completing all the work; and

(d) do everything required by the Contract; subject, however, to the terms, provisions and conditions listed hereinafter.

(e) The University shall pay and the Contractor shall accept as full and complete payment for the performance of this Agreement, subject to additions or deductions as provided herein, the total contract compensation of \$_____, (in figures), _____ (in words).

Article I
General Provisions

Section 1.01 Definitions

Where the following words and expressions are used in the Contract Documents it is understood that they have the meaning set forth as follows:

Allowance Any and all work and materials which may be required of the Contractor in performing work set forth under one or more allowances to this Agreement shall be Work, as defined herein, which shall be performed in accordance with the base schedule for the performance of the Contractor's Work. Contractor shall not be entitled to an extension of time for the performance of an allowance or all allowances.

Consultant The Architect or Engineer named in the Notice to Bidders or such other person or firm designated by the University to provide general administration of the Contract and inspection of the work.

Bidding Documents Notice to Bidders, Information for Bidders and Proposals

Bonds Performance Bond and Labor and Material Bond

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Delay	For purposes of this document and as used herein and in any other contract documents between the Contractor and the University the word "delay" shall be interpreted broadly and shall include by way of example only and not by way of limitation: delay, disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the University and/or Consultant, and lack of coordination, cumulative impact of multiple change orders, delay and other impacts.
Contract or Contract Documents	The Agreement, Exhibits A and A-1, Bidding Documents, Bonds, Specifications, Project Manual, Drawings Addenda issued prior to the opening of bids and Change Orders issued after award of the Contract.
University	State University of New York
Notice to Proceed	Written notice provided by the University to the Contractor stating the date on which the contractor can begin project work.
Project	The facility or facilities to be constructed including all usual, appropriate and necessary attendant work shown on, described in or mentioned in the Contract.
Site	The area within the Contract limit lines, as shown on the Drawings, and all other areas upon which the Contractor is to perform work.
Substantial Completion	Substantial Completion is the completion of Work so that the Project can be fully occupied and used for the purposes for which it is intended. Substantial Completion includes: (1) completion of all work required for the issuance of a code compliance certificate, or a temporary approval for occupancy, completed in a manner that includes no uncorrected deficiency or material violation of the Building Code of New York State within the area or work for which the certificate is to be issued; (2) completion of all building systems and functional testing of said systems (other than tests that cannot be performed due to the seasonal environmental conditions in effect at the time of completion); (3) acceptance and approval of the Operating Instructions and Manuals and Training of Campus Personnel; and (4) the sum of values determined for Punch List work at the time of Substantial Completion shall not exceed one (1) percent of the amount of the Contract consideration unless otherwise agreed to by the University.
Work	The using, performing, installing, furnishing and supplying of all materials, equipment, labor, services and incidentals necessary or proper for or incidental to the successful completion of the Project and the carrying out of all duties and obligations imposed upon the Contractor by the Contract.

Section 1.02 Captions

The titles or captions of Articles and Sections of the Contract are intended for convenience and reference purposes only and in no way define, limit or describe the scope or intent thereof or of the Contract or in any way affect the Contract.

Section 1.03 Nomenclature

Materials, equipment or other work described in words and abbreviations which have a well-known, technical or trade meaning shall be interpreted as having such meaning in connection with the Contract.

Section 1.04 Entire Agreement

The Contract constitutes the entire agreement between the parties hereto and no statement, promise, condition, understanding, inducement or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and the Contract shall not be changed, modified, or altered in any manner except by an instrument in writing executed by the parties hereto.

Section 1.05 Successors, Assigns and Agents

To the extent allowed by the terms of "Exhibit A", the Contract shall bind the successors, assigns and representatives of the parties hereto. The University reserves the right to have the State University Construction University Fund act as its agent at any time or duration of this Agreement. Such designation of the Fund to act on the behalf of the University shall be in writing and addressed to the Contractor.

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Section 1.06 Accuracy and Completeness of Contract Documents

- (1) The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. The intention of the Documents is to include all materials, plant, equipment, tools, skill and labor of every kind necessary for the proper execution of the work and also those things which may be reasonably inferable from the Contract Documents as being necessary to produce the intended results.

- (2) The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. The Contractor acknowledges that the Contract consideration includes sufficient money allowance to make its work complete and operational and in compliance with good practice and it agrees that inadvertent minor discrepancies or omissions or the failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another shall not be the cause for additional charges or claims. In case of a conflict between any part or parts of the Contract Documents with any other part or parts thereof, as contrasted to an omission or failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another part thereof, the following shall be given preference, in the order hereinafter set forth, to determine what work the Contractor is required to perform: (a) Exhibit A and A-1, (b) Addenda (later dates to take preference over earlier dates); (c) Amendments to Agreement; (d) Agreement; (e) Bidding Documents; (f) Specifications; (g) Schedules (i.e. finish schedules); (h) Large scale detail Drawings (detail drawings having a scale of 3/4" and over); (i) Large scale plan and section Drawings (plan and section drawings having a scale equal to or larger than that used for the basic floor or site plan, as the case may be); (j) Small scale detail Drawings (detail drawings having a scale of less than 3/4"); and (k) Small scale plan and section Drawings (plan and section drawings having a scale less than that used for the basic floor or site plan, as the case may be). In the event of such a conflict between or among parts of the Contract Documents that are entitled to equal preference, the more expensive way of doing the work, the better quality or greater quantity of material shall govern unless the University otherwise directs.

Section 1.07 Organization of Contract Documents

The Specifications and Drawings are generally divided into trade sections for the purpose of ready references, but such division is arbitrary and such sections shall not be construed as the prescription by the Consultant or the University of the limits of the work of any subcontractor or as a determination of the class of labor or trade necessary for the fabrication, erection, installation or finishing of the work required. The Contractor will be permitted to allot the work of subcontractors at its own discretion regardless of the grouping of the Specifications and Drawings. It shall be the Contractor's responsibility to settle definitively with each subcontractor the portions of the work which the latter will be required to do. The University and the Consultant assume no responsibility whatever for any jurisdiction claimed by any of the trades involved in the work.

Section 1.08 Furnishing of Contract Documents

The University shall establish the format for the Contract Documents (hard copy and/or electronic media) at the start of the Project. The Contractor shall be furnished, free of charge, with two (2) copies of the Specifications and Drawings in the selected format(s). Any other copies of the Specifications and Drawings which the Contractor may desire can be obtained at the Contractors expense.

Section 1.09 Examination of Contract Documents and Site

By executing the Contract, the Contractor agrees that it has carefully examined the Contract Documents together with the site of the proposed work as well as its surrounding territory; that it is fully informed regarding all the conditions affecting the work to be done and the labor and materials to be furnished for the completion of the Contract; and that its information has been acquired by personal investigation and research and not in the estimates and records of the University.

Section 1.10 Invalid Provisions

If any term or provision of the Contract Documents or the application thereof to any person, firm or corporation or circumstance shall, to any extent, be invalid or unenforceable, the remainder of the Contract Documents, or the application of such terms or provisions to persons, firms or corporations or circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby and each term or provision of the Contract Documents shall be valid and be enforced to the fullest extent permitted by law.

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Section 1.11 No Collusion or Fraud

The Contractor hereby agrees that the Contract was secured without collusion or fraud and that neither any officer nor any employee of the University has or shall have a financial interest in the performance of the Contract or in the supplies, work or business to which it relates, or in any portion of the profits thereof.

Section 1.12 Notices

- (1) All notices permitted or required hereunder shall be in writing and shall be transmitted either:
- a. via certified or registered United States mail, return receipt requested;
 - b. by personal delivery;
 - c. by expedited delivery service; or
 - d. by email if actually received by the University. Contractor bears the burden of proof of service by email and receipt of email by the University.

Such notices shall be addressed as follows or to such different addresses as the parties may from time to time designate:

Binghamton University
Name: Matthew Schofield
Title: Director of Procurement
Address: 4400 Vestal Parkway East
Binghamton, New York 13902
Telephone Number: (607) 777-4526
E-mail address: mschofie@binghamton.edu

Name:
Title:
Address:

Telephone Number:
E-mail Address:

- (2) Any such notice shall be deemed to have been given either at the time of personal delivery or actual receipt by the University, or in the case of email, upon receipt by the University.
- (3) The parties may, from time to time, specify any new or different address in the United States as their address for purpose of receiving notice under this Agreement by giving fifteen (15) days written notice to the other party sent in accordance herewith. The parties agree to mutually designate individuals as their respective representatives for the purposes of receiving notices under this Agreement. Additional individuals may be designated in writing by the parties for purposes of implementation and administration/billing, resolving issues and problems and/or for dispute resolution.

Section 1.13 Singular-Plural; Male-Female

As used in the Contract Documents, the singular of any word or designation, whenever necessary or appropriate, shall include the plural and vice versa, and the masculine gender shall include the female and neutral genders and vice versa.

Article II
Contract Administration and Conduct

Section 2.01 Consultant's Status

- (1) The Consultant, as the University's representative, shall provide general administration of the Contract and inspection of the work. The Consultant will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work, and it will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. The Consultant's duties, services and work shall in no way supersede or dilute the Contractor's obligation to perform the work in conformance with all Contract requirements, but it is empowered by the University to act on its behalf

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with respect to the proper execution of the work and to give instructions and/or direction when necessary to require such corrective measures as may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the University's interest.

- (2) The Consultant shall have the authority to stop the work or to require and/or direct the prompt execution thereof whenever such action may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the interests of the University.
- (3) Except as otherwise provided in the Contract, the Consultant shall determine the amount, quality, acceptability, fitness and progress of the work covered by the Contract and shall decide all questions of fact which may arise in relation to the interpretation of the plans and Specifications, the performance of the work and the fulfillment by the Contractor of the provisions of the Contract. The Consultant shall in the first instance be the interpreter of the provisions of the Contract and the judge of its performance and it shall use its power under the Contract to enforce its faithful performance.

Section 2.02 Finality of Decisions

- (1) Any decision or determination of the Consultant under the provisions of the Contract shall be final, conclusive and binding on the Contractor unless the Contractor shall, within ten (10) working days after such decision, make and deliver to the University a verified written statement of its contention that the decision of the Consultant is contrary to a provision of the Contract. The University shall thereupon determine the validity of the Contractor's contention. Pending decision by the University, the Contractor shall proceed in accordance with the Consultant's decision.
- (2) Wherever it is provided in the Contract Documents that an application must be made to the University and/or determination made by the University, the University's decision on such application and/or its determination under the Contract Documents shall be final, conclusive and binding upon the Contractor unless the Contractor, within ten (10) working days after receiving notice of the University's decision or determination, files a written statement with the University and the Consultant that it reserves its rights in connection with the matters covered by said decision or determination and after a court of competent jurisdiction determines the University's said decision or determination to be fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith in an action brought in accordance with Section 4.24.

Section 2.03 Claims and Disputes

- (1) If the Contractor claims (i) that any work it has been ordered to do is extra work or (ii) that it has performed or is going to perform extra work or (iii) that any action or omission of the University or the Consultant is contrary to the terms and provisions of the Contract, it shall:
 - a. Promptly comply with such order;
 - b. Notwithstanding the provisions of Section 1.12 of the Agreement and any other provisions of the Contract documents to the contrary, file with the University and the Consultant, within five (5) working days after being ordered to perform the work claimed by it to be extra work or within five (5) working days after commencing performance of the extra work, whichever date shall be the earlier, or within fifteen (15) working days after the said action or omission on the part of the University or the Consultant occurred, a written notice of the basis of its claim and request a determination thereof.
 - c. Notwithstanding the provisions of Section 1.12 of the Agreement and any other provisions of the Contract documents to the contrary, file with the University and the Consultant, within thirty (30) calendar days after said alleged extra work was required to be performed or said alleged extra work was commenced, whichever date shall be the earlier, or said alleged action or omission by the University or the Consultant occurred, a verified detailed statement, with documentary evidence, of the items and basis of its claim, including an initial and updated detailed Time Progress Schedule,
 - d. Produce for the University's examination, upon notice from the University, such information and documentation as directed by the University, which shall include but not be limited to job cost reports and all estimates and documentation used to develop the Bid Proposal, all its books of account, bills, invoices, payrolls, subcontracts, time books, progress records, daily reports, bank deposit books, bank statements, checkbooks and cancelled

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checks, showing all of its actions and transactions in connection with or relating to or arising by reason of its claim, and submit persons in its employment and in its subcontractors' employment for examination under oath by any person designated by the University to investigate any claims made against the University under the Contract, such examination to be made at the offices of the Contractor; and

- e. Proceed diligently, pending and subsequent to the determination of the University with respect to any such disputed matter, with the performance of the Contract and in accordance with all instructions of the University and the Consultant.
- (2) The Contractor's failure to comply with any or all parts of subdivision b, c and d of paragraph (1) of this Section shall be deemed to be: (i) a conclusive and binding determination on its part that said order, work, action or omission does not involve extra work and is not contrary to the terms and provisions of the Contract; and (ii) a waiver by the Contractor of all claims for additional compensation or damages as a result of said order, work, action or omission. The provisions of subdivision b, c and d of paragraph (1) of this Section are for the purpose of enabling the University to avoid waste of public funds by affording it promptly the opportunity to cancel or revise any order, change its plans, mitigate or remedy the effects or circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expenses or circumstances as they occur. Compliance with such provisions is essential whether or not the University is aware of the circumstances of any order or other circumstances which might constitute a basis for a claim and whether or not the University has indicated it will consider a claim in connection therewith.
 - (3) The Contractor's failure to submit and maintain a Time Progress Schedule in accordance with Section 3.02 of the Agreement shall be deemed to be a waiver by the Contractor of all claims for additional time, compensation or damages as a result of any condition which is an alleged cause of delay in the completion of the work. The Schedule of Record, regularly updated and submitted at required durations in accordance with the provisions of the General Requirements, Section paragraph titled "Project Schedule": (i) informs the University and affords it promptly of regular opportunities to change its plans or mitigate or remedy the effects or circumstances giving rise to a claim of delay in the completion of the work or take such other action as may seem desirable to verify any claimed circumstances as they occur; and (ii) forms a record which becomes the basis of the University's verification of an alleged cause of delay in the completion of the work.
 - (4) No person has power to waive or modify any of the foregoing provisions and, in any action against the University to recover any sum in excess of the sum certified by the University to be due under or by reason of the Contract, the Contractor must allege in its complaint and prove at the trial compliance with the provisions of this Section.
 - (5) Nothing in this Section shall in any way affect the University's right to obtain an examination before trial or a discovery and inspection in any action that might be instituted by or against the University or the Contractor.

Section 2.04 Omitted Work

The University reserves the right at any time during the progress of the work to delete, modify or change the work covered by the Contract, by a Change Order or Field Order thereto providing for either a reduction or omission of any portion of the work, without constituting grounds for any claim by the Contractor for allowances for damages or for loss of anticipated profits and in such event a deduction shall be made from the Contract consideration, the amount of which is to be determined in accordance with the provisions of Section 4.02 or 4.05A of the Agreement.

Section 2.05 Extra Work

- (1) The University reserves the right at any time during the progress of the work to add, modify or change the work covered by the Contract by Change Order or Field Order or as otherwise required by the University thereto providing for extra work of either a qualitative or quantitative nature and in such event the Contract consideration may be increased by an amount to be determined in accordance with the provisions of Sections 4.02 and 4.05A of the Agreement and the completion date for all or any part of the work may be extended for such period of time as may be determined by the University as necessary, because of the extra work, to complete the work or any part thereof.
- (2) Nothing in the Contract Documents shall excuse the Contractor from proceeding with the extra work as directed., The terms and conditions of the Contract Documents shall be fully applicable to all extra work.

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- (3) The Contractor shall have no claim for extra work or an extension of time if the performance of such work, in the judgment of the Consultant, is made necessary or desirable because of any act or omission of the Contractor which is not in accordance with the Contract.
- (4) Notwithstanding the provisions of Section 2.02 of the Agreement and any other provisions of the Contract Documents to the contrary, the University, after conferring with the Consultant, shall have the right to overrule a determination or decision of the Consultant, that relates to whether certain work is included in the Contract Documents or is extra work, which the University believes is incorrect; in the event the University exercises such right, that determination or decision shall be final, conclusive and binding upon the Contractor and the University unless the same shall be determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith.

Section 2.06 Contractor to Give Personal Attention

- (1) The Contractor shall give its constant personal attention to all the work while it is in progress and shall place the work in charge of a competent and reliable full-time superintendent acceptable to the Consultant and the University who shall have authority to act for the Contractor and who shall be accountable to the Consultant to the extent provided in the Contract. Unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in its employ, such superintendent shall not be changed without the written permission of the Consultant and the University.
- (2) When the Contractor and its superintendent are temporarily absent from the site of the work, the Contractor or its superintendent shall designate a responsible supervisory employee, approved by the Consultant and the University, to receive such orders as the Consultant or its representative may give. At no time shall any work be conducted on the site in the absence of an individual present who has been so designated by the Contractor or its superintendent as having authority to receive and execute instructions given by the Consultant or its representative.
- (3) If the superintendent, project manager or other supervisory employees are not satisfactory to the University, the Contractor shall, if directed by the University, immediately replace such supervisory employees with other supervisory employees acceptable to the Consultant and the University. Such replacement and all related impacts shall be at no additional cost to the University.

Section 2.07 Employment of Workers

The Contractor shall at all times employ competent and suitable workers and equipment which shall be sufficient to prosecute all the work to full completion in a disciplined orderly manner and in accordance with the Time Progress Schedule and the contractually required time of performance. All workers engaged in special or skilled work shall have had sufficient experience in such work to properly and satisfactorily perform the same. Should the Consultant deem any employee of the Contractor or any subcontractor incompetent, careless, insubordinate or otherwise objectionable or whose continued employment on the work is deemed by the Consultant to be contrary to the public interest, it shall so advise the Contractor and the latter shall dismiss or shall cause the subcontractor, if such employee is employed by the latter, to dismiss such employee and such employee shall not again be employed on the work to be performed under the Contract without obtaining the prior written approval of the Consultant.

Section 2.08 Detailed Drawings and Instructions

Upon timely notice from the Contractor that supplementary information is required, the Consultant shall furnish additional instructions, by means of Drawings or otherwise, necessary for the proper execution of the work. All such Drawings and instructions shall be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper Drawings and/or instructions.

Section 2.09 Contract Documents to Be Kept at Site

The Contractor shall keep at the site of the work a copy of the Drawings and Specifications and shall at all times give the Consultant and the University access thereto.

Section 2.10 Permits and Building Codes

The Contractor shall obtain from the proper authorities all permits legally required to carry on its work, pay any and all taxes and fees legally required and shall be responsible for conducting its operations in accordance with the provisions

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of such permits. Except as otherwise expressly provided in the Contract Documents, all of the work covered by this Agreement which is to be performed on property owned by the State University of New York is not subject to the building code of any city, county or other political subdivision of the State of New York. It is, however, subject to the provisions of the Building Code of New York State and the applicable Federal and State health and labor laws and regulations.

Section 2.11 Surveys

- (1) From the data shown on the Drawings and identified at the site by the Consultant, a licensed surveyor, to be designated and paid for by the University, shall establish one (1) fixed benchmark and one (1) fixed base line at the site. The Contractor shall work from the benchmarks and base lines shown on the Drawings, identified at the site by the Consultant and established at the site by the aforesaid surveyor and shall establish such supplementary bench marks and base lines that are required in order for it to lay out the work. The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the Specifications, shown on the Drawings, or as the same may be modified at the direction of the Consultant to meet changed conditions or as a result of modifications to the work covered by the Contract.
- (2) The Contractor shall furnish at its own expense such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the work. If, for any reason, monuments are disturbed, it shall be the responsibility of the Contractor to reestablish them, without cost to the University, as directed by the Consultant. The Consultant may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or the work in progress.
- (3) In all multiple-story construction, the Contractor shall establish and maintain line marks at each floor level and grade marks four (4) feet above the finished floor at each floor level.

Section 2.12 Site Conditions

- (1) The Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provision as it deems proper for all physical conditions and subsurface conditions as it could reasonably anticipate encountering from the provisions of the Contract Documents, borings, rock cores, topographical maps and such other information as the University or the Consultant made available to it prior to the University's receipt of bids or from its own inspection and examination of the site prior to the University's receipt of bids.
- (2) In the event that the Contractor encounters subsurface physical conditions or other latent physical conditions at the site differing substantially from those shown on or described or indicated in the Contract Documents and which could not have been reasonably anticipated from the aforesaid information made available by the University or the Consultant or from the Contractor's aforesaid inspection and examination of the site, it shall give immediate notice to the Consultant of such conditions before they are disturbed. The Consultant will thereupon promptly investigate the conditions and, if it finds that they do substantially differ from that which should have been reasonably anticipated by the Contractor, it shall make such changes in the Drawings and Specifications as may be necessary and a Change Order or Field Order may be issued, the amount of which shall be determined in accordance with the provisions of Sections 4.02 and 4.05A, to reflect any increase or decrease in the cost of, or the time required for, performance of the Contract as a result of any of the aforesaid changes made by the Consultant and/or as a result of such unanticipated subsurface conditions.

Section 2.13 Right to Change Location

When additional information regarding the subsurface conditions becomes available to the University as a result of the excavation work, further testing or otherwise, it may be found desirable to change the location, alignment, dimensions or grades to conform to such conditions. The University reserves the right to make such reasonable changes in the work as, in its opinion, may be considered necessary or desirable; such changes and any adjustments in the Contract consideration as a result thereof are to be made in accordance with the provisions of Sections 2.04, 2.05 4.02 and 4.05A of the Agreement.

Section 2.14 Unforeseen Difficulties

Except as otherwise expressly provided in Section 2.12 of the Agreement and in other Sections of the Contract Documents, the Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such

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provisions as it deems proper for any unforeseeable obstacles or difficulties which it may encounter in the performance of the work.

Section 2.15 Moving Materials and Equipment

Should it become necessary, in the judgment of the Consultant, at any time during the course of the work to move materials which are stored on the site and equipment which has been temporarily placed thereon, the Contractor upon request of the Consultant shall move them or cause them to be moved at its sole cost and expense; provided, however, if materials and equipment that have been stored or placed by the Contractor at a location on the site expressly approved, in writing, by the Consultant and the same are moved or caused to be moved by the Contractor at the Consultant's request, such removal shall be deemed extra work and the Contractor shall be compensated therefor in accordance with the provisions of Sections 4.02 and 4.05A of the Agreement.

Section 2.16 Other Contracts

- (1) Prior to and during the progress of the work hereunder the University reserves the right to let or permit the letting of other contracts relating to the Project or in connection with work on sites within the Contract limit lines or adjoining or adjacent to that on which the work covered by this Agreement is to be performed. In the event such other contracts are let, or have previously been let, the Contractor and such other contractors shall coordinate their work with each other, arrange the sequence of their work to conform with the progressive operation of all the work covered by such contracts and afford each other reasonable opportunities for the introduction and storage of their materials, supplies and equipment and the execution of their work. If the Contractor or such other contractors contend that their work or the progress thereof is being interfered with by the acts or omissions of the other or others or that there is a failure to coordinate or properly arrange the sequence of the work on the part of the Contractor or such other contractors, they shall, within five (5) working days of the commencement of such interference or failure of coordination or failure to perform work in proper sequence, give written notification to the University and the Consultant of such contention. Upon receipt of such notification or on its own initiative, the Consultant shall investigate the situation and issue such instructions to the Contractor or such other contractors with respect thereto as it may deem proper. The Consultant shall determine the rights of the Contractor and of such other contractors and the sequence of work necessary to expedite the completion of all work covered by this Agreement in relation to the work covered by said other contracts.
- (2) The Contractor agrees that it has and will make no claim for damages against the University by reason of any act or omission to act by any other contractor or in connection with the Consultant's or University's acts or omissions to act in connection with such other contractor, but the Contractor shall have a right to recover such damages from the other contractors.
- (3) If the proper and accurate performance of the work covered by the Contract depends upon the proper performance and execution of work not included herein or depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Consultant any defects in such work that render it unsuitable for proper execution and results. Its failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the work covered by the Contract, except as to latent defects which may be discovered thereafter.

Section 2.17 Inspection and Testing

- (1) All materials and workmanship shall be subject to inspection, examination and testing by the Consultant and the University at all times during the performance of the work and at all places where the work is carried on. Except as otherwise herein specified, the University shall pay for the cost of inspection, examination and testing by the Consultant or the University. If, however, the tests prove that the materials and/or work tested do not meet the requirements of the Contract, then the entire cost of such tests and any additional testing and or inspections required until the work is deemed compliant is to be borne by the Contractor. The Consultant will have the right to reject defective material and workmanship furnished by the Contractor or require its correction. The Contractor, without charge therefor, shall satisfactorily and promptly correct all rejected work and replace all rejected material with proper material.
- (2) The Contractor shall promptly segregate and remove from the site of the work all rejected material and work. If the Contractor shall fail to proceed at once with the replacing of rejected material and/or correction of defective workmanship, the University may, by contract or otherwise, replace such material and/or correct such

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workmanship, and charge the costs thereof to the Contractor or it may cancel the Contract and terminate the Contractor's employment as provided in the Agreement.

- (3) The Contractor, without additional charge, shall promptly furnish all reasonable facilities, labor materials and equipment with associated operators necessary for the safe and convenient access, inspection and testing that may be required by the Consultant or the University.
- (4) If the Contract Documents or the Consultant's instructions or the applicable laws, ordinances or regulations of any governmental authority require any part of the work covered by the Contract to be specially tested or inspected, the Contractor shall give the Consultant timely notice of its readiness for such testing or inspection or, if the same is to be performed by a governmental authority, of the date fixed therefor. If any such work, without the written permission of the Consultant, should be covered up prior to such testing or inspection, the Contractor, at its sole cost and expense must, if directed by the Consultant, uncover the same for testing or inspection and reconstruct same after the tests or inspection are conducted. All certificates of inspection or testing, involving the Contractor's work, required to be obtained from governmental authorities are to be secured by the Contractor at its sole cost and expense.
- (5) Should it be considered necessary or advisable by the Consultant at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out same, the Contractor, upon request, shall furnish all necessary facilities, labor and material to perform such examination. If the work subject to such examination is found to be defective or nonconforming in any manner due to the fault of the Contractor or any of its subcontractors, such uncovering or destruction and necessary reconstruction, even though such includes work not covered in the Contract, shall be at the expense of the Contractor. If, however, such work after testing and examination is found to be satisfactory, the University will pay the Contractor the cost of such uncovering or destruction and reconstruction, such cost to be determined as in the case of extra work as provided in Sections 4.02 and 4.05A.
- (6) Inspection of material and furnished articles to be incorporated in the work may be made at the place of production, manufacture or shipment unless otherwise stated herein. The inspection of material and workmanship for final acceptance as a whole or in part will be made at the site of the work.

Section 2.18 Subcontractors

- (1) Except for subcontractors designated by the University, or required to be named at any earlier date, pursuant to the provisions of the Information for Bidders, within thirty (30) calendar days after receipt of the notice to proceed, the Contractor must submit a written statement to the Consultant giving the name and address of all proposed subcontractors. Said statement must contain a description of the portion of the work and materials which the proposed subcontractors are to perform and furnish and any other information tending to prove that the proposed subcontractors have the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and provisions of the Contract Documents.
- (2) If the Consultant finds that the proposed subcontractors are qualified, it will so notify the Contractor within ten (10) working days after receipt of the aforesaid information. If the determination is to the contrary, however, the Consultant within such period will notify the Contractor of such determination and the latter, unless it decides to do such work itself and is qualified, in the Consultant's opinion, to do such work, must, within ten (10) working days thereafter, submit similar information with respect to other proposed subcontractors.
- (3) The Consultant's approval of a subcontractor and/or the University's designation of a subcontractor pursuant to the provisions of the Contract Documents shall not relieve the Contractor of any of its responsibilities, duties and liabilities hereunder. The Contractor shall be solely responsible to the University for the acts or defaults of such subcontractors and of such subcontractors' officers, agents and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the Contractor to the extent of its subcontract.
- (4) The Contractor shall be fully responsible for the administration, integration, coordination, direction and supervision of all of its subcontractors and of all work and it shall check all space requirements of the work and coordinate and adjust the same so that conflicts in space do not occur in the work being performed by it with its own employees and with the work being performed by its subcontractors and so that all equipment, piping, wiring, etc., can be installed, where possible, in the spaces allowed for same.

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- (5) No subcontractor shall be permitted to work at the site until: (a) it has furnished satisfactory evidence to the Consultant of the insurance required by law; (b) in the case of a Project involving a federal grant, it has furnished satisfactory evidence to the Consultant of the same type and amount of liability insurance as that required of the Contractor by Section 5.06 of the Agreement; and (c) except for subcontractors designated by the University pursuant to the provisions of the Information for Bidders, it has been approved by the Consultant.
- (6) Within ten (10) working days after the Contractor receives payment from the University on account of a progress payment application for the percentage of the work done, it shall pay each of its subcontractors the sum contained in said payment for the percentage of said subcontractor's work, less the same amount retained therefrom by the University under the terms of the Contract Documents or in consequence of any legal proceedings or statutory liens, and less any amounts due the Contractor under the subcontract for work not performed or not properly or timely performed by the subcontractor. In the event any subcontractor is not paid by the Contractor, the former should immediately notify the University of such fact.
- (7) The Contractor shall execute with each of its subcontractors and shall require all subcontractors to execute with their sub-subcontractors a written agreement which shall bind the latter to the terms and provisions of this Agreement insofar as such terms and provisions are applicable to the work to be performed by such subcontractors. The Contractor shall require all subcontractors and sub-subcontractors to promptly, upon request, file with the Consultant and the University a conformed copy of such agreements, from which the price and terms of payment may be deleted.
- (8) If for sufficient reason, at any time during the progress of the work to be performed hereunder, the Consultant determines that any subcontractor or sub-subcontractor is incompetent, careless, or uncooperative, the Consultant will notify the Contractor accordingly and immediate steps will be taken by the Contractor for cancellation of such subcontract or sub-subcontract. Such termination, however, shall not give rise to any claim by the Contractor or by such subcontractor or sub-subcontractor for loss of prospective profits on work unperformed and/or work unfurnished and a provision to that effect shall be contained in all subcontracts and sub-subcontracts.
- (9) No provisions of this Agreement shall create or be construed as creating any contractual relation between the University and any subcontractor or sub-subcontractor or with any person, firm or corporation employed by, contracted with or whose services are utilized by the Contractor.

Section 2.19 Shop Drawings and Samples

- (1) The Contractor in accordance with the approved Shop Drawing, Submittal, Mockup, and Sample schedules and with such promptness and in such sequence as to cause no delay in the work, shall submit for the Consultant's approval all Shop Drawings and Samples called for under the Contract or requested by the Consultant.
- (2) Shop Drawings and mock-ups shall establish the actual detail of the work, indicate proper relation to adjoining work, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings include drawings, diagrams, schedules, product data and other information or materials specially prepared for the work by the Contractor to illustrate some portion of the work. Product data include standard illustrations, schedules, performance charts, instructions, brochures, diagrams and other information identified by the Contractor to illustrate materials or equipment for some portion of the work.
- (3) All Shop Drawings, mock-ups and samples shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Consultant for approval and all Shop Drawings shall bear the Contractor's recommendation for approval. Any Shop Drawings submitted without this stamp of approval and certification, and Shop Drawings which, in the Consultant's opinion, are incomplete, contain numerous errors or have not been checked or only checked superficially, will be returned unchecked by the Consultant for resubmission by the Contractor. In checking Shop Drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the Shop Drawings of any section or trade with the requirements of all other sections or trades whose work is related thereto, as required for proper and complete installation and sequence of the work.

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- (4) Samples must be of sufficient size or number to show the quality, type, range of color, finish and texture of the material. Each Sample shall be properly labeled to show the nature of the material, trade name of manufacturer, name and location of the work where the material represented by the Sample is to be used and the name of the Contractor submitting the Sample. Transportation charges to the Consultant must be prepaid on Samples forwarded to it.
- (5) At the start of the Project, the format for submittals shall be established by the University. If an electronic method is selected for the submission and approval of submittals, the Contractor shall provide submittals in a PDF format and the Consultant will return the submittals in electronic format to the Contractor. For both hard-copy and electronic submittal formats, all submittals that require physical samples or mock-ups shall be provided in accordance with the requirements set forth in the Contract Specifications. Shop Drawings and Samples, submitted by the Contractor in accordance with the approved Shop Drawing and Sample schedule that is included in the Time Progress Schedule, will be reviewed by the Consultant within fifteen (15) working days and if satisfactory will be approved. A Shop Drawing, when approved, will be returned to the Contractor. If not satisfactory, the Drawings and Samples will be appropriately marked and returned to the Contractor for correction thereof, in which event the Contractor shall resubmit to the Consultant a corrected copy of the Shop Drawing or a new Sample, as the case may be. The Contractor shall make any correction required by the Consultant and shall appropriately note any changes or revisions on the Shop Drawing, dated to correspond with the date of the Consultant's request for the change. Upon approval of the Shop Drawing by the Consultant, the Contractor shall promptly furnish to the Consultant as many copies thereof as the Consultant may reasonably request. Should more than two (2) separate reviews of any required shop drawings or samples submitted be necessary, in the judgement of the Consultant and the University, the Contractor shall be responsible for the reasonable costs incurred by the University for such additional reviews by the Consultant.
- (6) At the time of submission of a Shop Drawing or Sample, the Contractor shall inform the Consultant and the University in writing of any deviation in the Shop Drawing or Sample from the requirements of the Contract Documents. Unless such deviation is specifically noted by the Contractor with a notation that such deviation will result in extra work for which the Contractor requests payment, the Contractor shall be deemed to have waived any claim for extra work, additional compensation or payment or an extension of time with respect to all work shown on, described in or related to the Shop Drawing or Sample.
- (7) The Consultant's approval of Shop Drawings or Samples is for design only and is not a complete check on the method of assembly, erection or construction. Approval shall in no way be construed as: (a) permitting any departure whatsoever from the Contract Documents, except where the Contractor, in accordance with the provisions of paragraph 6 of this Section, has previously notified the University and the Consultant of such departure; (b) relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, omissions or otherwise that may exist; (c) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing or deficiencies in strength; (d) relieving the Contractor of full responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors; or (e) permitting departure from additional details or instructions previously furnished by the Consultant.
- (8) No work requiring a Shop Drawing or Sample shall be commenced until a Shop Drawing or Sample is approved by the Consultant and all such work shall be: (a) in accordance with the approved Shop Drawing, provided the latter conforms in all respects to the Contract Documents or to such deviations therefrom as have been previously noted by the Contractor in accordance with the provisions of paragraph 6 of this Section; and (b) in conformance in all respects to the sample furnished to and approved by the Consultant and, unless otherwise specified, as new and of good quality.
- (9) The Contractor may be required to provide professional services that constitute the practice of architecture or engineering when specifically required by the Contract Documents for a portion of the work or the Contractor needs to provide such services in order to carry out its responsibilities for construction means, methods, techniques, sequences and procedures. When professional services are required in the Contract Documents, the Consultant will specify all performance and design criteria that such services must satisfy. The University and Consultant shall be entitled to rely on the adequacy, accuracy and completeness of the professional services, certifications, and approvals performed or provided by design professionals working for the Contractor.

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- (10) Contractor agrees that the University may deduct from any application for payment made by the Contractor, any and all Design Professional, Consultant and/or Construction Management fees and costs incurred by the University together with a markup upon such hard costs in the amount of 15% in the review or evaluation of any substitutions for methods, products or performance pursuant to this Section 2.19.

Section 2.20 Equivalentents - Approved Equal

(1) Equivalentents or Approvals - General

- a. The words "similar and equal to", or equal", "equivalent" and such other words of similar content and meaning shall for the purposes of this Agreement be deemed to mean similar and equivalent to one of the named products. For the purposes of subdivisions (1) and (2) of this Section and for the purposes of the Bidding Documents, the word "products" shall be deemed to include the words "articles", "materials", "items", "equipment" and "methods". Whenever in the Contract Documents one or more products are specified, the words "similar and equal to" shall be deemed inserted.
- b. Whenever any product is specified in the Contract Documents by a reference to the name, trade name, make or catalog number of any manufacturer or supplier, the intent is not to limit competition, but to establish a standard of quality which the Consultant has determined is necessary for the Project. A Contractor may at its option use any product other than that specified in the Contract Documents provided the same is approved by the Consultant in accordance with the procedures set forth in subdivision (2) of this Section. In all cases the Consultant shall be the sole judge as to whether a proposed product is to be approved and the Contractor shall have the burden of proving, at its own cost and expense, to the satisfaction of the Consultant, that the proposed product is similar and equal to the named product. In making such determination the Consultant may establish such objective and appearance criteria as it may deem proper that the proposed product must meet in order for it to be approved.
- c. Nothing in the Contract Documents shall be construed as representing, expressly or implied, that the named product is available or that there is or there is not a product similar and equal to any of the named products and the Contractor shall have and make no claim by reason of the availability or lack of availability of the named product or of a product similar and equal to any named product.
- d. The Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Consultant in considering a product proposed by the Contractor or by reason of the failure of the Consultant to approve a product proposed by the Contractor.
- e. Requests for approval of proposed equivalentents will be received by the Consultant only from the Contractor.
- f. Approval shall in no way be construed as: (a) permitting any departure whatsoever from the Contract Documents, (b) relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, sequence of work, omissions or otherwise that may exist, (c) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing or deficiencies in strength, (d) relieving the Contractor of full responsibility for satisfactory performance of all work to achieve a functionally complete facility or result and coordination with the work of all subcontractors and other contractors or (e) permitting departure from additional details or instructions previously furnished by the Consultant.
- g. Contractor agrees that the Contractor approves and authorizes the deduction from Contractor's applications for payment any and all costs incurred by the Construction Manager, Consultant, Design Professional or otherwise in evaluating Contractor's submissions under this Section 2.20, together with a markup upon such hard costs in the amount of 15%.

(2) Equivalentents or Approvals After Bidding

- a. Any and all submissions for "or equal" products which are submitted by the Contractor after award of the Contract must be made by the Contractor within ninety (90) calendar days after the date of award. Contractor agrees that it waives and relinquishes the right, claim or privilege, if any, to submit "or equal" proposals if such are made ninety (90) calendar days after the date of award of the Contract to the Contractor.
- b. Requests for approval of proposed equivalentents will be considered by the Consultant after bidding only in the

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following cases: (a) the named product cannot be obtained by the Contractor because of strikes, lockouts, bankruptcies or discontinuance of manufacture and the Contractor makes a written request to the Consultant for consideration of the proposed equivalent within ten (10) calendar days of the date it ascertains it cannot obtain the named product; or (b) the proposed equivalent is superior, in the opinion of the Consultant, to the named product; or (c) the proposed equivalent, in the opinion of the Consultant, is equal to the named product and its use is to the advantage of the University, e.g., the University receives an equitable credit, acceptable to it, as a result of the estimated cost savings to the Contractor from the use of the proposed equivalent or the University determines that the Contractor has not failed to act diligently in placing the necessary purchase orders and a savings in the time required for the completion of the construction of the Project should result from the use of the proposed equivalent.

- c. Where the Consultant pursuant to the provisions of this subdivision approves a product proposed by a Contractor and such proposed product requires a revision or redesign of any part of the work covered by this Agreement, all such revision and redesign and all new Drawings and details required therefor shall be subject to the approval of the Consultant and shall be provided by the Contractor at its own cost and expense.

Where the Consultant pursuant to the provisions of this Section approves a product proposed by a Contractor and such proposed product requires a different quantity and/or arrangement of duct work, piping, wiring, conduit or any other part of the work from that specified, detailed or indicated in the Contract Documents, the Contractor shall provide the same at its own cost and expense.

- (3) Contractor agrees that the University may deduct from any application for payment made by the Contractor any and all Design Professional, Consultant and/or Construction Management fees and costs incurred by the University, together with a markup upon such hard costs in the amount of 15%, in the consideration or evaluation of any substitutions for methods, products or performance pursuant to this Section 2.20.

Section 2.21 Patents, Trademarks and Copyrights

The Contractor acknowledges that the Contract consideration includes all royalties, license fees and costs arising from patents or trademarks in any way involved in the work; provided, however, that the Contract consideration shall not be deemed to have included therein any royalty, license fee or cost arising from a patent or trademark for a design prepared by the Consultant and neither the Contractor nor the University shall have any liability in connection therewith. Where the Contractor is required or desires to use any product, device, material or process covered by patent or trademark, the Contractor shall indemnify and save harmless the University and the State of New York from any and all claims, actions, causes of action or demands, for infringement by reason of the use of such patented product, device, material or process, and shall indemnify the University and the State of New York from any cost, liability, damage and expense, including reasonable attorneys' fees and court costs, which it may be obligated to incur or pay by reason of any claim or infringement at any time both before or after the University's final acceptance of all the work to be performed under the Contract.

Section 2.22 Possession Prior to Completion

If before the final completion of all the work it shall be deemed advisable or necessary by the University to take over, use, occupy or operate any part of the completed or partly completed work or to place or install therein equipment and furnishings, the University, upon reasonable written notice to the Contractor, shall have the right to do so and the Contractor will not in any way interfere therewith or object to the same. Such action by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract Documents and the Contractor acknowledges that such action by the University does not in any way evidence the completion of the work or any part thereof or in any way signify the University's acceptance of the work or any part thereof. The Contractor agrees to continue the performance of all work covered by the Contract in a manner which will not unreasonably interfere with such takeover, use, occupancy, operation, placement or installation.

Section 2.23 Completion and Acceptance

(1) Partial Completion

If before the final completion of all the work any portion of the permanent construction has been satisfactorily completed and the same will be immediately useful to the University, the latter may, by written notice, advise the Contractor that it accepts such portion of the work. Such action by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any work not so completed and accepted. The partial completion of any portion of the Contractor's work by the University, the

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Campus or the Consultant, shall not impact the assessment of liquidated damages or actual costs for delays or disruption to the Project caused by the Contractor, its subcontractors or vendors.

- (2) Substantial Completion
When all the Work covered by the Contract is substantially completed, as defined in Section 1.01, the Contractor shall give written notice thereof to the University and the Consultant. The latter will then promptly make an inspection of the work and, if they shall determine that all the work is substantially completed, they shall so advise the Contractor. Such action shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any uncompleted (including untested or deferred work), unaccepted or corrective work or in any way affect, limit or preclude the issuance by the Consultant, from time to time thereafter, of "Punch Lists", i.e., lists of uncompleted or corrective work which the Contractor is to promptly complete and/or correct. In the judgement of the University, should more than two (2) separate inspections of the Work be necessary, the Contractor agrees that the University may deduct from any application for payment made by the Contractor, any and all Design Professional, Consultant and/or Construction Management fees and costs incurred by the University together with a markup upon such hard costs in the amount of 15% for all such additional inspections.

The Contractor must fully, completely and acceptably perform all Punch List work and any other work subsequently discovered remaining to be completed or corrected, within ninety (90) calendar days of Substantial Completion or within such other timeframe stipulated by the University or Consultant. Failure to complete the Punch List within the time so designated hereunder may be deemed default on the part of the Contractor.

- (3) Final Completion and Acceptance
After the completion of all the work the Contractor shall give written notice to the University and the Consultant that all the work is ready for inspection and final acceptance. The University and the Consultant shall promptly make such inspection and, if they shall determine that all the work has been satisfactorily completed, the University shall thereupon by written notice advise the Contractor that it accepts such work. In the judgement of the University, should more than two (2) separate inspections of the Work be necessary, the Contractor agrees that the University may deduct from any application for payment made by the Contractor, any and all Design Professional, Consultant and/or Construction Management fees and costs incurred by the University together with a markup upon such hard costs in the amount of 15% for all such additional inspections.

Section 2.24 Record Drawings

- (1) At the start of the Project, the format for Record Drawings shall be established by the University. Prior to acceptance by the University of all work covered by the Contract, the Contractor shall furnish to the Consultant one (1) set of current Contract Drawings on which the Contractor has recorded, using colored pencil for hard copy format or electronic editing tool in contrasting color for electronic format, in a neat and workmanlike manner, all instances where actual field construction differs from work as indicated on the Contract Drawings. These "Record". Drawings shall show the following information: (a) all significant changes in plans, sections, elevations and details, such as shifts in location of walls, doors, windows, stairs and the like made during construction; (b) all significant changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorages and "knock-out" panels made during construction; (c) final location of electric panels, final arrangement of electric circuits and any significant changes made in electrical design as a result of Change Orders, Field Orders or job conditions; (d) final location and arrangement of all mechanical equipment and major concealed plumbing, including, but not limited to, supply and circulating mains, vent stacks, sanitary and storm water drainage; (e) final location and arrangement of all underground utilities, connections to building and/or rerouting of existing utilities, including, but not limited to, sanitary, storm, heating, electric, signal, gas, water and telephone; and (f) final make and model for all significant equipment and devices listed in the specifications. The Contractor shall also provide an electronic version as determined by the Consultant.
- (2) Periodically during the work, the Consultant may request submission of a progress set of Record Drawings for review and advise the Contractor of errors or omissions, if any, that must be corrected or completed prior to final submission of the Record Drawings. Shop Drawings shall not be acceptable as Record Drawings.
- (3) The Contractor shall submit the Record Drawings to the Consultant at least fifteen (15) days prior to the date of Substantial Completion. The Consultant will then review the Record Drawings and, if they shall determine that the Record Drawings represent the actual field construction being completed, they shall so advise the

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Contractor. If not satisfactory, the Record Drawings will be appropriately marked and returned to the Contractor for correction thereof, in which event the Contractor shall promptly correct and resubmit to the Consultant a corrected copy of the Record Drawings. Acceptance of the Record Drawings by the University is a condition precedent to the Contractor's entitlement to receive Final Payment.

Section 2.25 Guarantees

- (1) The Contractor, at the convenience of the University, shall remove, replace and/or repair at its own cost and expense any defects in workmanship, materials, ratings, capacities or characteristics occurring in or to the work covered by the Contract within one (1) year or within such longer period as may otherwise be provided in the Contract, the period of such guarantee to commence with the University's final acceptance of all work covered under the Contract or at such other date or dates as the University may specify prior to that time, and the Contractor, upon demand, shall pay for all damage to all other work resulting from such defects and all expenses necessary to remove, replace and/or repair such other work which may be damaged in removing, replacing or repairing the said defects. The obligations of the Contractor under the provisions of this paragraph or any other guarantee provisions of the Contract Documents are not limited to the monies retained by the University under the Contract.
- (2) Unless such removal, replacement and/or repair shall be performed by the Contractor within ten (10) working days after it receives written notice from the University specifying such defect, or if such defect is of such a nature that it cannot be completely removed, repaired and/or replaced within said ten (10) day period and the Contractor shall not have diligently commenced removing, repairing and/or replacing such defect within said ten (10) day period and shall not thereafter with reasonable diligence and in good faith proceed to do such work, the University may employ such other person, firm or corporation as it may choose to perform such removal, replacement and/or repair and the Contractor agrees, upon demand, to pay to the University all amounts which it expends for such work.

Section 2.26 Default of Contractor

- (1) In addition to those instances specifically referred to in other Sections hereof, the University shall have the right to declare the Contractor in default of the whole or any part of the work if:
 - a. The Contractor becomes insolvent; or if
 - b. The Contractor makes an assignment for the benefit of creditors pursuant to the statutes of the State of New York; or if
 - c. A voluntary or involuntary petition in bankruptcy is filed by or against the Contractor; or if
 - d. A receiver or receivers are appointed to take charge of the Contractor's property or affairs; or if
 - e. The Contractor fails to commence work when notified to do so by the Consultant; or if
 - f. The Contractor shall abandon the work; or if
 - g. The Contractor shall refuse to proceed with the work or extra work when and as directed by the Consultant or the University; or if
 - h. The Contractor shall without just cause reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the University, to complete the work in accordance with the approved time progress schedule, and shall fail or refuse to sufficiently increase such working force when ordered to do so by the Consultant; or if
 - i. The Contractor shall sublet, assign, transfer convey, or otherwise dispose of the Contract other than as herein specified; or if
 - j. The University shall be of the opinion that the Contractor 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; or if

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- k. The University shall be of the opinion that the work cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the University's opinion, attributable to conditions within the Contractor's control; or if
 - l. The work is not completed within the time herein provided therefor or within the time to which the Contractor may be entitled to have such completion extended; or if
 - m. The University shall be of the opinion that the Contractor is or has been willfully or in bad faith violating any of the provisions of this Agreement;
 - n. The University shall be of the opinion that the Contractor is not or has not been executing the Contract in good faith and in accordance with its terms; or if
 - o. At any time during the period of the Agreement, insurance as required is not in effect or proof thereof is not provided to the University.
- (2) Before the University shall exercise its right to declare the Contractor in default by reason of the conditions set forth in the above items *a, b, c, d, e, f, g, h, i, j, k, l, m, n* and *o*, it shall give the Contractor three (3) working days' notice of its intention to declare the Contractor in default and unless, within such three (3) day period, the Contractor shall make arrangements, satisfactory to the University, to correct and/or eliminate the conditions set forth in the University's aforesaid notice, the Contractor may be declared in default at the expiration of such three (3) day period or at the expiration of such longer period of time as the University may determine.
- (3) The right to declare in default for any of the grounds specified or referred to shall be exercised by the University sending the Contractor a written notice setting forth the ground or grounds upon which such default is declared. Upon receipt of notice that it has been declared in default, the Contractor shall immediately discontinue all further operations under the Contract and shall immediately quit the site, leaving untouched all plant, materials, equipment, tools and supplies then on site.
- (4) The University, after declaring the Contractor in default, may then have the work completed by such means and in such manner, by contract, with or without public letting, or otherwise, as it may deem advisable, 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 it may call upon the Contractor's surety at its own expense to do so.
- (5) In the event that the University declared the Contractor in default of the work or any part of the work, the Contractor, in addition to any other liability to the University hereunder or otherwise provided for or allowed by law, shall be liable to the University for any costs it incurs for additional architectural and engineering services necessary, in its opinion, because of the default and the total amount of liquidated damages 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 expenses incurred by the University 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.
- (6) If the University completes the work, the Consultant shall issue a certificate stating the expenses incurred in such completion, including the cost of re-letting. Such certificate 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.
- (7) The expense of such completion, as so certified by the Consultant, shall be charged against and deducted out of such monies as would have been payable to the Contractor if it had completed the work; the balance of such monies, if any, subject to the other provisions of the Contract, to be paid to the Contractor without interest after such completion. Should the expense of such completion, so certified by the Consultant, exceed the total sum which would have been payable under the Contract if the same had been completed by the Contractor, any such excess shall be paid by the Contractor to the University upon demand.

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- (8) In the event the University shall determine to complete the work without calling upon the Contractor's surety to do so, the Contractor shall not be entitled, from and after the effective date of the declaration of the default, to receive any further payment under the Contract until the said work shall be wholly completed and accepted by the University.
- (9) In case the University shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractors or persons whom the University may engage to complete the work as to which the Contractor was declared in default.
- (10) The provisions relating to declaring the Contractor in default as to the entire work shall be equally applicable to a declaration of partial default, except that the University shall be entitled to utilize for completion of the part of the work as to which the Contractor was declared in default only such plant, materials, equipment, tools and supplies as had been previously used by the Contractor on such part.
- (11) In completing the whole or any part of the work, the Consultant and the University shall have the power to depart from, change or vary the terms and provisions of the Contract; provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variations, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the Consultant's certificate of the cost of completion, nor shall it constitute a defense to any action to recover the amount by which such certificate exceeds the amount which would have been payable to the Contractor hereunder but for its default.
- (12) The provisions of this Section shall be in addition to any and all other legal or equitable remedies provided by this Agreement and otherwise applicable by law.

Section 2.27 Termination for Convenience

- (1) The performance of work under this Agreement may be terminated by the University, in whole or in part, whenever the University shall determine that such termination is in the best interest of the University. Any such termination shall be effected by a notice in writing to the Contractor specifying the date upon which such termination shall become effective and the extent to which performance of the Contract shall be terminated. Such termination shall be effective on the date and to the extent specified in said notice.
- (2) Upon receipt of a notice of termination, and-except as otherwise directed in writing by the University, the Contractor shall:
- a. Discontinue all work and the placing of all orders for materials and facilities otherwise required for the performance thereof,
 - b. Cancel all existing orders and subcontracts to the extent such orders and subcontracts relate to the performance of work terminated by the notice of termination;
 - c. Take such action as may be necessary to secure to the University the benefits of any rights of the Contractor under orders or subcontracts which relate to the performance of work terminated by the notice of termination, including, but not limited to, the assignment to the University, in the manner and to the extent directed by the University, all the right, title and interest of the Contractor under the orders or subcontracts so terminated and cancelled. In the event of such assignment, the University shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination and cancellation of such orders and subcontracts;
 - d. Transfer title and deliver to the University, in accordance with the direction of the University, all materials, supplies, work in process, facilities, equipment, machines or tools produced as a part of or acquired by the Contractor in connection with the work terminated by said notice, and all plans, Drawings, Working Drawings, sketches, Specifications and information for use in connection therewith; provided, however, that the Contractor may retain any of the foregoing if it so elects and foregoes reimbursement therefor;
 - e. Take such action as may be necessary or as the Consultant or the University may prescribe for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.

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- (3) Notwithstanding the foregoing, should the notice of termination relate to only a portion of the work covered by the Contract, the Contractor will proceed with the completion of such portions of the work as are not terminated.
- (4) The University will pay and the Contractor shall accept, in full consideration for the performance and completion of the portions of the work as are not terminated, a sum calculated by determining the percentage the portions of the work not terminated bear to the total amount of the work covered by the Contract, and by multiplying the Contract consideration by such percentage - the product thereof being the amount to be paid to the Contractor. The University shall determine the amount of such consideration in accordance with the foregoing.
- (5) Upon compliance by the Contractor with the foregoing provisions of this Section and subject to deductions for payments previously made, the University, for the portions of the work terminated, shall compensate the Contractor as follows:
 - a. By reimbursing the Contractor for actual expenditures made with respect to such work, including expenditures made in connection with any portion thereof which may have been completed prior to termination, as well as expenditures made after termination in completing those portions of the work covered by the Contract which the Contractor may have been required by the notice of termination to complete. The University shall determine the allowability and amount of such expenditures.
 - b. By reimbursing the Contractor for all actual expenditures made, with the prior written approval of the University or pursuant to a court judgment, in settling or discharging any outstanding contractual obligations or commitments incurred or entered into by the Contractor in good faith with respect to the Contract and resulting from the termination thereof.
 - c. By reimbursing the Contractor for all actual expenditures made after the effective date of the notice of termination resulting from or caused by the Contractor taking necessary action or action prescribed by the Consultant or the University for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.
 - d. By paying the Contractor a markup, which is to be calculated in the same manner as that provided for in subdivision c of paragraph (1) of Sections 4.02 and 4.05A for extra work, on the foregoing expenditures, which markup is to cover the Contractor's overhead and profit; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, said markup shall be reduced by one-third.
- (6) The sum of all amounts payable under this Section, plus the sum of all amounts previously paid by the University under the provisions of the Contract, shall not exceed the amount of the Contract consideration. In no event shall the Contractor be entitled to any payment for loss of anticipated profits on uncompleted work and the University shall not be liable for same.
- (7) Termination by the University under the provisions of this Section shall be without prejudice to any claims or rights which the University may have against the Contractor. The University may retain from the amount due to the Contractor under the provisions of this Section such monies as may be necessary to satisfy any claim which the University may have against the Contractor in connection with the Contract; provided, however, that the University's failure to retain such monies shall not be deemed a waiver of any of its rights or claims against the Contractor.
- (8) Notwithstanding the foregoing, where the Contractor and the Consultant can agree upon another method of determining the amount of the consideration to be paid to the Contractor under the provisions of this Section, such method, subject to the approval of the University, may, at the option of the University, be substituted for the method set forth above.

Article III
Time of Performance

Section 3.01 Commencement, Prosecution and Completion of Work

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- (1) The Contractor agrees that it will begin the work herein embraced upon receipt of notice to proceed, unless the University consents in writing, to begin at a different date, and that it will prosecute the same with such diligence that all work covered by the Contract shall be substantially completed and performed on or before the time specified on page one of the Agreement.
- (2) The Contractor further agrees that time is of the essence in this Agreement and that all the work shall be prosecuted in such manner and with sufficient plant and forces to complete all work timely.

Section 3.02 Time Progress Schedule

- (1) To show compliance with the requirements of Section 3.01 of the Agreement, provide and maintain a Time Progress Schedule in accordance with the General Requirements, Special Conditions, Section paragraph titled "Project Schedule". Unless otherwise accepted by the University, the Time Progress Schedule shall be strictly adhered to by the Contractor. The time for substantial completion shall be on or before the time specified on page one of the Agreement.
- (2) If through the fault of the Contractor or any subcontractor the Contractor shall fail to adhere to the time progress schedule, it must promptly adopt such other and additional means and methods of construction as will make up for the time lost and will assure completion in accordance with such schedule.
- (3) The failure of the Contractor to submit a Time Progress Schedule, the University's or the Consultant's acceptance of the Contractor's time progress schedule or lack of such acceptance, the means and/or methods of construction employed by the Contractor, including any revisions thereof, and/or its failure to revise the same shall not relieve the Contractor of its obligation to accomplish the result required by the Contract in the time specified on page one of the Agreement, nor shall the exercise of the Consultant's or the University's right to reject any portion of the work, create or give rise to any claim, action or cause of action, legal, equitable or otherwise, against the Consultant or the University.
- 4) The failure of the Contractor to submit and maintain a Time Progress Schedule in accordance with the General Requirements shall be deemed to be a waiver by the Contractor of all claims for additional compensation or damages as a result of any condition which is an alleged cause of delay in the completion of the work.

Section 3.03 Time Progress Schedule for Shop Drawings and Samples

The Contractor shall include activities for preparation and submission of all Shop Drawings, mock-ups and Samples in the Time Progress Schedule in Section 3.02.

Section 3.04 Notice of Conditions Causing Delay

- (1) Within ten (10) working days after the commencement of any condition which is causing or may cause delay in completion or require Contractor to request an extension of time, the Contractor must notify the Consultant and the University in writing of the effect, if any, of such condition upon the Time Progress Schedule, and must state why and in what respects, if any, the condition is causing or may cause such delay.
- (2) Contractor agrees that an express condition precedent to Contractor's entitlement to any extension of time on the project shall be full and complete compliance to the satisfaction of the University with the Contractor's obligations in Section 3.06, Contractor's Progress Reports. Failure to submit proper Contractor's progress reports in appropriate and timely fashion shall be deemed a waiver and relinquishment of any right, claim or privilege to obtain an extension of time for the performance of the Contractor's work.
- (3) Failure to strictly comply with this requirement may, in the discretion of the University, be deemed sufficient cause to deny any extension of time on account of delay in completion arising out of or resulting from any change, extra work, suspension, or other condition.
- (4) Except as otherwise set forth in this Section 3.04 all procedures set forth in Sections 2.02 and 2.03 of this Agreement shall be complied with by the Contractor. Furthermore, full and complete compliance with the requirements of this Article III is a condition precedent to the Contractor's entitlement to receive an extension of time.

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Section 3.05 Extension of Time

- (1) Within ten (10) working days after the commencement of any condition which is causing or may cause the Contractor to incur, require or otherwise need an extension of time, the Contractor shall notify the Consultant and the University of such condition. Full and complete compliance with this paragraph 3.05(1) is a condition precedent to the Contractor obtaining an extension of time for performance of any portion or all of its work.
- (2) An extension or extensions of time for the completion of the work may be granted by the University subject to the provisions of this Section, but only upon written application therefor by the Contractor to the University and the Consultant.
- (3) An application for an extension of time must set forth in detail the source and the nature of each alleged cause of delay in the completion of the work, the date upon which each such cause of delay began and ended and the number of days of delay attributable to each of such causes. It must be submitted prior to completion of the work.
- (4) If such an application is made, the Contractor may be entitled to an extension of time for delay in completion of the work caused solely: (a) by the acts or omissions of the University, its trustees, officers, agents or employees; or (b) by the acts or omissions of other contractors, not including subcontractors of the Contractor, on this Project; or (c) by unforeseeable supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes).
- (5) The Contractor may, however, be entitled to an extension of time for such causes only for the number of calendar days of delay which the University may determine to be due solely to such causes, and then only if the Contractor shall have strictly complied with all of the requirements of this Section and Section 3.04. The University shall make such determination within ninety (90) calendar days after receipt of the Contractor's application for an extension of time; provided, however, said application complies with the requirements of this Section.
- (6) 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 for the actual period of delay in completion of the work as determined by the University, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the Contractor or of its subcontractors or material-men and would of itself (irrespective of the concurrent causes) have delayed the work, no extension of time will be allowed for the period of delay resulting from such an act, fault or omission.
- (7) The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the discretion of the University.
- (8) If the Contractor shall claim to have sustained any damages by reason of delays, extraordinary or otherwise, or hindrances which it claims to be due to any action, omission, direction or order by the University or the Consultant, the Contractor shall be entitled only to an extension of time as hereinabove provided and shall not have or assert any claim or prosecute any suit, action, cause of action or proceeding against the University based upon such delays or hindrances, unless such delays or hindrances were caused by the University's bad faith or its willful, malicious, or grossly negligent conduct, or un contemplated delays, or delays so unreasonable that they constitute an intentional abandonment of the Contract by the University, or delays resulting from the University's breach of a fundamental obligation of the Contract.
- (9) The Contractor shall not be entitled to an extension of time for the performance of any or all of the Work set forth in allowances to the Contract. All allowance work shall be performed in accordance with the Contractor's schedule.

Section 3.06 Contractor's Progress Reports

After commencement of the work the Contractor shall furnish the Consultant with written monthly reports setting forth the condition and progress of the work, the percentage of each part of the work that has been finished, those parts of the work which have been completed within the scheduled time and those parts of the work which have not been finished within the scheduled time, and the general progress of the work that is being performed away from the site and the approximate date when such work will be finished and delivered to the site. Contractor agrees that compliance with this

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Section 3.06 is an express condition precedent to the Contractor's right, claim or entitlement to obtain an extension of time for the performance of the Contractor's work. Failure to comply with this Section 3.06 shall be a waiver and relinquishment of all such rights, claims and privileges to request or obtain an extension of time for the performance of Contractor's work.

Article IV
Payment

Section 4.01 Compensation to Be Paid Contractor

The University shall pay to the Contractor and the latter shall accept as full and complete payment for the performance of this Agreement, subject to additions or deductions as provided herein, the sum of identified on page one of this agreement which sum is the amount of the Contract consideration.

Section 4.02 Value of Omitted and Extra Work

(1) The amount by which the Contract consideration is to be increased or decreased by any Change Order or Field Order shall be determined by the University by one or more of the following methods:

- a. By applying the applicable price or prices set forth on the attached Schedule "I" of this Agreement or by applying a unit price agreed to by both parties. Subject to the provisions of Section 4.04, this method must be used if the Contract Documents contain applicable unit prices.
- b. By estimating the fair and reasonable cost of: (i) labor, including all wages, required wage supplements and insurance required by law (workers' compensation, social security, disability, unemployment, etc.) paid to or on behalf of foremen, workers and other employees below the rank of superintendent directly employed at the site of the Project; (ii) materials; and (iii) equipment, excluding hand tools, which, in the judgment of the University, would have been or will be employed exclusively and directly on the omitted work or extra work, as the case may be; and, in the case of extra work, where the same is performed directly by the Contractor, by adding to the total of such estimated costs a sum equal to 15 percent thereof, but, where the extra work is performed by a subcontractor, by adding a sum equal to 15 percent of said costs for the benefit of such subcontractor, and by adding, for the benefit of the Contractor (no further allowance will be made where extra work is performed by the sub-subcontractor), an additional sum equal to 10 percent of the first \$10,000 of the above-estimated costs, including the subcontractor's percentage override, plus 5 percent of the next \$90,000 of the total of said items, plus 3 percent of any sum in excess of \$100,000 of the total of said items. There is no markup on the premium portion of overtime labor. For the purposes of the aforesaid percentage overrides, the words "extra work" shall be defined as a complete item of added, modified or changed work as described in the Consultant's written instructions to the Contractor. Such "extra work" may include the work of one or more trades and/or subcontractors or sub-subcontractors and shall include all labor, materials, plant, equipment, tools and all incidentals directly and/or indirectly necessary, related, involved in or convenient to the successful completion of the extra work item. Where the Consultant's aforesaid written instructions to the Contractor involve both an increase and a reduction in similar or related work, the above percentage overrides will be applied only on the amount, if any, the cost of the increased work exceeds the cost of the reduced work.

No overhead and profit shall be retained by the Contractor on the cost of work determined by the method provided in Subparagraph (1)a.

All profit, overhead and expense of whatsoever kind and nature, other than those set forth above in items (i) through (iii), of the Contractor, its subcontractors and sub-subcontractors, are covered by the aforesaid percentage overrides and no additional payment therefor will be made by the University.

The University may make such cost estimate either before or after the extra work is completed by the Contractor.

- c. By determining the actual cost of the extra work in the same manner as in the above subdivision b except that actual costs of the Contractor shall be utilized in lieu of estimated costs. The University shall have the option to utilize this method provided it notifies the Contractor of its intent to do so prior to the time the Contractor commences performance of such extra work.
- (2) Irrespective of the method used or to be used by the University in determining the value of a Change Order or Field Order, the Contractor, within fifteen (15) working days after a request for the same, must submit to the University

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and the Consultant a detailed breakdown of the Contractor's estimate of the value of the omitted and/or extra work in a format approved by the University.

- (3) Equipment Watch Rental Rate Blue Book (published online by Intertec Penton Media, Inc.) or other published rates as approved by the University in writing, will be utilized for the equipment rental pricing. For the purposes of paragraph (1) hereof, the cost of equipment shall be determined, irrespective of the actual price for any rental or actual cost associated with such equipment as follows: take the monthly rate listed in Equipment Watch and dividing the same by 176 hours to establish an hourly rate and then multiplying such hourly rate by the actual number of hours that the equipment was used. The Contractor will submit an actual rental invoice, or acceptable quotation from a bonafide equipment rental supplier for rented equipment when equipment is not owned by the Contractor. The equipment rental supplier cannot be an "affiliate" of the Contractor, nor in any way be related to the Contractor. If submitted invoices/quotations are acceptable to the University, the Contractor will be reimbursed the actual rental cost including sales tax and appropriate mark-up. If no listing of rates for an item of equipment is contained in Equipment Watch, the University shall determine the reasonable rate of rental of the particular item of equipment by such other means as it finds appropriate. The edition Equipment Watch to be used shall be that in effect on the date of the receipt of bids for this Agreement. None of the provisions of Equipment Watch shall be deemed referred to or included in this Agreement excepting only the aforesaid monthly rates. To the cost of equipment as determined above, there is to be added the actual cost of gasoline, oil, grease and maintenance required for operation of such equipment and, in the case of equipment utilized only for extra work when, in the opinion of the Consultant, suitable equipment therefor was not available on the site, the reasonable cost of transporting said equipment to and from the site. Notwithstanding the foregoing, if the Consultant should determine that the nature or size of the equipment used by the Contractor in connection with the extra work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Consultant to be suitable for the extra work, the cost of equipment will not be based upon the equipment used by the Contractor but instead will be based on the smallest or least elaborate equipment determined by the Consultant to have been suitable for the performance of the extra work.
- (4) Unless otherwise specifically provided for in a Change Order or Field Order, the compensation specified therein for extra work includes full payment for both the extra work covered thereby and for any damage or expense caused the Contractor by any delays to other work to be done under the Contract resulting from or on account of said extra work, and the Contractor waives all rights to any other compensation for said extra work, damage or expense.

Section 4.03 Adjustment for Bond and Insurance Premiums

Upon final acceptance of the work to be performed under this Agreement, the University may adjust the Contract consideration to reflect any changes in the cost of all required Bonds and liability and builder's risk insurance premiums which the Contractor had to pay for on all extra work and would have had to furnish and pay for on all omitted work. Unless such cost is agreed upon by the University and the Contractor, the University may calculate and determine the amount of the adjustment in the Contract consideration by estimating such costs. There is no markup on bond or insurance premium adjustment.

Section 4.04 Unit Prices

- (1) Except as otherwise provided in the second paragraph of this Section, the unit prices, set forth on the attached Schedule "I" of this Agreement, will be binding upon both the University and the Contractor in determining the value of omitted and/or extra work, and, in the case of extra work, such unit prices shall be deemed to include all profit, overhead and expenses of whatsoever kind and nature of the Contractor, its subcontractors and sub-subcontractors, and the Contractor agrees that it shall make no claim for any profit, overhead, expense or percentage override in connection therewith.
- (2) Where said Schedule "I" sets forth a unit price for added and/or deducted work, the University shall have the option, whenever it is found that the quantity of changed work varies by more than 15 percent from the quantity that is stated or that can be determined by the Contract Documents at the time of execution thereof, to accept or reject such unit price for the quantity that the changed work varies by more than 15 percent from the stated or determinable quantity. Where a quantity is not specifically stated in the Contract Documents, the University's determination of the amount of said quantity included in the Contract Documents shall determine the applicability of this paragraph. Where the University, pursuant to the foregoing provisions, exercises its aforesaid option, the amount of the increase or decrease in the Contract consideration for the quantity of work which varies by more

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than 15 percent from the stated or determinable quantity shall be determined in accordance with the provisions of Section 4.02 of the Agreement as if there was no unit price therefor set forth in said Schedule "I".

Section 4.05 Allowances

- (1) The Contractor acknowledges that the Contract consideration includes the allowances set forth on the attached Schedule "II" and "III" of this Agreement and, except for quantitative and field order allowances, it agrees to cause the work covered thereby to be done by such contractors for such sums as the University may direct. Where cash allowances are provided, the allowances shall be deemed to include the purchase of the materials and/or equipment and the delivery of same to the job site. Unless otherwise specified in the Contract Documents, cash allowances do not include the proper installation of the materials and/or equipment or the connection for final utilities thereto; the cost of said installation and/or connection having been included in the amount of the Contract consideration.
- (2) The Contractor acknowledges that the Contract consideration includes such sums for expenses and profit on account of cash allowances as it deems proper and that it shall make no claim for expenses or profit or any percentage override in addition thereto; said items having been included in the amount of the Contract consideration.
- (3) In the event any of the cash allowances listed below are either higher or lower than the cost of having the work done in accordance herewith, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be the difference between the amount of the allowance and the actual cost of performing the work covered thereby.
- (4) When quantitative allowances are provided, progress payments thereof to the Contractor will be based upon the applicable unit prices set forth on the attached Schedule "I" of the Agreement, subject, however, to the provisions of paragraph (2) of Section 4.04. In the event any of said quantitative allowances are more than or less than the actual quantity of work performed, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be determined in accordance with the provisions of Sections 4.02, 4.04 and 4.05A of the Agreement.

Section 4.05A Field Orders

When the Agreement contains a Field Order Allowance, the bid shall include the amount of such allowance. Said amount shall cover the cost of additional labor, materials and time for contingent activities within the scope of the Agreement as directed and described by the University in writing in a Field Order. The Field Order will include a description of the work and the method for determining the value of such work. The value of the work directed under this allowance will be determined by one or more of the provisions of Section 4.02. If the net cost(s) of all Field Orders issued are more or less than the specified amount of the allowance, the Contract sum will be adjusted by Change Order.

Section 4.06 Deductions for Unperformed and/or Uncorrected Work

- (1) Without prejudice to any other rights, remedies or claims of the University, in the event that the Contractor at any time fails or neglects to supply working forces and materials of the proper quantity and quality necessary, in the opinion of the Consultant or the University, to comply with the approved time progress schedule, or fails in any respect to prosecute the work with promptness and diligence or causes by any action or omission the stoppage or delay of or interference with the work of any other contractor having a contract with the University, or fails in the performance of any obligations and responsibilities under this Agreement, then, and in that event, the University, acting itself or through the Consultant, may, upon three (3) working days' notice to the Contractor, either itself provide or have any other contractor, including but limited to the University's Job Order Contracting Program, provide any and all labor or materials or both necessary, in its opinion, to correct any aforesaid deficiency of the Contractor, and the University will thereafter backcharge the Contractor by issuing a Change Order reducing the amount of the Contract consideration for all costs and expenses it incurs in connection with the correction of such deficiency. The Contractor agrees that the University may deduct from any application for payment made by the Contractor, any and all Design Professional, Consultant and/or Construction Management fees and costs incurred by the University together with a markup upon such hard costs in the amount of 15% for services required in connection with the correction of such deficiency(ies).
- (2) Notwithstanding any provisions in the Contract Documents to the contrary, if the University deems it inexpedient to correct work not done in accordance with the Contract or any work damaged as a result thereof, it shall notify

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the Contractor of such fact and the latter shall not remedy or correct the same. In such event, however, the amount of the Contract consideration shall be decreased by an amount, determined by the University, which is equal to the difference in value of the work as performed by the Contractor and the value of the work had it been satisfactorily performed in accordance with the Contract or which is equal to the cost of performing the corrective work, whichever shall be the higher amount.

Section 4.07 Liquidated Damages

In the event that the Contractor shall fail to substantially complete all the work within the time fixed for such completion on page one of this agreement, or within the time to which such completion may have been extended or in the event that the Contractor abandons the work and the same is not substantially completed within the aforesaid time for such completion, the Contractor must pay to the University as damages for each calendar day of delay in completing the work the amount set forth on page one of the Contractors proposal, as stated on page one of this agreement. . In view of the difficulty of accurately ascertaining the loss which the University will suffer by reason of delay in completion of the work hereunder, said sum is hereby fixed and agreed as liquidated damages which the University will suffer by reason of such delay and not as a penalty. The University may deduct and retain out of the monies which may become due hereunder to the Contractor the amount of any such liquidated damages and, in case the amount which may become due to the Contractor under the provisions of the Contract may be less than the liquidated damages suffered by the University, the Contractor shall pay the difference, upon demand, to the University.

Section 4.08 Contract Breakdown

Prior to the submission of its first application for a progress payment, the Contractor shall present to the University and the Consultant for their approval a detailed schedule showing the breakdown of the Contract consideration. The Contract Breakdown Summary shall be further broken down as required by the Consultant and the University. Such schedule must contain the amount estimated for each part of the work and quantity survey for each part of the work. It shall also list the estimated value of the Contractor's guarantee obligations under the provisions of the Contract Documents, which is hereby fixed at \$5,000 or one-half of one percent (1/2%) of the Contract award amount, whichever is the lesser sum. Such schedule shall be revised by the Contractor until the same shall be satisfactory to the University and the Consultant and shall not be changed after the University and the Consultant have approved the same. The amounts set forth in the schedule will not be considered as fixing the basis for additions to or deductions from the Contract consideration.

Section 4.09 Prompt Payment Requirements

- (1) For the purposes of Article XI-A of the State Finance Law, the campus for which the work is being performed is the University's designated payment office. Applications for payment must contain the approval of the Consultant before being submitted to the University.
- (2) Whenever the Consultant's approval of an application for payment is required under the Contract, the Consultant shall have fifteen (15) calendar days, after receipt of such application, to inspect the work before acting on the application.
- (3) Until such time that the Contract is approved by the University, the thirty (30) day period, referred to in Article XI-A of the State Finance Law for the payment of invoices without interest, shall not begin.

Section 4.10 Progress Payments

- (1) Unless otherwise provided in the Contract, progress payments will be made as the work progresses upon applications submitted by the Contractor and approved by the Consultant and the University. Payment of such approved applications shall be made by the University within thirty (30) days after such approval has been given.
- (2) The University shall make progress payments to the Contractor on the basis of such approved applications, less a retained amount equal to 5 percent thereof (i.e. retainage) , plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged, , together with any back charges and offsets which are deemed necessary or likely to be incurred by the University as a result of any failure by the Contractor to fully, completely, accurately and timely perform its work, which it shall reserve from each such payment until all of the work covered by the Contract has been completed.
- (3) When the University and the Consultant have determined that all the work is substantially completed, or that a substantial portion of the permanent construction has been completed and accepted, the University shall make

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a progress payment to the Contractor, on the basis of an application submitted by the Contractor and approved by the Consultant and the University, which shall reduce the unpaid amount due to the Contractor under the terms of the Contract, including all monies retained by the University from previous progress payments to the Contractor, to an amount equal to two (2) times the cost, estimated by the Consultant, of performing, in accordance with the Contract, all uncompleted, unaccepted and corrective work, plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of work are satisfactorily completed or corrected, the University shall make progress payments to the Contractor, on the basis of applications submitted by the Contractor and approved by the University and the Consultant, covering said items of work less an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

Section 4.11 Applications for Progress Payments

The Contractor shall prepare all applications for progress payments for work performed, together with supporting data and computations as are deemed necessary by the Consultant to determine the accuracy of the application. The application for payment and all required supporting documentation shall be submitted using the University's prescribed forms. The Contractor shall include with such applications reports detailing actual payments to minority and women-owned businesses who participate on University projects. Failure of the Contractor to submit applications for progress payments, or lack of complete and accurate supporting data, shall be sufficient reason for withholding payment until such omissions or errors are rectified. Unless otherwise directed, such applications, signed and certified as correct by the Contractor, shall be delivered by the Contractor to the Consultant once each month showing the total value of work completed and in place on the last day of the payment period covered by the application.

Section 4.12 Progress Payments for Materials Delivered to Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment to be furnished and installed under the Contract, after such materials and equipment have been delivered and accepted at the site of the work.
- (2) Materials and equipment for which such progress payment has been made shall not be removed from the site, shall be stored until incorporated into the work in a location approved by the Consultant and shall be adequately protected from fire, theft and vandalism, the effects of the elements and any other damage whatsoever, and shall at all times be available for inspection by the Consultant and the University.

Section 4.13 Transfer of Title to Materials Delivered to Site

Title to all supplies and materials to be furnished or provided by the Contractor to the University pursuant to the provisions of the Contract Documents shall immediately vest in and become the sole property of the University upon delivery of such supplies and materials to the site. Notwithstanding such transfer of title, the Contractor shall have the full continuing responsibility to install such materials and supplies, protect them, maintain them in proper condition and forthwith repair, replace and make good any damage thereto without cost to the University until such time as the work covered by the Contract is fully accepted by the University. 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 University, any of such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the Contractor.

Section 4.14 Progress Payments for Materials Stored Off Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment which are in short and/or critical supply or have been specially fabricated for the Project. Materials and equipment, for which a progress payment is made pursuant to the preceding sentence, shall be stored by the Contractor, after fabrication, until such time as their delivery to the site is required, at a facility and location approved by the Consultant; shall be adequately protected from fire, theft and vandalism, the effects of the elements and any other damage whatsoever; and shall at all times be available for inspection by the Consultant and the University. No progress payment shall, however, be made for said materials and equipment until:
 - a. The Contractor furnishes to the University a bill of sale listing quantity and costs of said materials and equipment f.o.b. point of origin;
 - b. The Consultant shall have inspected said materials and equipment and recommended payment therefor; and

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- c. The Contractor furnishes to the University a builder's risk insurance policy, with the broad form extended coverage endorsement, for said materials and equipment, in an amount equal to 100 percent of the value thereof, which policy shall be maintained, at the sole cost and expense of the Contractor, until said materials and equipment have been incorporated into the Project. The said insurance policy shall contain a provision that the loss, if any, is to be made adjustable with and payable to the University as trustee for the insured, i.e., the University and the Contractor, 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 University is given thirty (30) days written notice to the contrary.
 - d. The Contractor shall develop and provide a preventive maintenance log for stored equipment when determined appropriate by the Consultant. The Contractor shall provide timely notification and opportunity for the Consultant and the University to view the Contractor's preventative maintenance efforts.
- (2) Materials and equipment for which a progress payment has been made by the University pursuant to this Section shall be, become and remain the sole property of the University; provided, however, that the Contractor shall have the full continuing responsibility to install such materials and equipment, to deliver it to the site, to protect it, to maintain it in proper condition and to forthwith repair, replace and make good any damage thereto without cost and/or additional time to the University until such time as the work covered by the Contract is fully accepted by the University. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract.

Section 4.15 Withholding of Progress Payments

Notwithstanding anything contained in the Contract to the contrary, the University may withhold payment of all or any part of a progress, final or guarantee payment, in such an amount as it may deem proper to enforce the provisions of the Contract and to satisfy the claims of third parties, when:

- a. The University shall learn of any claim, of whatsoever nature or kind, against the University or the Contractor, which in any way arises or is alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract or out of or in connection with the Contractor's operations or performance at or in the vicinity of the construction site, that, in the opinion of the University, may not be adequately covered by insurance.

If an action on such claim is timely commenced and the liability of the University and/or the Contractor shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the Contractor to be valid, the University shall pay such judgment or admitted claim out of the monies retained by it under the provisions of the Contract and return the balance, if any, without interest, to the Contractor.

The University may withhold from the Contractor any payments retained by it until such time as all such claims are either satisfied or barred by law from being presented. At such time the University, upon written demand by the Contractor, shall return to the Contractor the amount so withheld, without interest.

- b. The Contractor has not complied with any lawful or proper direction of the Consultant or the University or their representatives concerning the work covered by the Contract or the performance of the Contract or the production of records as required under the provisions of the Contract.
- c. There exists any of the conditions, listed in Section 2.26, which would allow the University to declare the Contractor in default of the whole or any part of the work.
- d. The Contractor is a foreign contractor and has not furnished satisfactory proof that all taxes due by such Contractor under the provisions of the Tax Law have been paid. The Certificate of the New York State Tax Commission to the effect that all such taxes have been paid shall be conclusive proof of the payment of such taxes. The term "foreign contractor" as used herein means, in the case of an individual, a person who is not a resident of the State of New York; in the case of a partnership, one having one or more partners not a resident of the State; and in the case of a corporation, one not organized under the laws of the State of New York.

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- e. The Contractor, upon request of the University at any time after the initial progress payment by the University to the Contractor, fails to furnish the University with such documentary evidence that the University may deem necessary to prove to it that material and labor paid for by the University under previous applications for payment submitted have been paid for by the Contractor and that there are no outstanding claims or liens in connection therewith or fails to satisfy the University that the Contractor, with good cause, has sufficiently provided for the payment and/or satisfaction of claims for said material and labor.

Section 4.16 Lien Law

The attention of the Contractor is specifically called to the provisions of the Lien Law of the State of New York, wherein funds received by a Contractor for a public improvement are declared to constitute trust funds in the hands of such Contractor to be applied first to the payment of certain claims.

Section 4.17 Substitution of Securities for Retainage

Any time after 50 percent of all the work has been completed, the University, if the progress and performance of the work is satisfactory to it, on request of the Contractor, will allow the Contractor to withdraw up to 50 percent of the aforesaid amount retained by the University by depositing with the Comptroller of the State of New York government securities, of the type and kind specified in Section 139 of the State Finance Law, having a market value not exceeding par, at the time of deposit, equal to the amount so withdrawn. The Comptroller of the State of New York shall, from time to time, collect all interest or income on the obligations so deposited, and shall pay the same, when and as collected, to the Contractor. If the deposit be in the form of coupon bonds, the coupons as they respectively become due shall be delivered to the Contractor; provided, however, that the Contractor shall not be entitled to interest or coupons or income on any of the deposited securities, the proceeds of which have or will be used or applied by the University. In the event that the Contractor does not, in accordance with the terms and provisions of the Contract, comply with and fulfill all of its obligations and responsibilities thereunder, the Comptroller of the State of New York shall have the right to sell, assign, transfer or otherwise dispose of the aforesaid securities and the University shall have the right to use and apply all or any part of the monies obtained by the Comptroller of the State of New York from such a sale, assignment, transfer or disposition or from the collection of interest or income from said securities to the performance and fulfillment of said obligations and responsibilities. Notwithstanding the foregoing, when the University makes a payment under Section 4.10 (3) of the Agreement, it will return to the Contractor, as part of such payment, its substituted securities, and thereafter all retention of the University shall be in funds and not in substituted securities.

Section 4.18 Final Payment

Upon acceptance of all the work, except for the Contractor's guarantee obligations under Section 2.25 of the agreement and the Contractor's guarantee obligations under any provision of the Specifications, the Contractor shall prepare and submit to the University and the Consultant, for their approval, a final application for payment, which the University, within thirty (30) days after its approval of same, shall pay. Such application and payment shall be in an amount equal to 100 percent of the Contract consideration excluding the Contractor's guarantee obligations, less:

- a. All previous payments by the University to the Contractor;
- b. All deductions authorized to be made by the University under the Contract; and
- c. An amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.
- d. The Contractor shall not be entitled to any interest on the monies retained by the University pursuant to Subdivision c of Section 4.18 of the Agreement.

Section 4.19 Acceptance of Final Payment

- (1) The acceptance by the Contractor, or by any one claiming by or through it, of the final payment shall, except with respect to the amount retained by the University pursuant to the provisions of subdivisions b and c of Section 4.18 of the Agreement, constitute and operate as a release to the University from any and all claims of any liability for anything theretofore done or furnished for or relating to or arising out of the work covered by the Contract and for any prior act, neglect or default on the part of the University or any of its trustees, officers, agents or employees in connection therewith.
- (2) Should the Contractor refuse to accept the final payment as tendered by the University or should the Contractor refuse to execute the final application for payment without protest and without reserving any rights or claims

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against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said final application for payment.

Section 4.20 Guarantee Payment

- (1) Subject to the provisions of the second paragraph of this Section, at the expiration of one (1) year after the University has accepted all the work covered by the Contract, the Contractor shall prepare and submit to the University and the Consultant, for their approval, a guarantee application for payment, which the University, within thirty (30) days after its approval of same, shall pay. Such application and payment shall be in an amount equal to the monies retained by the University for the Contractor's guarantee obligations under the Agreement, less any monies deducted by the University under this Section. The Contractor shall not be entitled to any interest on the monies retained by the University pursuant to subdivision c of Section 4.18 of the Agreement.
- (2) In the event the Contractor does not, in accordance with the terms and provisions of the Contract, complete all corrective work or comply with and fulfill its contractual obligations, the University may use and apply all or any part of the monies retained by it to have such work or obligations performed or fulfilled by a person, firm or corporation other than the Contractor. The obligations of the Contractor, under the terms and provisions of the Contract, shall not, however, be limited to the monies retained by the University pursuant to the provisions of the Contract.
- (3) No payments may be made under this agreement for work completed more than 365 days after the completion date listed on page one of this agreement unless the date/duration listed on page one of this agreement, is extended in writing by the University.

Section 4.21 Acceptance of Guarantee Payment

The acceptance by the Contractor or by anyone claiming by or through it, of the guarantee payment shall constitute and operate as a release to the University from any and all claims in connection with monies retained by the University. Should the Contractor refuse to accept the guarantee payment as tendered by the University or should the Contractor refuse to execute the guarantee application for payment without protest and without reserving any rights or claims against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said guarantee application for payment.

Section 4.22 Contractor Limited to Money Damages

Inasmuch as the Contractor can be compensated adequately by money damages for any breach of the Contract which may be committed by the University, the Contractor agrees that no default, act or omission of the University shall constitute a material breach of the Contract entitling it to cancel or rescind the same or to suspend or abandon performance thereof; and it hereby waives any and all rights and remedies to which it might otherwise be or become entitled to because of any wrongful act or omission of the University or its representatives, saving only its right to money damages.

Section 4.23 No Estoppel or Waiver

- (1) The University shall not be precluded or estopped by any inspection, acceptance, application for payment or payment, final or otherwise, issued or made under the Contract or otherwise issued or made by it, the Consultant, or any trustee, officer, agent or employee of the University, from showing at any time the true amount and character of the work performed, or from showing that any such inspection, acceptance, application for payment or payment is incorrect or was improperly issued or made; and the University shall not be precluded or estopped, notwithstanding any such inspection, acceptance, application for payment or payment, from recovering from the Contractor any damages which it may sustain by reason of any failure on its part to comply strictly with the Contract and any monies which may be paid to it or for its account in excess of those to which it is lawfully entitled.
- (2) Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefor; nor any order or application for payment issued under the Contract or otherwise issued by the University, the Consultant, or any trustee, officer, agent or employee of the University; 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 University of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the University in its performance of such duties or obligations; nor any delay or omission by the University 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;

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nor any other thing done or omitted to be done by the University, its trustees, 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 University 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 University may be entitled because of such breach. No waiver by the University of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

Section 4.24 Limitation of Actions

- (1) No action or proceeding shall be maintained by the Contractor, or anyone claiming under or through the Contractor, against the University, or its trustees, officers, agents or employees, upon any claim arising out of or based upon the Contract or any breach thereof or by reason of any act or omission or requirement of the University, or its trustees, officers, agents or employees, unless:
- a. Such action or proceeding shall be instituted in the Court of Claims in the State of New York.
 - b. The Contractor or the person claiming under or through it shall have strictly complied with all requirements relating to the giving of notices and information with respect to such claims; and shall have provided the University with an electronic version of any claims, including all required information and copies of all contractually required notices that the Contractor provided to the University and the Consultant throughout the duration of the Contract ;
 - c. Such action or proceeding by the Contractor shall be commenced within eighteen months after the date of substantial completion set by the University or its Consultant and issued in writing to the Contractor. Any action or proceeding not commenced within this time frame shall be dismissed with prejudice.
 - d. If the Contract is terminated or the Contractor declared in default by the University, such action is commenced within six (6) months after the date of such termination or declaration of default by the University.
 - e. The Parties shall use good faith efforts to amicably resolve any dispute arising under this Agreement. If the Parties are unable to amicably resolve the dispute within thirty (30) days, then either Party may seek legal or equitable redress.
- (2) Notwithstanding anything in the laws of the State of New York to the contrary, the Contractor, or anyone claiming under or through the Contractor, shall not be entitled to any additional time to begin anew any other action if an action commenced within the times herein specified is dismissed or discontinued for any reason whatsoever.

Section 4.25 Electronic Payments

The Contractor shall provide complete and accurate payment applications in order to receive payment. Payment applications submitted must contain all information and supporting documentation required by the University. Payment for applications submitted by the Contractor shall only be rendered electronically unless payment by paper check is expressly authorized by the University's sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary State procedures and practices. The Contractor shall comply with the State Comptroller's procedures to authorize electronic payments. Authorization forms are available at the Office of the State Comptroller's website at www.osc.state.ny.us/epay/index.htm; by email at epunit@osc.state.ny.us; or by telephone at 518-474-4032. The Contractor acknowledges that it will not receive payment on any invoices submitted under this Agreement if it does not comply with the State Comptroller's electronic payment procedures, except where the University has expressly authorized payment by paper check as set forth above.

Article V
Protection of Rights and Property

Section 5.01 Accidents and Accident Prevention

The Contractor shall at all times take reasonable precautions for the safety of persons engaged in the performance of the work. The Contractor shall comply fully with all applicable provisions of the laws of the State of New York and OSHA

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and with all valid rules and regulations thereunder. The Contractor's attention is specifically called to the applicable rules and regulations, codes and bulletins of the New York State Department of Labor.

Section 5.02 Adjoining Property

The Contractor shall be required to protect all the adjoining property and to repair or replace any such properties damaged or destroyed by it, its employees or subcontractors through, by reason of or as a result of activities under, for or related to the Contract.

Section 5.03 Emergencies

- (1) In case of an emergency which threatens loss or injury to persons or property, the Contractor will be allowed to act, without previous instructions from the Consultant or the University, in a diligent manner, to the extent required to avoid or limit such loss or injury, and it shall notify the Consultant and the University immediately thereafter of the action taken by it and of such emergency. Where the Contractor has not taken action but has notified the Consultant or the University of an emergency which threatens loss or injury to persons or property, it shall act in accordance with the instructions and/or authorization by the Consultant or the University.
- (2) In the event that the Contractor performs extra work in accordance with the preceding paragraph, it will be compensated therefor in accordance with the provisions of Section 4.02.

Section 5.04 Fire Safety

- (1) If the existing building is to be partially occupied during the course of the project, all existing exits except those shown for closure, fire walls, fire barriers and fire protection systems shall be continuously maintained in the occupied phases in compliance with the Fire Code of New York State and as required by NFPA 241 and as recommended in its Annex A, Explanatory Material, or other measures must be taken which in the opinion of the Consultant will provide equal safety. Those portions occupied by the campus must be available for their use 24 hours a day, seven days a week during the contract period unless otherwise scheduled in these documents. Comply with all applicable State and Federal codes and regulations. Prior to removal of existing fire walls, fire barriers and fire protection systems, if such removal is part of the work, install equivalent temporary fire walls, fire barriers and fire protection systems. The cost of all labor, fire watches, variances, materials, installations, maintenance and removal of such temporary fire protection systems or modifications to the existing systems are the responsibility of the Contractor. Install permanent fire walls, fire barriers and fire protection systems, if provided as part of the work, as soon as practical and as required by NFPA 241 and as recommended in its Annex A, Explanatory Material.
- (2) Solid fuel salamanders and heaters shall not be used by the Contractor or any of its subcontractors. All other salamanders used by the Contractor or any of its subcontractors shall require constant attendance of competent persons on each floor where in use.
- (3) All temporary fabric used by the Contractor or any of its subcontractors for curtains or awnings shall be either non-combustible or flame retarded so that it will not burn or propagate flame.

Section 5.05 Risks Assumed by Contractor

- (1) To the fullest extent permitted by law, the Contractor solely assumes the following distinct several risks whether they arise from acts or omissions (whether negligent or not and whether supervisory or otherwise) of the Contractor, of the University, of third persons or from any other cause, including unforeseen obstacles and difficulties which may be encountered in the prosecution of the work covered by the Contract, whether such risks are within or beyond the control of the Contractor and whether such risks involve a legal duty, primary or otherwise, imposed upon the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York, excepting only risks which arise from defects in maps, plans, designs or Specifications prepared, acquired or used by the Consultant or the University, from the negligence of the University, its agents or employees or from affirmative acts of the, State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York or their trustees, officers, agents or employees committed with intent to cause the loss, damage and injuries herein below set forth:
 - a. The risk of loss or damage, direct or indirect, to the work covered by the Contract or to any plant, equipment, tools, materials or property furnished, used, installed or received by the University or by the Contractor or any subcontractor, material man or worker performing services or furnishing materials for the work covered

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hereunder. The Contractor shall bear such risk of loss or damage until the work covered by the Contract has been finally accepted by the University or until completion of removal of such plant, equipment, tools, materials or property from the construction site and the vicinity thereof, whichever event occurs last. In the event of such loss or damage, the Contractor shall forthwith repair, replace and/or make good any such loss or damage without cost to the University.

- b. The risk of claims, just or unjust, by third persons against the Contractor, the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York, or the State University of New York on account of wrongful death, bodily injuries and property damage, direct or consequential, loss or damage of any kind whatsoever arising or alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract (whether actually caused by or resulting from the performance of the Contract) or out of or in connection with the Contractor's operations or presence at or in the vicinity of the construction site.
- (2) To the fullest extent permitted by law, the Contractor shall indemnify and save harmless the State University Construction Fund the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees against all claims described above and for all costs and expenses incurred by them in the defense, settlement or satisfaction thereof, including attorneys' fees and court costs. If so directed, the Contractor shall at its own expense defend against such claims, in which event it shall not, without obtaining express advance permission from Counsel of the University, raise any defense involving in any way jurisdiction of the tribunal over the University, governmental nature of the University or the provisions of any statutes respecting suits against the University.
- (3) Neither the University's final acceptance of the work to be performed hereunder nor the making of any payment shall release the Contractor from its obligations under this Section. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provision of this Section or to imply that it assumes or is responsible for only risks or claims of the type enumerated.

Section 5.06 Insurance Requirements

- (1) General Provisions
- a. Prior to the execution of the Agreement, the Contractor shall at its sole cost and expense, procure and furnish to the University a Certificate of Insurance and required endorsements in a form satisfactory to the University demonstrating that the Contractor has complied with the specific provisions of this Article and the Agreement, The Contractor shall maintain in force and effect at all times during the Agreement from Notice to Proceed until Final Acceptance, or as may otherwise be required by this Article and the Agreement, policies of insurance covering all operations under the Agreement whether performed by the Contractor or its subcontractors as herein set forth.
 - b. All insurance required by the Agreement shall be written by companies that have an A.M. Best Company rating of "A-," Class "VII" or better. In addition, companies writing insurance intended to comply with the requirements of the Agreement shall be an admitted carrier approved by the New York State Department of Financial Services to issue insurance in the State of New York or meet such other requirements as may be acceptable to the University in its sole and exclusive discretion. If during the duration of coverage on the Agreement, the carrier's A.M. Best rating falls below "A-," Class "VII," the insurance must be replaced, on or before the renewal date of the policy with insurance that meets the requirements set forth herein.
- (2) Submission of Insurance
- a. **Coverage Types.** The types of insurance coverage and policy limits required from the Contractor pursuant to the Agreement are specified in Paragraph (3) Specific Coverage below and limits outlined in Schedule A attached hereto ("Schedule A").
 - b. **Policy.** Except as may be otherwise specifically provided herein or agreed to in writing by the University, policies of insurance must be maintained on an occurrence basis at all times during the Agreement from Notice to

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Proceed until Final Acceptance, or as may be otherwise required by this Article and the Agreement, with limits not less than those set forth in Schedule A and as required by the terms of the Agreement, or as required by law, whichever is greater. If such insurance contains an aggregate limit, it shall apply separately on a per project basis.

- c. **Certificates of Insurance.** The Contractor shall provide the University a Certificate or Certificates of Insurance, on the appropriate Certificate of Liability Insurance ACORD form, as well as the ACORD 855 NY form for liability insurance including required policy endorsements, in accordance with New York Insurance Law and submitted directly by the insurance broker or agent to the University, before commencing any work under the Agreement. The certificate C105.2 or the U26.3 (State Insurance Fund) are the only acceptable proof of coverage for Worker's Compensation. The DB120.1 is the only acceptable proof of coverage for Disability Benefits. Certificates must reference the NAIC number of the issuing company, policy number, effective dates of coverage, policy limits consistent with Schedule A and the Agreement requirements, name the Additional Insureds, and shall name the University as the Certificate Holder.
- d. **Primary Coverage.** The liability and protective policies of insurance shall provide primary and non-contributory coverage to the Additional Insureds required in Section 5.06(2)(h) below for any claim arising from the Contractor's work under the Agreement, or because of the Contractor's activities. Any other insurance maintained by the University or Additional Insureds shall be in excess of and shall not contribute to the Contractor's insurance or subcontractor's insurance, regardless of the "other insurance" clause contained in the University's or Additional Insured's policy of insurance, if any. A copy of the endorsement reflecting this requirement may be requested by the University.
- e. **Policy Renewal/Expiration.** Unless otherwise agreed to in writing by the University, all insurance policies must have a policy period of at least one year. Not less than five (5) days prior to the expiration date or renewal date of the policy for insurance, the Contractor shall supply the University with updated replacement certificates of insurance and required endorsements. The Contractor shall give written notice to the University of any letter or notification that cancels, materially changes, or non-renews the policy and the Contractor shall require the insurance carrier(s) to copy the University on any letter or notification that cancels, materially changes, or non-renews the policy.

Unless otherwise agreed to in writing by the University, policies shall be written to include a provision that the policy will not be canceled, materially changed, or not renewed without at least thirty (30) days' prior, written notice except for non-payment, in which case notice shall be provided as required by law from the insurance carrier to the University. In addition, if required by the University, the Contractor shall deliver to the University within three (3) business days of such request a copy of any or all certificates of insurance and required endorsements not previously provided.

If, at any time during the Agreement, the University determines that the insurance as required is not in effect as per the terms of the Agreement, or proof thereof is not provided to the University, or the Contractor has otherwise failed to strictly adhere to the provisions of this Article, the University may withhold further Agreement payments and shall have the option to (i) direct the Contractor to stop work with no additional cost or extension of time due on account thereof; or (ii) treat such failure as an event of default under Section 2.26 of the Agreement..

With exception of the A.M. Best rating requirements, if at any time the coverage provisions and limits of the policies of insurance required herein do not meet the provisions and limits set forth in Schedule A and the Agreement, the Contractor shall immediately cease work on the project site. Further, the Contractor will not be allowed access to the project site without providing proof of proper insurance. The Contractor shall not resume work on the project until permitted to do so by the University. Any delay or time lost as a result of the Contractor not having insurance or providing proof thereof as required by this Article and the Agreement shall not give rise to a delay claim or any other claim by the Contractor against the University. If required by the University, the Contractor shall deliver to the University within fifteen (15) business days of such request, full and complete copies of any or all policies of insurance and endorsements relating to the project that were not previously provided, certified by the insurance carrier as true and complete.

- f. **Self-Insured Retention / Deductibles.** Certificates must disclose any Deductible, Self-Insured Retention, Aggregate Limit or any exclusion to the policy that materially changes the coverage required by the Agreement, and Deductibles or Self-Insured Retentions above \$25,000 shall be subject to approval from the University.

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The Contractor shall be solely responsible for all claim expenses and loss payments within the Deductible or Self-Insured Retention.

- g. **Subcontractors.** Should the Contractor engage subcontractors, the Contractor shall impose on those entities the general insurance requirements of this Article and the Agreement. Required insurance limits shall be determined commensurate with the work of the subcontractor. The Contractor shall maintain the subcontractor certificates of insurance and required endorsements on file which shall be delivered to the University within three (3) business days of such request. If required by the University, the Contractor shall deliver to the University within fifteen (15) business days of such request, full and complete copies of any or all subcontractor policies of insurance and endorsements relating to the project that were not previously provided, certified by the insurance carrier as true and complete.
- h. **Additional Insureds.** The Contractor shall cause to be included in each of the liability insurance policies coverage for on-going and completed operations naming as Additional Insureds, The People of the State of New York, the State University of New York, the Dormitory Authority of the State of New York, the Fund, other such entities as named in Schedule A, and their officers, agents, and employees ("Additional Insureds"). An Additional Insured Endorsement evidencing such coverage shall be provided to the University prior to the commencement of the Agreement. Additional Insured protection afforded must contemplate on-going and completed operations, and the additional insured protection for products/completed operations must remain in place for three years after Final Acceptance. For Contractors who have Self-Insured Retention, the Contractor shall be obligated to defend and indemnify the above-named Additional Insureds with respect to Commercial General Liability insurance and Business Automobile Liability insurance, in the same manner that the Contractor would have been required to pursuant to this Article had the Contractor obtained such insurance policies.
- i. **Waiver of Subrogation.** Unless otherwise agreed to in writing by the University, with the exception of Disability policies, all policies of insurance must be endorsed to provide that there shall be no right of subrogation against the State of New York, the State University of New York, the Dormitory Authority of the State of New York, the Fund, the Additional Insureds, and their officers, agents and employees. To the extent that any of the policies of insurance prohibit such a waiver of subrogation, the Contractor shall secure the necessary permission to make this waiver.

(3) Specific Coverage

The Contractor shall obtain and maintain in full force and effect, the following insurance with limits not less than those described in Schedule A and as required by the terms of the Agreement, or as required by law, whichever is greater:

- a. **Commercial General Liability Insurance.** A Commercial General Liability ("CGL") insurance policy with coverage that shall include, but not be limited to, coverage for bodily injury, property damage, personal/advertising injury, premises liability, independent contractors/ subcontractors, blanket contractual liability including tort liability of another assumed in contract, liability arising from all work and operations under the Agreement, defense and indemnification obligations, including those assumed under the Agreement, cross liability coverage for Additional Insureds, products/completed operations for a term no less than three years commencing upon Final Acceptance, explosion, collapse, and underground hazards, contractor means and methods, and liability resulting from Section 240 or Section 241 of the NYS Labor Law. Such policy shall be written on ISO Occurrence form CG 00 01 or a substitute form that is acceptable to the University, providing equivalent coverage.

The General Aggregate limit included in the CGL insurance shall apply separately on a per project basis at the limits set forth herein in Schedule A.

Insurance policies that remove or restrict blanket contractual liability located in the "insured contract" definition (as stated in Section V, Number 9, Item f in the ISO CGL policy) so as to limit coverage against claims that arise out of the work under the Agreement, or that remove or modify the "insured contract" exception to the employers liability exclusion, or that do not cover the Additional Insureds for claims involving injury to employees of the Named Insured or subcontractors, are not acceptable.

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In the event any work under the Agreement involves activity on or within 50 ft. of railroad property or a railroad right-of-way or requires entrance upon a railroad property or railroad right-of-way, or requires an assignment of a Railroad employee, any exclusion for such work must be deleted. In addition, the Contractor shall otherwise fully comply with Section 5.06 (3)h below. For purposes of this paragraph, a subway is also a railroad.

- b. **Comprehensive Business Automobile Liability Insurance.** A Commercial Automobile Liability insurance policy at the limits set forth herein in Schedule A covering liability arising out of the use of any motor vehicle in connection with the Agreement, including owned, leased, hired, and non-owned vehicles bearing, or, under the circumstances under which they are being used, required by the Motor Vehicle Laws of the State of New York to bear license plates. If the Agreement involves the removal of hazardous waste from the project site or otherwise transporting Hazardous Materials, pollution liability coverage for covered autos shall be provided.
- c. **Workers' Compensation. New York State Workers' Compensation** (including occupational disease) and Employer's Liability insurance coverage during the life of the Agreement for the benefit of the Contractor's and its subcontractors' employees as are required to be covered by the New York State Workers' Compensation Law.

In the event any of the work under the Agreement involves activity on or near a shoreline or on or near navigable waterways or when any part of the work under the Agreement is connected to water related activities, an endorsement to the Workers' Compensation policy or the Protection & Indemnity policy providing coverage for all of the Contractor's and its subcontractors' employees under the Jones Act and the US Longshore and Harbor Workers' Compensation Act will be required and shall be delivered to the University within three (3) business days of such request. A waiver of subrogation in favor of the Additional Insureds must be included on the policy. In addition, the Contractor shall otherwise fully comply with Section 5.06(3)g below.

Evidence of Workers' Compensation and Employer's Liability coverage must be provided to the University on forms specified by the Chairman of the New York State Workers' Compensation Board.

- d. **Disability Benefits.** Disability coverage during the life of the Agreement for the benefit of the Contractor's and its subcontractors' employees as are required to be covered by the New York State Disability Benefits Law.

Evidence of New York State Disability Benefits coverage must be provided to the University on forms specified by the Chairman of the New York State Workers' Compensation Board.

- e. **Umbrella and Excess Liability.** When the limits of the CGL, Auto, and/or Employers Liability policies procured are insufficient to meet the limits specified in Schedule A, the Contractor shall procure and maintain Commercial Umbrella and/or Excess Liability policies with limits in excess of the primary, provided, however, that the total amount of insurance coverage is at least equal to the requirements set forth above. Such policies shall follow the same form as the primary. Any insurance maintained by the University or Additional Insureds shall be considered in excess of and shall not contribute with any other insurance procured or maintained by the Contractor including primary, umbrella and excess liability regardless of the "other insurance" clause contained in either party's policy.

- f. **Contractor's Pollution Liability.** If the Agreement involves abatement, handling, removal, repair, replacement, enclosure, encapsulation and/or disposal of any pollutants, which includes but is not limited to, petroleum, petroleum products, Hazardous Materials or substances including asbestos, lead, mercury, PCBs, fungus and those as defined by applicable State and federal laws and regulations (collectively referred to as "Hazardous Activities"), the Contractor shall procure, or otherwise obtain through an approved subcontractor, and maintain in full force and effect throughout the term of the Agreement, from Notice to Proceed and for three years after Final Acceptance, Contractor's Pollution Liability with limits as set forth in Schedule A, providing coverage for bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured. Such policy shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants, including any loss, cost or expense incurred as a result of any cleanup of pollutants or in the investigation, settlement or defense of any claim, suit, or proceedings against the University or Additional Insureds arising from the Contractor's or its subcontractors' work under the Agreement.

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In addition, in the event the Contractor or any subcontractor is engaged in Hazardous Activities related to the Agreement, the Contractor or subcontractor shall, to the fullest extent permitted by law, hold harmless and indemnify the Additional Insureds and their trustees, officers, agents or employees, for any claims or liabilities in connection with illness or sickness arising from work performed, not performed, or which should have been performed. The Contractor shall have said hold-harmless and indemnification conditions stipulated in all contracts with subcontractors.

- g. **Marine General Liability, Protection & Indemnity, Hull & Machinery, Jones Act and United States Longshore and Harbor Workers' Act Coverage.** In the event any of the work under the Agreement involves activity on or near a shoreline or on or near navigable waterways or when any part of the work under the Agreement is connected to water related activities (collectively referred to as "Marine Operations"), Marine General Liability, Protection & Indemnity and Hull and Machinery coverage is required. Hull and Machinery coverage shall be provided for the total value of the watercraft and equipment used. The Contractor shall obtain Marine General Liability and Protective and Indemnity Liability Insurance for all Marine Operations relating to the Agreement at the limits set forth herein in Schedule A. Any endorsements that eliminate or minimize coverage for claims related to the imposition of New York Labor Law are prohibited. Certificate of Liability Insurance must be provided that certifies the required coverage is in place and must be accompanied by an ACORD 855 form or its equivalent.
- h. **Railroad Protective Liability.** In the event any work under the Agreement involves activity on or within 50 ft. of railroad property or a railroad right-of-way, or requires entrance upon a railroad property or railroad right-of-way, or requires an assignment of a Railroad employee, the Contractor shall provide and maintain a Railroad Protective Liability ("RPL") Insurance Policy in the amount required by the respective railroad as set forth herein in Schedule A. For purposes of this paragraph, a subway is also a railroad.

The RPL policy must name the Railroad as the Named Insured. No Additional Insureds may be listed on the RPL policy and the definition of "physical damage to property" must be amended to mean direct and accidental loss of or damage to "all property of any Named Insured and all property in any Named Insured's care, custody or control."

Evidence of RPL must be provided to the University on a Certificate of Insurance, and a detailed Binder pending issuance of the policy, or on an ISO-RIMA or equivalent form approved by the Railroad and meet any other requirements as specified by the Railroad and/or the University."

Section 5.07 Builder's Risk

- (1) The Contractor shall procure and maintain, at its own cost and expense, until final acceptance of all work covered by this Agreement or until the Project has been turned over for use by the State University of New York, whichever event occurs earlier, a builder's risk insurance policy covering all risks, with fire, extended coverage, vandalism and malicious mischief coverage. In the event the loss occurs at an occupied facility, the policy shall permit occupancy without the consent of the insurance company. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by operation of any law, ordinance, or regulation, and property of the State held in their care, custody and/or control.
- (2) The policy shall be in an amount equal to the Project's insurable value, i.e., the Contract consideration less the cost of the Contractor's Performance and Labor and Material Bonds; the cost of trees, shrubbery, lawn grass, plants and the maintenance of the same; the cost of demolition; the cost of excavation; the cost of foundations, piers or other supports which are below the undersurface of the lowest basement floor, or where there is no basement, which are below the surface of the ground, concrete and masonry work; the cost of underground flues, pipes or wiring; the cost of earthmoving, grading and the cost of paving, roads, walks, parking lots or athletic fields; and the cost of bridges, tunnels, dams, piers, wharves, docks, retaining walls and radio and/or television towers and antennas.
- (3) The policy may contain a provision for a \$500 deductible for each loss to a Project having an insurable value of less than \$1,500,000 and a \$1,000 deductible for each loss to a Project having an insurable value of \$1,500,000 or more.

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- (4) The University, the Contractor and its subcontractors, as their interests may appear, shall be named as the parties insured under said policy.
- (5) The Contractor shall have the sole responsibility to promptly report any loss to the insurer and/or its representatives and to furnish the latter with all necessary details relating to the occurrence of the loss and the amount thereof. The University, the 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.
- (6) 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 University and the insurance company issuing the same.
- (7) 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 Agreement or to be a limitation on the nature or extent of such obligations and risks.
- (8) Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the University with an updated replacement certificate of insurance and endorsements. The Contractor shall advise the University 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 University 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 University a certificate in duplicate of the insurance herein required. Such insurance must be procured from an insurance carrier approved by the University, licensed or authorized to do business in the State of New York and rated at least "A-" by A.M. Best Company.

Section 5.08 Effect of Procurement of Insurance

Neither the procurement nor the maintenance of such insurance shall in any way affect or limit the obligations, responsibilities or liabilities of the Contractor hereunder.

Section 5.09 No Third-Party Rights

Nothing in this Section or in this Agreement shall create or give to third parties, except the Dormitory Authority of the State of New York, the State of New York and the State University Construction Fund any claim or right of action against the Contractor, the Consultant, the State University of New York, the State University Construction Fund, the Dormitory Authority of the State of New York, or the State of New York and beyond such as may legally exist irrespective of this Section or this Agreement.

Article VI

Minority and Women's Business Enterprises (MWBEs) / Equal Employment Opportunity (EEO) Provisions

The University is required to implement the provisions of New York State Executive Law Article 15-A and 5 NYCRR Parts 142-145 ("MWBE Regulations") for all State contracts as defined therein, with a value (1) in excess of \$25,000 for labor, services, equipment, materials, or any combination of the foregoing or (2) in excess of \$100,000 for real property renovations and construction.

The requirements for the MWBE and EEO programs are set forth in "Exhibit A-1" which is attached hereto and made a part hereof, and shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Agreement shall forthwith be physically amended to make such insertion or correction.

Article VII

Provisions Required by Law

Section 7.01 Provisions Deemed Inserted

Each and every provision required by law to be inserted in the Contract, including, but not limited to, the applicable provisions set forth in Exhibit "A" which is attached hereto and made a part hereof, shall be deemed to be inserted herein

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and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Agreement shall forthwith be physically amended to make such insertion or correction.

Section 7.02 Wage Rates

The Contractor shall post the appropriate prevailing wage schedules in a conspicuous place at the construction site. The Department of Labor shall provide the Contractor with posters relating to prevailing wage rates and same shall be displayed by the Contractor in a conspicuous place at the construction site. The Contractor shall also distribute wallet cards, to be provided by the Department of Labor, to all workers engaged at the construction site containing information relating to wage rates and telephone numbers to call if a worker believes his or her rights are being violated. The Contractor shall provide each worker with a written notice, informing them of the applicable prevailing wage requirements, and the Contractor must obtain a signed statement or declaration from such worker attesting to the fact that he or she has been given this information. Further, the Contractor is required to keep certified copies of its payrolls at the construction site.

Section 7.03 Governing Law

This Agreement shall be governed, construed and enforced in accordance with the laws of New York State, excluding New York State's choice of law principles, in a court of competent jurisdiction, and all claims relating to or arising out of this Agreement or the breach thereof, whether sounding in contract, tort or otherwise, shall likewise be governed by the laws of New York State, excluding the New York choice of law principles, in a court of competent jurisdiction. Consultant agrees to submit itself to such courts' jurisdiction.

Article VIII
Vendor Responsibility

- (1) The Contractor shall at all times during the Agreement term remain responsible. The Contractor shall provide the University with written notice as required by this Article of any issues impacting its responsibility, which shall minimally include updated responses to the it's filed vendor responsibility questionnaire. The Contractor agrees, if requested by the University, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance and organizational and financial capacity.
- (2) The University, at its sole discretion, reserves the right to suspend any or all activities under this Agreement, at any time, when the University discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Agreement activity may resume at such time as the University issues a written notice authorizing a resumption of performance under the Agreement.
- (3) Upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate University officials or staff, the Contractor may be terminated by the University at the Contractor's expense where the Contractor is determined by the University to be non-responsible. In such event, the University may complete the contractual requirements in any manner that the University may deem advisable and pursue available legal or equitable remedies for breach.

In no case shall termination of the Contract by the University be deemed a breach by the University thereof, nor shall the University be liable for any damages or lost profits or otherwise, which may be sustained by Contractor as a result of such termination.

Article IX
Use of Service-Disabled Veteran-Owned Business Enterprises in Contract Performance

Article 17-B of New York State Executive Law acknowledges that Service-Disabled Veteran-Owned Businesses (SDVOBs) strongly contribute to the economies of the State and the nation. As defenders of our nation and in recognition of their economic activity in doing business in New York State, the Contractor for the Project and Work defined in this Agreement, agrees to, at no additional cost to the University, fully comply and cooperate with the University's implementation of New York State Executive Law Article 17-B and provide opportunities for SDVOBs in the fulfillment of the requirements of this Agreement. SDVOBs can be readily identified on the directory of certified businesses at: http://www.ogs.ny.gov/Core/docs/CertifiedNYS_SDVOB.pdf.

State University of New York
Construction Agreement

In accordance with the Chapter 17 of the Laws of 2023 certain University contracts are subject to review by the Office of the State Comptroller. As such a contract, the State shall have no liability under this Agreement and this Agreement is not valid, effective, or binding until it has been approved by the Office of the State Comptroller and filed in their office.

This Agreement may be amended only upon the mutual written consent of the Parties, and with the approval of the New York Attorney General and the Office of the State Comptroller if such approval is required.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

Agency Certification:

In addition to the acceptance of this contract, I also certify that original copies of this signature page will be attached to all other exact copies of this contract.

Contract Number: *Insert Contract Number*

Insert Contractor Name

STATE UNIVERSITY OF NEW YORK

Sign: _____ Date: _____

Sign: _____ Date: _____

Print: _____

Print: _____

Title: _____

Title: _____

APPROVED BY ATTORNEY GENERAL:

**APPROVED BY OFFICE OF THE STATE
COMPTROLLER:**

_____ Date: _____

_____ Date: _____

By:

By:

State University of New York
Construction Agreement

ACKNOWLEDGMENTS
(ACKNOWLEDGMENT BY AN INDIVIDUAL)

STATE OF NEW YORK)
) ss.
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____, to me known and known to me to be the person(s) described in and who executed the foregoing instrument and he/she acknowledged to me that he/she executed the same.

Public Notary

(ACKNOWLEDGMENT BY A PARTNERSHIP)

STATE OF NEW YORK)
) ss.
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____, to me known and known to me to be the person who executed the above instrument, who, being duly sworn by me, did for themselves depose and say that they are a member of the firm of _____, consisting of themselves and _____, that he/she executed the foregoing instrument in the firm name _____, and that he/she had authority to sign the same, and that he/she did duly acknowledge to me that he/she executed the same as the act and deed of the aforementioned firm for the purposes mentioned therein.

Public Notary

(ACKNOWLEDGMENT BY A CORPORATION)

STATE OF)
) ss.
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____, to me known, who, being duly sworn, did depose and say that he/she reside in _____; that he/she is the _____ of the _____, the corporation described in and which executed the above instrument; and that he/she/they signed his/her/their name(s) thereto by authority of the board of directors of said corporation.

Notary Public

State University of New York
Construction Agreement

Schedule I, II, III

SCHEDULE I
Unit Prices

Refer to Section 4.04 of the Agreement for additional information.

<u>Work or Material</u> <u>Description</u> _____	<u>Amount in Words</u>	<u>Amount in Figures</u>
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“none”

SCHEDULE II Allowance(s)

Refer to Section 4.05 of the Agreement for additional information. The amount(s) indicated below shall be included in the Total Bid amount and their total indicated on the Proposal in the space provided.

<u>Work or Material</u> <u>Description</u> _____	<u>Amount in Words</u>	<u>Amount in Figures</u>
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“none”

SCHEDULE III Field Order Allowance

Refer to Section 4.05A of the Agreement for additional information. The amount indicated below shall be included in the Total Bid amount and indicated on the Proposal in the space provided

“none”

(in words)

(in figures)

State University of New York
Construction Agreement

Schedule A
Insurance Requirements

Contract Number: *insert contract number*

All certificate(s) of insurance/ACORD Form must be submitted pursuant to Contract Article 5.06 and include the following information:

- For each insurance certificate, the name and NAIC number of issuing company, number of policy, with effective dates and deductibles, if applicable
- Policy limits consistent with the requirements listed below
- Certificate must disclose that the policies are on a primary and non-contributory basis
- The contract/project number assigned by the University
- Admitted Carriers must meet the following criteria: (1) AM Best Company rating of A- or greater, (2) financial score of VII or greater

Insurance Type	Per Occurrence	Per Aggregate	Forms
Workers Compensation	As required by NYS		Form C105.2 (Certificate of NYS Workers' Compensation Coverage) or the U-26.3 (State Insurance Fund Certificate)
Disability	As required by NYS		Form DB120.1 (Certificate of Insurance Coverage under the NYS Disability Benefits Law)
Commercial General Liability	\$2,000,000	\$2,000,000	ACORD 25 Certificate of Liability Insurance; and ACORD 855 Certificate of Liability Addendum
Automobile	\$1,000,000, combined single limit		ACORD 25 Certificate of Liability Insurance
Contractor's (or Subcontractor's) Pollution Liability	Campus insert value	Campus insert value	ACORD 25 Certificate of Liability Insurance
Builders Risk	Policy shall match the total contract value, or where appropriate - the value determined using the Builder Risk Insurance Breakdown		ACORD 25 Certificate of Liability Insurance

Specific contract requirements for insurance may be found in section 5.06 of the Construction Agreement.

Additional Insureds for each liability insurance policy, including coverage for on-going and completed operations:

- The People of the State of New York
- The State University of New York
- The Dormitory Authority of the State of New York
- The State University Construction Fund
- The Campus
- If applicable, Construction Manager
- If applicable, Railroad
- The officers, agents, and employees of those listed above
- If applicable, non-state landowner impacted by this work

Such policy shall be written on ISO Occurrence form CG 00 01 or a substitute form that is acceptable to the University, providing equivalent coverage.

Guidance to Submit Insurance Certificates

- Certificates must be signed
- Acord forms must be emailed directly by the agent or carrier
- Email certificates and other insurance related correspondence to Jferraro@binghamton.edu
- Include in the subject line the campus and contract number
- Please do not mail additional copies

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State or State University of New York, whether a Contractor, licensor, licensee, lessor, lessee or any other party; the State University of New York shall hereinafter be referred to as "SUNY"):

1. **EXECUTORY CLAUSE.** In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. **PROHIBITION AGAINST ASSIGNMENT.** In accordance with Section 138 of the State Finance Law, this contract may not be assigned by the Contractor or its right, title or interest therein assigned, transferred, conveyed, sublet or otherwise disposed of without the State's previous written consent, and attempts to do so are null and void. Notwithstanding the foregoing, such prior written consent of an assignment of a contract let pursuant to Article XI of the State Finance Law may be waived at the discretion of SUNY and with the concurrence of the State Comptroller where the original contract was subject to the State Comptroller's approval, where the assignment is due to a reorganization, merger or consolidation of the Contractor's business entity or enterprise. SUNY retains its right to approve an assignment and to require that any Contractor demonstrate its responsibility to do business with SUNY. The Contractor may, however, assign its right to receive payments without SUNY's prior written consent unless this contract concerns Certificates of Participation pursuant to Article 5-A of the State Finance Law.

3. **COMPTROLLER'S APPROVAL.** (a) In accordance with Section 112 of the State Finance Law, the State Comptroller's approval is required for the following contracts: (i) goods, services, construction, and construction-related services for State University hospital or healthcare facilities which exceed \$150,000; (ii) purchases utilizing an Office of General Services (OGS) centralized contract which exceed \$200,000 (iii) goods, services, construction, and construction-related services not described in (i) or (ii) and which exceed \$75,000;

(b) If this contract exceeds the threshold amounts listed above in Paragraph 3(a), or, if this is an amendment for any amount to a contract which, as so amended, exceeds said threshold amounts, or if, by this contract, the State agrees to give something other than money when the value or reasonably estimated value of such consideration exceeds \$25,000, it shall not be valid, effective or binding upon the State, and the State shall bear no liability, until it has been approved by the State Comptroller and filed in his or her office.

4. **WORKERS' COMPENSATION BENEFITS.** In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. **NON-DISCRIMINATION REQUIREMENTS.** To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment, nor subject any individual to harassment, because of age, race, creed, color, national origin, citizenship or immigration status, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or domestic violence victim status or because the individual has opposed any practices forbidden under the Human Rights Law or has filed a complaint, testified, or assisted in any proceeding under the Human Rights Law. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of \$50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation

6. **WAGE AND HOURS PROVISIONS.** If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the State of any State- approved sums due and owing for work done upon the project.

7. **NON-COLLUSIVE BIDDING CERTIFICATION.** In accordance with Section 139-d of the State Finance Law, if this contract was awarded based upon the submission of competitive bids, Contractor affirms, under penalty of perjury, that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to SUNY a non-collusive bidding certification on Contractor's behalf.

8. **INTERNATIONAL BOYCOTT PROHIBITION.** In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds \$5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export Administration Act of 1979 (50 USC App. Sections 2401 *et seq.*) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2 NYCRR § 105.4).

9. **SET-OFF RIGHTS.** The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by SUNY, its representatives, or the State Comptroller.

10. **RECORDS.** The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter, collectively, "the Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as well as SUNY and any other agencies involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. SUNY shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate SUNY official, in writing, that said Records should not be disclosed; and (ii) said Records shall be sufficiently identified; and (iii) designation of said Records as exempt under the Statute is reasonable. Nothing contained herein shall diminish or in any way adversely affect, SUNY's or the State's right to discovery in any pending or future litigation.

11. **IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION.**

(a) Identification Number(s). Every invoice or New York State Claim for Payment submitted to SUNY by a payee, for payment for the sale of goods or services or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. The number is any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Failure to include such number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on its invoice or Claim for Payment, must give the reason or reasons why the payee does not have such number or numbers.

(b) Privacy Notification. (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to SUNY or the State is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of SUNY contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in the Statewide Financial System by the Vendor Management Unit within the Bureau of State Expenditures, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

12. **EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN.**

In accordance with Section 312 of the Executive Law and 5 NYCRR Part 143, if this

contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of \$25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of \$100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of \$100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the following shall apply and by signing this agreement the Contractor certifies and affirms that it is Contractor's equal employment opportunity policy that:

(a) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status, shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its workforce on State contracts and will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(b) at SUNY's request, Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein; and

(c) the Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

Contractor will include the provisions of "a," "b," and "c" above, in every subcontract over \$25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State. The State shall consider compliance by a contractor or sub-contractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this clause. SUNY shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, SUNY shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Department of Economic Development's Division of Minority and Women's Business Development pertaining hereto.

13. CONFLICTING TERMS. In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Exhibit A, the terms of this Exhibit A shall control.

14. GOVERNING LAW. This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

15. LATE PAYMENT. Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

16. NO ARBITRATION. Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized) but must, instead, be heard in a court of competent jurisdiction of the State of New York.

17. SERVICE OF PROCESS. In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30) calendar days after service hereunder is complete in which to respond.

18. PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS. The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of State Finance Law §165 (Use of Tropical Hardwoods), which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this law will be the responsibility of the contractor to establish to meet with the approval of the State.

In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in Section 165 of the State Finance Law. Any such use must meet with the approval of the State, otherwise, the bid may not be considered responsive. Under bidder certifications, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

19. MACBRIDE FAIR EMPLOYMENT PRINCIPLES. In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that the Contractor either (a) has no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165 of the New York State Finance Law), and shall permit independent monitoring of compliance with such principles.

20. OMNIBUS PROCUREMENT ACT OF 1992.

It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority and women-owned business enterprises as bidders, subcontractors and suppliers on its procurement contracts.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business and Technology Development
625 Broadway
Albany, NY 12245
Telephone: 518-292-5100

A directory of certified minority and women-owned business enterprises is available from:

NYS Department of Economic Development
Division of Minority and Women's Business Development
633 Third Avenue 33rd Floor
New York, NY 10017
646-846-7364
email: mwbebbusinessdev@esd.ny.gov
<https://ny.newnycontracts.com/FrontEnd/searchcertifieddirectory.asp>

The Omnibus Procurement Act of 1992 (Chapter 844 of the Laws of 1992, codified in State Finance Law § 139-i and Public Authorities Law § 2879(3)(n)-(p)) requires that by signing this bid proposal or contract, as applicable, Contractors certify that whenever the total bid amount is greater than \$1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority and women-owned business enterprises, on this project, and has retained the documentation of these efforts to be provided upon request to SUNY;

(b) The Contractor has complied with the Federal Equal Employment Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Service Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The Contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that the State may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with the State in these efforts.

21. RECIPROCITY AND SANCTIONS PROVISIONS. Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act of 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively, codified in State Finance Law § 165(6) and Public Authorities Law § 2879(5))

require that they be denied contracts which they would otherwise obtain.
NOTE: As of May 2023, the list of discriminatory jurisdictions subject to this provision includes the states of South Carolina, Alaska, West Virginia, Wyoming, Louisiana and Hawaii.

22. COMPLIANCE WITH BREACH NOTIFICATION AND DATA SECURITY LAWS. Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law § 899-aa, § 899-bb, and State Technology Law § 208).

23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW. If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer programming, engineering, environmental health and mental health services, accounting, auditing, paralegal, legal or similar services, then in accordance with Section 163(4)(g) of the State Finance Law (as amended by Chapter 10 of the Laws of 2006), the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to SUNY, the Department of Civil Service and the State Comptroller.

24. PURCHASES OF APPAREL AND SPORTS EQUIPMENT. In accordance with State Finance Law Section 165(7), SUNY may determine that a bidder on a contract for the purchase of apparel or sports equipment is not a responsible bidder as defined in State Finance Law Section 163 based on (a) the labor standards applicable to the manufacture of the apparel or sports equipment, including employee compensation, working conditions, employee rights to form unions and the use of child labor; or (b) bidder's failure to provide information sufficient for SUNY to determine the labor conditions applicable to the manufacture of the apparel or sports equipment.

25. PROCUREMENT LOBBYING. To the extent this contract is a "procurement contract" as defined by State Finance Law §§ 139-j and 139-k, by signing this contract the Contractor certifies and affirms that all disclosures made in accordance with State Finance Law §§ 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the contract by providing written notification to the Contractor in accordance with the terms of the contract.

26. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING USE TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS. To the extent this contract is a contract as defined by Tax Law § 5-a, if the Contractor fails to make the certification required by Tax Law § 5-a or if

during the term of the contract, the Department of Taxation and Finance or SUNY discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor in accordance with the terms of the contract, if SUNY determines that such action is in the best interests of the State.

27. IRAN DIVESTMENT ACT. By entering into this contract, Contractor certifies in accordance with State Finance Law §165-a that it is not on the "Entities Determined to be Non-Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at: <https://ogs.ny.gov/iran-divestment-act-2012>.

Contractor further certifies that it will not utilize on this contract any subcontractor that is identified on the Prohibited Entities List. Contractor agrees that should it seek to renew or extend this contract, it must provide the same certification at the time the contract is renewed or extended. Contractor also agrees that any proposed Assignee of this contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by the State.

During the term of the contract, should SUNY receive information that a person (as defined in State Finance Law §165-a) is in violation of the above-referenced certifications, SUNY will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then SUNY shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

SUNY reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the Prohibited Entities list after contract award.

28. ADMISSIBILITY OF REPRODUCTION OF CONTRACT. Notwithstanding the best evidence rule or any other legal principle or rule of evidence to the contrary, the Contractor acknowledges and agrees that it waives any and all objections to the admissibility into evidence at any court proceeding or to the use at any examination before trial of an electronic reproduction of this contract, in the form approved by the State Comptroller, if such approval was required, regardless of whether the original of said contract is in existence.

THE FOLLOWING PROVISIONS SHALL APPLY ONLY TO THOSE CONTRACTS TO WHICH A HOSPITAL OR OTHER HEALTH SERVICE FACILITY IS A PARTY

29. Notwithstanding any other provision in this contract, the hospital or other health service facility remains responsible for insuring that any service provided pursuant to this contract complies with all pertinent provisions of Federal, state and local statutes, rules and regulations. In the foregoing sentence, the word "service" shall be construed to refer to the health care service rendered by the hospital or other health service facility.

30. (a) In accordance with the 1980 Omnibus Reconciliation Act (Public Law 96-499), Contractor hereby agrees that until the expiration of four years after the furnishing of services under this agreement, Contractor shall make available upon written request to the Secretary of Health and Human Services, or upon request, to the Comptroller General of the United States or any of their duly authorized representatives, copies of this contract, books, documents and records of the Contractor that are necessary to certify the nature and extent of the costs hereunder.

(b) If Contractor carries out any of the duties of the contract hereunder, through a subcontract having a value or cost of \$10,000 or more over a twelve-month period, such subcontract shall contain a clause to the effect that, until the expiration of four years after the furnishing of such services pursuant to such subcontract, the subcontractor shall make available upon written request to the Secretary of Health and Human Services or upon request to the Comptroller General of the United States, or any of their duly authorized representatives, copies of the subcontract and books, documents and records of the subcontract that are necessary to verify the nature and extent of the costs of such subcontract.

(c) The provisions of this section shall apply only to such contracts as are within the definition established by the Health Care Financing Administration, as may be amended or modified from time to time.

31. Hospital Retained Authority: Hospital Retained Authority: The Hospital retains direct, independent authority over the appointment and/or dismissal, in its sole discretion, of the facility's management level employees (including but not limited to, the Facility/Service Administrator/Director, the Medical Director, the Director of Nursing, the Chief Executive Officer, the Chief Financial Officer and the Chief Operating Officer) and all licensed or certified health care staff. The Hospital retains the right to adopt and approve, at its sole discretion, the facility's operating and capital budgets. The Hospital retains independent control over and physical possession of the facility's books and records. The Hospital retains independent control over and physical possession of the facility's operating policies and procedures. The Hospital retains full authority and responsibility for, and control over, the operations and management of the facility. The Hospital retains the right and authority to independently adopt, approve and enforce, in its sole discretion, policies affecting the facility's delivery of health care services. The Hospital retains the right to independently adopt, approve and enforce, at its sole discretion, the disposition of assets and authority to incur debts. The Hospital retains the right to approve, at its sole discretion, contracts for administrative services, management and/or clinical services. The Hospital retains the right to approve, at its sole discretion, any facility debt. The Hospital retains the right to approve, at its sole discretion, settlements of administrative proceeding or litigation to which the facility is a party. No powers specifically reserved to the Hospital may be delegated to, or shared by, the Contractor or any other person. In addition, if there is any disagreement between the parties to this Agreement regarding control between the Hospital and the Contractor, the terms of this Section shall control.

1. DEFINITIONS. The following terms shall be defined in accordance with Section 310 of the Executive Law:

STATE CONTRACT herein referred to as "State Contract", shall mean: (a) a written agreement or purchase order instrument, providing for a total expenditure in excess of twenty-five thousand dollars (\$25,000.00), whereby the State University of New York ("University") is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or a combination of the foregoing, to be performed for, or rendered or furnished to the University; (b) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; (c) and (d) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University as an owner of a state assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project.

SUBCONTRACT herein referred to as "Subcontract", shall mean any agreement for a total expenditure in excess of \$25,000 providing for services, including non-staffing expenditures, supplies or materials of any kind between a State agency and a prime contractor, in which a portion of the prime contractor's obligation under the State contract is undertaken or assumed by a business enterprise not controlled by the prime contractor.

WOMEN-OWNED BUSINESS ENTERPRISE herein referred to as "WBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more United States citizens or permanent resident aliens who are women; (b) an enterprise in which the ownership interest of such women is real, substantial and continuing; (c) an enterprise in which such women ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed fifteen million dollars (\$15,000,000), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

A firm owned by a minority group member who is also a woman may be certified as a minority-owned business enterprise, a women-owned business enterprise, or both, and may be counted towards either a minority-owned business enterprise goal or a women-owned business enterprise goal, in regard to any Contract or any goal, set by an agency or authority, but such participation may not be counted towards both such goals. Such an enterprise's participation in a Contract may not be divided between the minority-owned business enterprise goal and the women-owned business enterprise goal.

MINORITY-OWNED BUSINESS ENTERPRISE herein referred to as

"MBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more minority group members; (b) an enterprise in which such minority ownership is real, substantial and continuing; (c) an enterprise in which such minority ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed fifteen million dollars (\$15,000,000.00), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

MINORITY GROUP MEMBER shall mean a United States citizen or permanent resident alien who is and can demonstrate membership in one of the following groups: (a) Black persons having origins in any of the Black African racial groups; (b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American of either Indian or Hispanic origin, regardless of race; (c) Native American or Alaskan native persons having origins in any of the original peoples of North America. (d) Asian and Pacific Islander persons having origins in any of the Far East countries, South East Asia, the Indian Subcontinent or Pacific Islands.

CERTIFIED ENTERPRISE OR BUSINESS shall mean a business verified as a minority or women-owned business enterprise pursuant to section 314 of the Executive Law. A business enterprise which has been

approved by the New York Division of Minority & Women Business Development (“DMWBD”) for minority or women-owned enterprise status subsequent to verification that the business enterprise is owned, operated, and controlled by minority group members or women, and that also meets the financial requirements set forth in the regulations.

2. TERMS. The parties to the attached State Contract agree to be bound by the following provisions which are made a part hereof (the word "Contractor" herein refers to any party other than the University:

1(a) Contractor and its Subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. For these purposes, affirmative action shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

(b) Prior to the award of a State Contract, the Contractor shall submit an equal employment opportunity (EEO) policy statement to the University within the time frame established by the University.

(c) As part of the Contractor’s EEO policy statement, the Contractor, as a precondition to entering into a valid and binding State Contract, shall agree to the following in the performance of the State Contract: (i) The Contractor will not discriminate against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State Contracts;(ii) The Contractor shall state in all solicitations or

advertisements for employees that, in the performance of the State Contract, all qualified applicants will be afforded equal employment opportunities without discrimination; (iii) At the request of the University the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate, and that such union or representative will affirmatively cooperate in the implementation of the Contractor’s obligations herein.

(d) Form 108 - Staffing Plan To ensure compliance with this Section, the Contractor shall submit a staffing plan to document the composition of the proposed workforce to be utilized in the performance of the Contract by the specified categories listed, including ethnic background, gender, and Federal occupational categories. Contractors shall complete the Staffing plan form and submit it as part of their bid or proposal or within a reasonable time, but no later than the time of award of the contract.

(e) Form 112 - Workforce Employment Utilization Report (“Workforce Report”)

(i) Once a contract has been awarded and during the term of Contract, Contractor is responsible for updating and providing notice to SUNY of any changes to the previously submitted Staffing Plan. This information is to be submitted on a quarterly basis during the term of the contract to report the actual workforce utilized in the performance of the contract by the specified categories listed including ethnic background, gender, and Federal occupational categories. The Workforce Report must be submitted to report this information.

(ii) Separate forms shall be completed by Contractor and any subcontractor performing work on the Contract.

(iii) In limited instances, Contractor may not be able to separate out the

workforce utilized in the performance of the Contract from Contractor’s and/or subcontractor’s total workforce. When a separation can be made, Contractor shall submit the Workforce Report and indicate that the information provided related to the actual workforce utilized on the Contract. When the workforce to be utilized on the contract cannot be separated out from Contractor’s and/or subcontractor’s total workforce, Contractor shall submit the Workforce Report and indicate that the information provided is Contractor’s total workforce during the subject time frame, not limited to work specifically under the contract.

(f) Contractor shall comply with the provisions of the Human Rights Law, all other State and Federal statutory and constitutional non-discrimination provisions. Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

(g) The Contractor shall include the provisions of this section in every Subcontract in such a manner that the requirements of the provisions will be binding upon each Subcontractor as to work in connection with the State Contract, including the requirement that Subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and, when requested, provide to the Contractor information on the ethnic background, gender, and Federal occupational categories of the

employees to be utilized on the State Contract.

(h) To ensure compliance with the requirements of this paragraph, the University shall inquire of a Contractor whether the work force to be utilized in the performance of the State Contract can be separated out from the Contractor's and/or Subcontractors' total work force and where the work of the State Contract is to be performed. For Contractors who are unable to separate the portion of their work force which will be utilized for the performance of this State Contract, Contractor shall provide reports describing its entire work force by the specified ethnic background, gender, and Federal Occupational Categories, or other appropriate categories which the agency may specify.

(i) The University may require the Contractor and any Subcontractor to submit compliance reports, pursuant to the regulations relating to their operations and implementation of their affirmative action or equal employment opportunity program in effect as of the date the State Contract is executed.

(j) If a Contractor or Subcontractor does not have an existing affirmative action program, the University may provide to the Contractor or Subcontractor a model plan of an affirmative action program. Upon request, the Director of DMWBD shall provide a contracting agency with a model plan of an affirmative action program.

(k) Upon request, DMWBD shall provide the University with information on specific recruitment sources for minority group members and woman, and contracting agencies shall make such information available to Contractors

3. Contractor must provide the names, addresses and federal identification numbers of certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State Contract and a description of the Contract scope of work which the Contractor intends to structure to

increase the participation by Certified minority- and/or women-owned business enterprises on the State Contract, and the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State Contract which the Contractor intends to be performed by a certified minority- or woman-owned business enterprise. In the event the Contractor responding to University solicitation is joint venture, teaming agreement, or other similar arrangement that includes a minority- and women owned business enterprise, the Contractor must submit for review and approval: i. the name, address, telephone number and federal identification of each partner or party to the agreement; ii. the federal identification number of the joint venture or entity established to respond to the solicitation, if applicable; iii. A copy of the joint venture, teaming or other similar arrangement which describes the percentage of interest owned by each party to the agreement and the value added by each party; iv. A copy of the mentor-protégé agreement between the parties, if applicable, and if not described in the joint venture, teaming agreement, or other similar arrangement.

4. PARTICIPATION BY MINORITY GROUP MEMBERS AND WOMEN. The University shall determine whether Contractor has made conscientious and active efforts to employ and utilize minority group members and women to perform this State Contract based upon an analysis of the following factors:

(a) Whether Contractor established and maintained a current list of recruitment sources for minority group members and women, and whether Contractor provided written notification to such recruitment sources that contractor had employment opportunities at the time such opportunities became available.

(b) Whether Contractor sent letters to recruiting sources, labor unions, or authorized representatives of workers with which contractor has

a collective bargaining or other agreement or understanding requesting assistance in locating minority group members and women for employment.

(c) Whether Contractor disseminated its EEO policy by including it in any advertising in the news media, and in particular, in minority and women news media.

(d) Whether Contractor has attempted to provide information concerning its EEO policy to Subcontractors with which it does business or had anticipated doing business.

(e) Whether internal procedures exist for, at a minimum, annual dissemination of the EEO policy to employees, specifically to employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions. Such dissemination may occur through distribution of employee policy manuals and handbooks, annual reports, staff meetings and public postings.

(f) Whether Contractor encourages and utilizes minority group members and women employees to assist in recruiting other employees.

(g) Whether Contractor has apprentice training programs approved by the N.Y.S. Department of Labor which provides for training and hiring of minority group members and women.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor.

5. PARTICIPATION BY MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES. Based upon an analysis of the following factors, the University shall determine whether Contractor has made good faith efforts to provide for meaningful participation by minority-owned and women-owned business enterprises which have been certified by DMWBD:

(a) Whether Contractor has actively solicited bids for Subcontracts from qualified

M/WBEs, including those firms listed on the Directory of Certified Minority and Women-Owned Business Enterprises, and has documented its good faith efforts towards meeting minority and women owned business enterprise utilization plans by providing, copies of solicitations, copies of any advertisements for participation by certified minority- and women-owned business enterprises timely published in appropriate general circulation, trade and minority- or women-oriented publications, together with the listing(s) and date(s) of the publications of such advertisements; dates of attendance at any pre-bid, pre-award, or other meetings, if any, scheduled by the University, with certified minority- and women-owned business enterprises, and the reasons why any such firm was not selected to participate on the project.

(b) Whether Contractor has attempted to make project plans and specifications available to firms who are not members of associations with plan rooms and reduce fees for firms who are disadvantaged.

(c) Whether Contractor has utilized the services of organizations which provide technical assistance in connection with M/WBE participation.

(d) Whether Contractor has structured its Subcontracts so that opportunities exist to complete smaller portions of work.

(e) Whether Contractor has encouraged the formation of joint ventures, partnerships, or other similar arrangements among Subcontractors.

(f) Whether Contractor has requested the services of the Department of Economic Development (DED) to assist Subcontractors' efforts to satisfy bonding requirement.

(g) Whether Contractor has made progress payments promptly to its Subcontractors.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor. It shall be the responsibility of Contractor to

ensure compliance by every Subcontractor with these provisions.

6. MWBE Utilization Plan.

(a) The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan prior to the execution of the contract.

(b) MWBE Utilization Plan (Form 7557-107).

Contractors are required to submit a Utilization Plan on Form 7557-107 with their bid or proposal. Complete the following steps to prepare the Utilization Plan:

- i. list NYS Certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State contract;
- ii. insert a description of the contract scope of work which the Contractor intends to structure to increase the participation by NYS Certified minority- and women-owned enterprises on the State contract;
- iii. insert the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State contract which the Contractor intends to be performed by a NYS Certified minority- or women-owned business; and

(c) Any modifications or changes to the agreed participation by NYS Certified MWBEs after the Contract Award and during the term of the contract must be reported on a revised MWBE Utilization Plan and submitted to the SUNY University-wide MWBE Program Office.

(d) The University will review the MWBE Utilization Plan and will issue the Contractor a written notice of acceptance or deficiency within twenty (20) day of its receipt. A notice of deficiency shall include the:

- i. list NYS Certified minority- and women-owned business enterprises which the

- ii. Contractor intends to use to perform the State contract; name of any MWBE which is not acceptable for the purpose of complying with the MWBE participation goals;
- iii. reasons why it is not an acceptable element of the Contract scope of work which the MWBE Program Office has determined can be reasonably structured by the Contractor to increase the likelihood of participation in the Contract by MWBEs; and other information which the MWBE Program Office determines to be relevant to the MWBE Utilization Plan.
- iv.

(e) The Contractor shall respond to the notice of deficiency within seven (7) business days of receipt by submitting to the University a written remedy in response to the notice of deficiency.

- i. If the written remedy that is submitted is not timely or is found to be inadequate, the University-wide MWBE Program Office shall notify the Contractor and direct the Contractor to submit, within five (5) business days, a request for partial or total waiver of MWBE participation goals on forms provided by the University-wide MWBE Program Office.
- ii. Failure to file the waiver form in a timely manner may be grounds for disqualification of the bid or proposal.

(f) The University may disqualify a Contractor as being non-responsive under the following circumstances:

- i. If a Contractor fails to submit a MWBE Utilization Plan;
- ii. If a Contractor fails to submit a written remedy to a notice of deficiency in a MWBE Utilization Plan;
- iii. If a Contractor fails to submit a request for waiver; or

iv. If the MWBE Program Office determines that the Contractor has failed to document Good Faith Efforts.

(g) Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this Appendix.

(h) Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, SUNY shall be entitled to any remedy provided herein, including but not limited to, a finding of Contractor non-responsiveness.

7. Waivers.

(a) For Waiver Requests Contractor should use (Form 7557-114) – Waiver Request.

(b) If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver form documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete the University shall evaluate the request and issue a written notice of acceptance or denial within twenty (20) days of receipt.

(c) If University, upon review of the MWBE Utilization Plan and updated Quarterly MWBE Contractor Compliance Reports determines that Contractor is failing or refusing to comply with the Contract goals and no waiver has been issued in regards to such non-compliance, the University may issue a notice of deficiency to the Contractor. The contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

8. MWBE Contractor Compliance Report.

Contractor is required to submit an MWBE Contractor Compliance Report (Form 7557-112) to the University by the 5th day following each end of quarter over the term of the Contract documenting the progress made towards achievement of the MWBE goals of the Contract. Compliance Reports for construction contracts (Form 7557-110) must be submitted on a monthly basis.

9. GOALS. (a) GOALS FOR MINORITY AND WOMEN WORK FORCE PARTICIPATION.

(i) The University shall include relevant work force availability data, which is provided by the DMWBD, in all documents which solicit bids for State Contracts and shall make efforts to assist Contractors in utilizing such data to determine expected levels of participation for minority group members and women on State Contracts.

(ii) Contractor shall exert good faith efforts to achieve such goals for minority and women's participation. To successfully achieve such goals, the employment of minority group members and women by Contractor must be substantially uniform during the entire term of this State Contract. In addition, Contractor should not participate in the transfer of employees from one employer or project to another for the sole purpose of achieving goals for minority and women's participation.

(b) GOALS FOR MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES PARTICIPATION.

For all State Contracts in excess of \$25,000.00 whereby the University is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or an combination of the foregoing or all State Contracts in excess of \$100,000.00 whereby the University is committed to expend or does expend funds for the acquisition,

construction, demolition, replacement, major repair or renovation of real property and improvements thereon, Contractor shall exert good faith efforts to achieve a participation goal of ten percent (10%) for Certified Minority-Owned Business Enterprises and twenty percent (20%) for Certified Women-Owned Business Enterprises.

10. ENFORCEMENT. The University will be responsible for enforcement of each Contractor's compliance with these provisions. Contractor, and each Subcontractor, shall permit the University access to its books, records and accounts for the purpose of investigating and determining whether Contractor or Subcontractor is in compliance with the requirements of Article 15-A of the Executive Law. If the University determines that a Contractor or Subcontractor may not be in compliance with these provisions, the University may make every reasonable effort to resolve the issue and assist the Contractor or Subcontractor in its efforts to comply with these provisions. If the University is unable to resolve the issue of noncompliance, the University may file a complaint with the DMWBD.

Failure to comply with all of the requirements herein may result in a finding of non-responsiveness, non-responsibility and/or a breach of contract, leading to the withholding of funds or such other actions, remedies or enforcement proceedings as allowed by the Contract.

11. DAMAGES FOR NON COMPLIANCE.

Where the University determines that Contractor is not in compliance with the requirements of the Contract and Contractor refuses to comply with such requirements, or if Contractor is found to have willfully and intentionally failed to comply with the MWBE participation goals, Contractor shall be obligated to pay

liquidated damages to the University. Such liquidated damages shall be calculated as an amount equaling the difference between:

- a. All sums identified for payment to MWBEs had the Contractor achieved the contractual MWBE goals; and
- b. All sums actually paid to MWBEs for work performed or materials supplied under the Contract.

In the event a determination has been made which requires the payment of liquidated damages and such identified sums have not been withheld by the University, Contractor shall pay such liquidated damages to the University within sixty (60) days after such damages are assessed, unless prior to the expiration of such sixtieth day, the Contractor has filed a complaint with the Director of the

Division of Minority and Woman Business Development pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the liquidated damages shall be payable if Director renders a decision in favor of the University.

BID BOND

BOND NO. _____

KNOW ALL PERSONS BY THESE PRESENTS, that _____

having an office at
_____(hereinafter called the "Principal") and the
_____(hereinafter called the "Surety") are held and firmly bound unto the State University of New York (hereinafter called the University)
in the full and just sum of

_____ dollars (\$_____)

*(in words)**(in figures)*

good and lawful money of the United States of America, or in the full and just sum of the difference between the Total Bid of the Principal and the Total Bid of the bidder submitting the next lowest bid, whichever sum shall be higher, for the payment of which said sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the University a Proposal for Project No. _____

Titled _____

which Proposal is incorporated herein by reference and made a part hereof as fully and to the same extent as if set forth at length herein;

NOW, THEREFORE, the condition of this obligation is such that in the event (1) the Principal's Total Bid is the lowest one submitted and the Principal timely provides the Post-Bid Information required under Section 8 of the Information for Bidders or (2) the University shall accept the Proposal of the Principal and the Principal shall enter into a Contract with the University in accordance with the terms of such Proposal and/or enter into certain prescribed subcontracts in accordance with the terms of such Proposal and give such Bond or Bonds as may be specified in the Bidding or Contract Documents, then this obligation shall be null and void, otherwise to remain in full force and effect.

BID BOND

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the University may accept the Proposal of the Principal and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and caused this instrument to be signed by its

_____ on this

_____ day of _____, 20_____

Principal By

IN WITNESS WHEREOF, the Surety has hereunto set its hand and seal and caused this instrument to be signed by its

_____ on this

_____ day of _____, 20_____

Surety By

ACKNOWLEDGMENTS FOR BID BOND

(Acknowledgment by Principal, unless it is a Corporation)

STATE OF NEW YORK)
) ss.: _____
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known and known to me to be the person(s) described in and who
executed the foregoing instruments and acknowledged that he / she executed the same.

Notary Public

(Acknowledgment by Principal, if a Corporation)

STATE OF NEW YORK)
) ss.: _____
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known, who, being duly sworn, did depose and say
that he / she resides in _____;
that he / she is the _____
of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said corporation; that the seal
affixed to said instruments is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he / she
signed their name thereto by like order.

Notary Public

(Acknowledgment by Surety Company)

STATE OF)
) ss.: _____
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known, who, being by me duly sworn, did depose and say
that he / she resides in _____;
that he / she is the _____
of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said corporation; that the
seal affixed to said instruments is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation, and that
he / she signed their name thereto by like order; and that the liabilities of said company do not exceed its assets as ascertained in the manner
provided by the laws of the State of New York.

Notary Public



PROSPECTIVE BIDDERS NOTICE MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISE REQUIREMENTS: CONSTRUCTION CONTRACTS

To Prospective Bidders:

Consistent with the State University of New York (SUNY)'s commitment and in accordance with Article 15-A of the New York State Executive Law, contractors are required to ensure that good faith efforts are made to include meaningful participation by Minority and Women-Owned Business Enterprises (MWBE). These requirements apply to all SUNY construction contracts in excess of \$100,000.

Receipt of the MWBE utilization plan is required within seven (7) business days after the bid opening, for construction contracts only. The Contract Administrator shall provide MWBE Utilization Plan Form (107) to the campus MWBE Program Coordinator for review and approval for the three apparent low bidders ("Contractor"). The MWBE forms identified below shall be submitted by all bidders.

- a. MWBE Utilization Plan ([7557-107](#))
- b. MWBE-EEO Staffing Plan ([7557-108](#))
- c. MWBE-EEO Policy ([7557-104](#)) or the vendor/contractor's own EEO Policy Statement

If the Contractor's MWBE participation rate shown on its MWBE Utilization Plan is below 30%, the campus MWBE Program Coordinator will provide a written notice of deficiency of the Utilization Plan within twenty (20) business days of its submission to the contractor, as required under 5 NYCRR §142.4.

The notice will include, but not be limited to the following:

- a. A list of NYS certified MWBEs that the contractor could potentially use within the contract scope of work;
- b. The name of any MWBE which is not acceptable for the purpose of complying with the MWBE participation goals; and
- c. Any other information which the MWBE Program Coordinator determines to be relevant to develop an approvable MWBE Utilization Plan.

The contractor shall respond to the notice of deficiency by submitting a revised MWBE Utilization Plan within seven (7) business days, as required by 5 NYCRR Part §142.6 (e) to the MWBE Program Coordinator.

If the deficiency is not corrected and the MWBE participation rate on the MWBE Utilization Plan is still below 30%, the contractor should request a waiver.

The Waiver Request Form submitted by the Contractor will include, but not be limited to, the following:

- a. A request for partial or total waiver of MWBE goals as required by 5 NYCRR Part §142.6 (f) on Request for Waiver Form ([Form 7557-114](#)) provided by the University-wide MWBE Program Office.
- b. Copy of the deficient Utilization Plan.
- c. Work Scope of this contract. If there are subcontracting opportunities, please provide documentation d, e, and f.
- d. Screenshot of searching results for available MWBEs in [NYS M/WBE Directory](#).
- e. Copy of email messages containing the request for quote, along with the responses from MWBEs.
- f. Forms required to obtain this information are:
[7557-101](#) – MWBE Contractor Solicitation Letter
[7557-102](#) – MWBE Participation Quote

[7557-103](#) – MWBE Contractor Unavailability Certification

Please submit the above documentations by mail, fax, or email:

Binghamton University
Rachel Talcott
4400 Vestal Parkway East
Binghamton, New York 13902
Fax: (607) 777-6643
Tel: (607) 777-3591
Email: rtalcott@binghamton.edu

- OR - IF APPLICABLE

Please submit the above documentation to the University-wide MWBE Program Office:

SUNY System Administration at State University Plaza,
Office of Diversity, Equity and Inclusion
University-wide MWBE Program
Albany, NY 12246
Fax: (518)-320-1548
Tel: (518)-320-1452
Email: MWBEProgram@suny.edu

Information regarding this legislation may be found at: [Participation by Minority Group Members and Women \(MWBEs\) with Respect to State University of New York Contracts](#) on the [State University of New York](#) web site.

STATE UNIVERSITY OF NEW YORK MWBE UTILIZATION PLAN INSTRUCTIONS (FOR ALL CONTRACT TYPES)

A letter of explanation and documentation of efforts should accompany any MBE/WBE Utilization Plan that falls short of the stated goals. Without an approved MBE/WBE Utilization Plan, SUNY's Notice of Award and Contract may be withheld.

If you have questions or need assistance related to the SUNY's Minority and Women's Business requirements call the University-wide MWBE Program Office at 518-320-1189 or email MWBEprogram@suny.edu.

1. The three low bidding contractors ("Contractors") are required to submit a Utilization Plan (107) to the MWBE Program Coordinator within seven (7) calendar days after the opening of bids for construction contracts exceeding \$100,000.
2. The MWBE Program Coordinator is required to submit the mandatory MWBE documentation to the University-wide MWBE Program Office web based contract management system for commodity, service and construction related consultant service contracts exceeding \$25,000 for construction project exceeding \$100,000 upon contract execution.
3. The MBE and WBE goals are separate and not to be treated as one combined goal.
4. The MBE and WBE firms included are businesses the bidder *seriously expects* to include in the project activity.
5. The contractor reasonably commits to the dollar values included in the plan for participation by MBE and WBE subcontractors and suppliers.
6. MBE and WBE firms **must be certified** by the New York State Department of Economic Development, Division of Minority and Women Business Development. A directory of certified minority and women-owned business enterprises is available on the internet at <https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp>.
7. Contractors utilizing MWBE firms for supplies/materials/equipment whose NYS certification profile designates them as Broker will receive an MWBE utilization credit for the actual monetary value of the broker fees or the actual markup percentage of the items brokered.
8. MBE and WBE Participation:

The actual services provided by the MBE or WBE must be essential in the performance of the scope of work for the applicable contract. Utilization of a certified MBE or WBE as a conduit or pass through for participation credit is **strictly prohibited**. It is the discretion of University-wide MWBE Program to determine whether services are essential in the performance of the scope of work and offer a determination of the appropriateness of work allowed for lower tier subcontracting in accordance with practices generally accepted in the construction industry. The services the MBE or WBE will provide must be among those explicitly identified in the profile (codes) of firm as listed in the NYS Empire State Development Directory of Certified MWBEs. Firms submitted or who participate in the project outside of these conditions and without specific prior approval by SUNY will not be credited toward the MWBE Utilization Plan and goals for the contract.
9. Prior to submitting the Plan, the bidders should confirm the following:
 - a. MBE and WBE firms are NYS certified;
 - b. MBE **or** WBE designation ~ Dual certified firms may be used as *either* but **not** both;
 - c. MBE and WBE firms are being used for item(s) within their certification product codes;
 - d. MBE and WBE firms will perform work for which they have been submitted; and
 - e. 2nd tier subcontractors and/or suppliers are noted as such and the purchaser of the product identified (i.e. purchase by electrical sub)

The prime Contractor is responsible for ensuring participation provided by subcontractors for 2nd and 3rd tier MBE and WBE participation.

Submission of a Utilization Plan which fails to meet or exceed each goal shall be accompanied by documentation of specific efforts undertaken both pre and post bid. The campus MWBE Program Coordinator will review and notify Contractor of its assessment.

The University-wide MWBE Program Office in collaboration with the campus MWBE Program Coordinator will review the Utilization Plan and notify the contractor of any deficiencies and determine necessary actions to bring the Utilization Plan into compliance. The University-wide MWBE Program Office reserves the right to require the contractor to provide sufficient documentation of the efforts made in the development of the Plan. The documentation should meet the good faith efforts standard under 5 NYCRR Part §141.6, and demonstrate the contractor's commitment to providing opportunities for MBE and WBE firms in the development of the plan.

A copy of the approved Utilization Plan will be provided to the contractor after issuance of Notice of Award.

MWBE FORM (107) INSTRUCTIONS

Requested information must be completed and submitted within seven (7) days after the bid opening.

Subcontractor Name & Address

Name & Address of each MBE/WBE subcontractor or supplier

MBE or WBE

Minority (MBE) or Women (WBE) Designation

Federal ID

Provide accurate Federal ID number of each MBE/WBE subcontractor or supplier

Dollar Value of Subcontract or Purchase Order

This is the total value of the signed subcontract. If this value is different from the amount in the approved MBE/WBE utilization plan, an explanation should be provided.

Description of Work or Supplies

Brief description of work performed or supplies provided by the MBE/WBE subcontractor or supplier

Schedule

This is the anticipated start and completion dates for each MBE/WBE subcontractor or supplier.
Do not include the construction schedule for the life of the entire project.

Signature

To be signed by an Officer of the Company

- The information included on the form is subject to verification by the campus MWBE Program Coordinator.
- The campus MWBE Program Coordinator must be notified prior to changes made to the approved MBE/WBE Utilization Plan.

Questions regarding this form should **first** be directed to the [campus MWBE Program Coordinator](#) (click the link and be directed to the SUNY MWBE Campus Contacts directory on the University-wide MWBE web site).

Questions regarding this form should be directed to the University-wide MWBE Program Office at (518) 320-1189 or via e-mail: MWBEprogram@suny.edu.

Submit To:

**State University of New York
Office of Diversity, Equity and Inclusion University-wide MWBE Program
353 Broadway
Albany, NY 12246
Or MWBEProgram@sunv.edu**

**MINORITY AND WOMEN’S BUSINESS - EQUAL EMPLOYMENT
OPPORTUNITY PROGRAM POLICY STATEMENT**

Policy Statement

The _____ commits to carrying out the intent of the New York State
(Name of Campus, Consultant, Contractor)
Executive Law, Article 15-A which assures the meaningful participation of minority and
women’s business enterprises in contracting and the meaningful participation of minorities and
women in the workforce on activities financed by public funds.

Minority Business Officer

_____ is designated as the Minority Business Enterprise Officer
(Name of Designated Officer)
responsible for administering the Minority and Women’s Business-Equal Employment
Opportunity (M/WBE-EEO) program.

Phone _____

Email _____

M/WBE Contract Goals

_____ % Minority Business Enterprise Participation

_____ % Women’s Business Enterprise Participation

EEO Contract Goals

10% Minority Labor Force Participation

10% Female Labor Force Participation

(Authorized Representative)

Title: _____

Date: _____

EEO STAFFING PLAN

Instructions on page 2

Solicitation No.:	Reporting Entity:	Report includes Contractor's/Subcontractor's: <input type="checkbox"/> Work force to be utilized on this contract <input type="checkbox"/> Total work force
Offeror's Name:		<input type="checkbox"/> Offerer
Offeror's Address:		<input type="checkbox"/> Subcontractor Subcontractor's name _____

Enter the total number of employees for each classification in each of the EEO-Job Categories identified

EEO-Job Category	Total Work force	Work force by Gender		Work force by Race/Ethnic Identification								Disabled		Veteran				
		Total Male (M)	Total Female (F)	White (M) (F)		Black (M) (F)		Hispanic (M) (F)		Asian (M) (F)		Native American (M) (F)		(M)	(F)	(M)	(F)	
Officials/Administrators																		
Professionals																		
Technicians																		
Sales Workers																		
Office/Clerical																		
Craft Workers																		
Laborers																		
Service Workers																		
Temporary /Apprentices																		
Totals																		

PREPARED BY (Signature):	TELEPHONE NO.:	DATE:
	EMAIL ADDRESS:	
NAME AND TITLE OF PREPARER (Print or Type):		Submit completed with bid or proposal

General instructions: All Offerors and each subcontractor identified in the bid or proposal must complete an EEO Staffing Plan (ADM/EEO 100) and submit it as part of the bid or proposal package. For construction, except for contracts of \$100,000 or less, the three lowest bidders shall submit to the University for its approval an EEO Staffing Plan within seven (7) calendar days after the opening of bids. Where the work force to be utilized in the performance of the State contract can be separated out from the contractor's and/or subcontractor's total work force, the Offeror shall complete this form only for the anticipated work force to be utilized on the State contract. Where the work force to be utilized in the performance of the State contract cannot be separated out from the contractor's and/or subcontractor's total work force, the Offeror shall complete this form for the contractor's and/or subcontractor's total work force.

Instructions for completing:

1. Enter the Solicitation number that this report applies to along with the name and address of the Offeror.
2. Check off the appropriate box to indicate if the Offeror completing the report is the contractor or a subcontractor.
3. Check off the appropriate box to indicate work force to be utilized on the contract or the Offerors' total work force.
4. Enter the total work force by EEO job category.
5. Break down the anticipated total work force by gender and enter under the heading 'Work force by Gender'
6. Break down the anticipated total work force by race/ethnic identification and enter under the heading 'Work force by Race/Ethnic Identification'. Contact the M/WBE Permissible contact(s) for the solicitation if you have any questions.
7. Enter information on disabled or veterans included in the anticipated work force under the appropriate headings.
8. Enter the name, title, phone number and email address for the person completing the form. Sign and date the form in the designated boxes.

RACE/ETHNIC IDENTIFICATION

Race/ethnic designations as used by the Equal Employment Opportunity Commission do not denote scientific definitions of anthropological origins. For the purposes of this form, an employee may be included in the group to which he or she appears to belong, identifies with, or is regarded in the community as belonging. However, no person should be counted in more than one race/ethnic group. The race/ethnic categories for this survey are:

- **WHITE** (Not of Hispanic origin) All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.
- **BLACK** a person, not of Hispanic origin, who has origins in any of the black racial groups of the original peoples of Africa.
- **HISPANIC** a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.
- **ASIAN & PACIFIC ISLANDER** a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands.
- **NATIVE INDIAN (NATIVE AMERICAN/ ALASKAN NATIVE)** a person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

OTHER CATEGORIES

- **DISABLED INDIVIDUAL** any person who:
 - has a physical or mental impairment that substantially limits one or more major life activity(ies)
 - has a record of such an impairment; or
 - is regarded as having such an impairment.
- **VIETNAM ERA VETERAN** a veteran who served at any time between and including January 1, 1963 and May 7, 1975.
- **GENDER** Male or Female



PROSPECTIVE BIDDERS NOTICE MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISE REQUIREMENTS: COMMODITY AND SERVICE CONTRACTS

To Prospective Bidders:

Consistent with the State University of New York (SUNY) 's commitment and in accordance with Article 15-A of the New York State Executive Law, contractors are required to ensure that good faith efforts are made to include meaningful participation by Minority and Women-Owned Business Enterprises (MWBE). These requirements apply to all SUNY commodity and service contracts in excess of \$25,000.

Bidders must submit MWBE documentation with all of the bids or proposals for commodities and services contracts when MWBE goals apply. The MWBE forms identified below shall be submitted by all bidders.

- a. MWBE Utilization Plan ([7557-107](#))
- b. MWBE-EEO Staffing Plan ([7557-108](#))
- c. MWBE-EEO Policy ([7557-104](#)) or the vendor/contractor's own EEO Policy Statement

If the Bidder's MWBE participation rate shown on its MWBE Utilization Plan is below 30%, the campus MWBE Program Coordinator will provide a written notice of deficiency of the Utilization Plan within twenty (20) business days of its submission to the contractor, as required under 5 NYCRR §142.4.

The notice will include but not be limited to the following:

- a. A list of NYS certified MWBEs that the contractor could potentially use within the contract scope of work;
- b. The name of any MWBE which is not acceptable for the purpose of complying with the MWBE participation goals; and
- c. Any other information which the MWBE Program Coordinator determines to be relevant to develop an approvable MWBE Utilization Plan.

The contractor shall respond to the notice of deficiency by submitting a revised MWBE Utilization Plan within seven (7) business days, as required by 5 NYCRR Part §142.6 (e) to the MWBE Program Coordinator.

If the deficiency is not corrected and the MWBE participation rate on the MWBE Utilization Plan is still below 30%, the contractor should request a waiver.

The Waiver Request Form submitted by the contractor will include, but not be limited to, the following:

- a. A request for partial or total waiver of MWBE goals as required by 5 NYCRR Part §142.6 (f) on Request for Waiver ([Form 7557-114](#)) provided by the University-wide Program Office.
- b. Copy of the deficient Utilization Plan.
- c. Work Scope of this contract. If there are subcontracting opportunities, please provide documentation d, e, and f.
- d. Screenshot of searching results for available MWBEs in [NYS M/WBE Directory](#).
- e. Copy of email messages containing the request for quote along with the responses from MWBEs.
- f. Forms recommended to obtain information on MWBE vendor solicitation efforts are:
[7557-101](#) – MWBE Contractor Solicitation Letter
[7557-102](#) – MWBE Participation Quote
[7557-103](#) – MWBE Contractor Unavailability Certification

Please submit the above documentations by mail, fax, or email:

Binghamton University
Rachel Talcott
4400 Vestal Parkway East
Binghamton, New York 13902
Fax: (607) 777-6643
Tel: (607) 777-3591
Email: rtalcott@binghamton.edu

- OR - IF APPLICABLE

Please submit the above documentation to the University-wide MWBE Program Office:

SUNY System Administration at State University Plaza,
Office of Diversity, Equity and Inclusion
University-wide MWBE Program
Albany, NY 12246
Fax: (518)-320-1548
Tel: (518)-320-1452
Email: MWBEProgram@suny.edu

Information regarding this legislation may be found at: [Participation by Minority Group Members and Women \(MWBEs\) with Respect to State University of New York Contracts](#) on the [State University of New York](#) web site.

STATE UNIVERSITY OF NEW YORK MWBE UTILIZATION PLAN INSTRUCTIONS [FOR ALL CONTRACT TYPES]

A letter of explanation and documentation of efforts should accompany any MBE/WBE Utilization Plan that falls short of the stated goals. Without an approved MBE/WBE Utilization Plan, SUNY's Notice of Award and Contract may be withheld.

If you have questions or need assistance related to the SUNY's Minority and Women's Business requirements call the University-wide MWBE Program Office at 518-320-1189 or email MWBEprogram@suny.edu.

1. The three low bidding contractors ("Contractor") are required to submit a Utilization Plan (107) to the MWBE Program Coordinator within seven (7) calendar days after the opening of bids for construction contracts exceeding \$100,000.
2. The MWBE Program Coordinator is required to submit the mandatory MWBE documentation to the University-wide MWBE Program Office web based contract management system for commodity, service and construction related consultant service contracts exceeding \$25,000 and for construction projects exceeding \$100,000 upon contract execution.
3. The MBE and WBE goals are separate and not to be treated as one combined goal.
4. The MBE and WBE firms included are businesses the bidder *seriously expects* to include in the project activity.
5. The contractor reasonably commits to the dollar values included in the plan for participation by MBE and WBE subcontractors and suppliers.
6. MBE and WBE firms **must be certified** by the New York State Department of Economic Development, Division of Minority and Women Business Development. A directory of certified minority and women-owned business enterprises is available on the internet at <https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp>.
7. Contractors utilizing MWBE firms for supplies/materials/equipment whose NYS certification profile designates them as Broker will receive an MWBE utilization credit for the actual monetary value of the broker fees or the actual markup percentage of the items brokered.
8. MBE and WBE Participation:

The actual services provided by the MBE or WBE must be essential in the performance of the scope of work for the applicable contract. Utilization of a certified MBE or WBE as a conduit or pass through for participation credit is **strictly prohibited**. It is the discretion of University-wide MWBE Program to determine whether services are essential in the performance of the scope of work and offer a determination of the appropriateness of work allowed for lower tier subcontracting in accordance with practices generally accepted in the construction industry. The services the MBE or WBE will provide must be among those explicitly identified in the profile (codes) of firm as listed in the NYS Empire State Development Directory of Certified MWBEs. Firms submitted or who participate in the project outside of these conditions and without specific prior approval by SUNY will not be credited toward the MWBE Utilization Plan and goals for the contract.
9. Prior to submitting the Plan, the Contractors should confirm the following:
 - a. MBE and WBE firms are NYS certified;
 - b. MBE **or** WBE designation ~ Dual certified firms may be used as *either* but **not** both;
 - c. MBE and WBE firms are being used for item(s) within their certification product codes;
 - d. MBE and WBE firms will perform work for which they have been submitted; and
 - e. 2nd tier subcontractors and/or suppliers are noted as such and an MWBE Utilization credit shall be given for 60% of the total contract value of supply purchases or services rendered (for example, when an electrical subcontractor purchases from a 3rd party supplier an MWBE utilization credit will be given for 60% of the total contract value).

The prime Contractor is responsible for ensuring participation provided by subcontractors for 2nd and 3rd tier MBE and WBE participation.

Submission of a Utilization Plan which fails to meet or exceed each goal shall be accompanied by documentation of specific efforts undertaken both pre and post bid. The campus MWBE Program Coordinator will review and notify contractor of its assessment.

The University-wide MWBE Program Office in collaboration with the campus MWBE Program Coordinator will review the Utilization Plan and notify the contractor of any deficiencies and determine necessary actions to bring the Utilization Plan into compliance. The University-wide MWBE Program Office reserves the right to require the contractor to provide sufficient documentation of the efforts made in the development of the Plan. The documentation should meet the good faith efforts standard under 5 NYCRR Part §141.6, and demonstrate the contractor's commitment to providing opportunities for MBE and WBE firms in the development of the Utilization Plan.

A copy of the approved Utilization Plan will be provided to the contractor after issuance of Notice of Award.

MWBE FORM (107) INSTRUCTIONS

Requested information must be completed and submitted within seven (7) days after the bid opening.

Subcontractor Name & Address

Name & Address of each MBE/WBE subcontractor or supplier

MBE or WBE

Minority (MBE) or Women (WBE) Designation

Federal ID

Provide accurate Federal ID number of each MBE/WBE subcontractor or supplier

Dollar Value of Subcontract or Purchase Order

This is the total value of the signed subcontract. If this value is different from the amount in the approved MBE/WBE utilization plan, an explanation should be provided.

Description of Work or Supplies

Brief description of work performed or supplies provided by the MBE/WBE subcontractor or supplier

Schedule

This is the anticipated start and completion dates for each MBE/WBE subcontractor or supplier.
Do not include the construction schedule for the life of the entire project.

Signature

To be signed by an Officer of the Company

- The information included on the form is subject to verification by the campus MWBE Program Coordinator.
- The campus MWBE Program Coordinator must be notified prior to changes made to the approved MBE/WBE Utilization Plan.

Questions regarding this form should **first** be directed to the [campus MWBE Program Coordinator](#) (click the link and be directed to the SUNY MWBE Campus Contacts directory on the University-wide MWBE web site).

Questions regarding this form should be directed to the University-wide MWBE Program Office at (518) 320-1189 or via e-mail: MWBEprogram@suny.edu.

Submit To:

**State University of New York
Office of Diversity, Equity and Inclusion University-wide MWBE Program
353 Broadway
Albany, NY 12246
Or MWBEProgram@sunv.edu**



**UNIVERSITY-WIDE SDVOB PROGRAM
UTILIZATION PLAN**

SUNY Project No. _____
 Contractor: _____
 Address: _____
 Phone Number: _____

Bid Date: [Click here to enter a date.](#) Agreement/Contract Value: _____
 Primary Contact: _____
 City: _____ State: _____ Zip Code: _____
 Fax Number: _____ E-Mail: _____

GOALS: SDVOB _____ %

Campus: _____

SUBCONTRACTOR	FEDERAL ID #	DOLLAR VALUE OF CONTRACT OR PURCHASE ORDER	DESCRIPTION OF WORK OR SUPPLIES	SUBCONTRACTOR/SUPPLIER SCHEDULE	
				START DATE	COMPLETION DATE
Company Name: _____ Street Address: _____ Contact Name: _____ E-Mail Address: _____				Click here to enter a date.	Click here to enter a date.
Company Name: _____ Street Address: _____ Contact Name: _____ E-Mail Address: _____				Click here to enter a date.	Click here to enter a date.
Company Name: _____ Street Address: _____ Contact Name: _____ E-Mail Address: _____				Click here to enter a date.	Click here to enter a date.
Company Name: _____ Street Address: _____ Contact Name: _____ E-Mail Address: _____				Click here to enter a date.	Click here to enter a date.

In accordance with the SUNY Contract Documents and Executive Law Article 17-B, my firm seriously expects to use the NYS certified SDVOB firms listed above. The Contractor shall immediately notify and request approval prior to any changes to this Utilization Plan from the Campus MWBE Program Coordinator.



NAME: _____ TITLE: _____ COMPANY OFFICER'S SIGNATURE _____ DATE: _____
[Click here to enter a date.](#)

APPROVED: DEFICIENT: MWBE PROGRAM COORDINATOR: _____ DATE: _____



UNIVERSITY-WIDE SDVOB PROGRAM UTILIZATION PLAN SDVOB FORM (107) INSTRUCTIONS

A letter of explanation and documentation of efforts must accompany any SDVOB Utilization Plan that falls short of the stated goals. Without an approved SDVOB Utilization Plan, SUNY's Notice of Award and Contract may be withheld.

If you have questions or need assistance related to the SUNY's Service-Disabled Veteran-Owned Business requirements call the University-wide MWBE Program Office at 518-320-1340 or email MWBEprogram@suny.edu.

1. The three low bidding contractors ("Contractors") are required to submit an SDVOB Utilization Plan (Form 7465-107) to the MWBE Program Coordinator within seven (7) calendar days after the opening of bids for construction contracts exceeding \$100,000.
2. The MWBE Program Coordinator is required to submit the mandatory SDVOB documentation to the University-wide MWBE Program Office after the opening of bids for commodity, service and construction related consultant service contracts exceeding \$25,000 for the lowest bidding Contractor.
3. The SDVOB goals are not related to any other goals. Dual certified firms may be used to meet both MBE and SDVOB or WBE and SDVOB goals.
4. The SDVOB firms included are businesses the bidder *seriously expects* to include in the project activity.
5. The Contractor must reasonably commit to the values included in the Utilization Plan for participation by SDVOB subcontractors and suppliers.
6. SDVOB firms must be certified by the New York State Office of General Services Division of Service-Disabled Veterans' Business Development. A directory of NYS Certified Service-Disabled Veteran-Owned Businesses is available on the internet at <http://ogs.ny.gov/Core/SDVOBA.asp>.
7. Contractors utilizing SDVOB firms for supplies/materials/equipment whose NYS certification profile designates them as a Broker will receive an SDVOB utilization credit for the actual monetary value of the broker fees or the actual markup percentage of the items brokered.
8. SDVOB Participation:

The actual services provided by the SDVOB must be essential in the performance of the scope of work for the applicable contract. Utilization of a certified SDVOB as a conduit or pass through for participation credit is strictly prohibited. It is the discretion of the SUNY to determine whether services are essential in the performance of the scope of work and to offer a determination of the appropriateness of work allowed for lower tier subcontracting, in accordance with practices generally accepted in the construction industry. The services the SDVOB will provide must be among those explicitly identified in the profile (codes) of the firm as listed in the NYS Office of General Services Directory of Certified SDVOBs. Firms submitted or firms that participate in the project outside of these conditions and without specific prior approval by SUNY will not be credited toward the SDVOB Utilization Plan and goals for the contract. ☐

9. Prior to submitting the Utilization Plan, the bidders should confirm the following:
 - a. SDVOB firms are NYS certified;
 - b. SDVOB designation ~ Dual certified firms may be used as *MBE/SDVOB and/or WBE/SDVOB*;
 - c. SDVOB firms are being used for item(s) within their certification product codes as indicated in their SDVOB Directory firm profile;
 - d. SDVOB firms will perform work for which they have been submitted; and
 - e. 2nd tier subcontractors and/or suppliers are identified as such and SDVOB Utilization credit shall be given for 60% of the total contract value of supply purchases or services rendered (for example, when an electrical subcontractor purchases from a 3rd party supplier an SDVOB utilization credit will be given for 60% credit of the total contract value).



UNIVERSITY-WIDE SDVOB PROGRAM UTILIZATION PLAN

The prime Contractor is responsible for ensuring participation provided by subcontractors for 2nd and 3rd tier SDVOB participation.

Submission of a Utilization Plan which fails to meet or exceed each goal shall be accompanied by documentation of specific efforts undertaken both pre and post bid. The campus MWBE Program Coordinator will review and notify Contractor of its assessment.

The University-wide MWBE Program Office in collaboration with the campus MWBE Program Coordinator will review the Utilization Plan and notify the Contractor of any deficiencies and determine necessary actions to bring the Utilization Plan into compliance. The University-wide MWBE Program Office reserves the right to require the Contractor to provide sufficient documentation of the efforts made in the development of the Utilization Plan. The documentation should be responsive to good faith efforts and demonstrate the Contractor's commitment to providing opportunities for SDVOB firms in the development of the Utilization Plan.

A copy of the approved Utilization Plan will be provided to the Contractor after issuance of Notice of Award.



UNIVERSITY-WIDE SDVOB PROGRAM UTILIZATION PLAN

Requested information must be completed and submitted within seven (7) days after the bid opening.

Subcontractor Name & Address

Name & Address of each SDVOB subcontractor or supplier.

SDVOB

Service-Disabled Veteran-Owned Designation.

Federal ID

Provide accurate Federal ID number of each SDVOB subcontractor or supplier.

Dollar Value of Subcontract or Purchase Order

This is the total value of the signed subcontract. If this value is different from the amount in the approved SDVOB Utilization Plan, an explanation should be provided.

Description of Work or Supplies

Brief description of work performed or supplies provided by the SDVOB subcontractor or supplier.

Schedule

This is the anticipated start and completion dates for each SDVOB subcontractor or supplier. Do not include the construction schedule for the life of the entire project.

Signature

To be signed by an Officer of the Company.

- The information included on the form is subject to verification by the University-wide MWBE Program Office.
- The University-wide MWBE Program Office must be notified prior to changes made to the approved SDVOB Utilization Plan.

Questions regarding this form should be directed to the University-wide MWBE Program Office at (518) 320- 1452 or via e-mail: mwbeprogram@suny.edu.

Submit To:

State University of New York
Office of Diversity, Equity and Inclusion University-wide MWBE Program
353 Broadway
Albany, NY 12246
or MWBEProgram@suny.edu



Affirmation AND Disclosure and Certification
with respect to State Finance Law §§ 139-j and 139-k

A complete copy of the State University of New York Procurement Lobbying Policy and Procedure is available for review at <http://www.suny.edu/sunypp/>.

Procurement Description:	_____
Procurement Proposal No:	_____

A. Affirmation with respect to State Finance Law §§ 139-j and 139-k:
Offerer **AFFIRMS** that it has reviewed and understands the Policy and Procedure of the State University of New York relating to State Finance Law §§ 139-j and 139-k, and agrees to comply with State University's procedure relating to Contacts with respect to this procurement.

B. Disclosure & Certification with respect to State Finance Law §§ 139-j and 139-k:
1. Has a Governmental Entity, as defined in State Finance Law §139j(l)(a), made a determination of non-responsibility with respect to the Offerer within the previous four years where such finding was due to a violation of State Finance Law §139-j or the intentional provision of false or incomplete information with respect to previous determinations of non-responsibility?

No _____
Yes If yes, identify the following details:
Governmental Entity which made the finding: _____
Date of finding: _____
Basis of finding: _____

2. Has a Governmental Entity terminated or withheld a procurement contract with the Offerer because of violations of State Finance Law § 139-j or the intentional provision of false or incomplete information with respect to previous determinations of non-responsibility?

No _____
Yes If yes, identify the following details:
Governmental Entity which terminated the contract: _____
Date of contract termination or withholding: _____
Identify the related procurement contract: _____

Offerer **CERTIFIES** that all information provided by Offerer with respect to its compliance with State Finance Law §§ 139-j and 139-k is complete, true and accurate.

Name of Offerer: _____
Address: _____

Signature of Person Submitting Form: _____
Name (printed or typed): _____
Title: _____
Date: _____

Model Language to Obtain the Offerer Disclosure of Prior Non-Responsibility Determinations

Note: Government Entities may wish to consider integrating this language in their existing forms.

Background:

New York State Finance Law §139-k(2) obligates a Governmental Entity to obtain specific information regarding prior non-responsibility determinations with respect to State Finance Law §139-j. This information must be collected in addition to the information that is separately obtained pursuant to State Finance Law §163(9). In accordance with State Finance Law §139-k, an Offerer must be asked to disclose whether there has been a finding of non-responsibility made within the previous four (4) years by any Governmental Entity due to: (a) a violation of State Finance Law §139-j or (b) the intentional provision of false or incomplete information to a Governmental Entity. The terms “Offerer” and “Governmental Entity” are defined in State Finance Law § 139-k(1). State Finance Law §139-j sets forth detailed requirements about the restrictions on Contacts during the procurement process. A violation of State Finance Law §139-j includes, but is not limited to, an impermissible Contact during the restricted period (for example, contacting a person or entity other than the designated contact person, when such Contact does not fall within one of the exemptions).

As part of its responsibility determination, State Finance Law §139-k(3) mandates consideration of whether an Offerer fails to timely disclose accurate or complete information regarding the above non-responsibility determination. In accordance with law, no Procurement Contract shall be awarded to any Offerer that fails to timely disclose accurate or complete information under this section, unless a finding is made that the award of the Procurement Contract to the Offerer is necessary to protect public property or public health safety, and that the Offerer is the only source capable of supplying the required Article of Procurement within the necessary timeframe. See State Finance Law §§139-j (10)(b) and 139-k(3).

Instructions:

A Governmental Entity must include a disclosure request regarding prior non-responsibility determinations in accordance with State Finance Law §139-k in its solicitation of proposals or bid documents or specifications or contract documents, as applicable, for procurement contracts. The attached form is to be completed and submitted by the individual or entity seeking to enter into a Procurement Contract. It shall be submitted to the Governmental Entity conducting the Governmental Procurement.

As an alternative to this form, the Governmental Entity may elect to incorporate this disclosure question into its procurement questionnaire, such as the New York State

Standard Vendor Responsibility Questionnaire set out at
<http://www.ogs.state.ny.us/procurecounc/pdfdoc/BestPractice.pdf>.

Offerer Disclosure of Prior Non-Responsibility Determinations

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

Address: _____

Name and Title of Person Submitting this Form: _____

Contract Procurement Number: _____

Date: _____

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please circle):
 No Yes
If yes, please answer the next questions:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j (Please circle):
 No Yes

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please circle):

 No Yes

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: _____

Date of Finding of Non-responsibility: _____

Basis of Finding of Non-Responsibility: _____

(Add additional pages as necessary)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle):
 No Yes

6. If yes, please provide details below.

Governmental Entity: _____

Date of Termination or Withholding of Contract: _____

Basis of Termination or Withholding: _____

(Add additional pages as necessary)

Offerer certifies that all information provided to the Governmental Entity with respect to State Finance Law §139-k is complete, true and accurate.

By: _____ Date: _____

Signature

Name: _____

Title: _____

INSURANCE REVIEW CHECKLIST*Risk Management Review Checklist for Insurance Certificates
For Construction and Construction Related Consultant Services Contracts*

Name of Contractor/Professional/Vendor _____

Project Name _____

Contract # _____ Project # _____ Date Contract Rec'd _____

Contract Type: _____ Construction _____ Design _____ Other (Specify) _____

Authorized Carriers*Authorized carriers must meet the following criteria: (1) AM Best Company rating of A- or greater, (2) financial score of VII or greater.*

- Carrier A Yes No Rating _____
- Carrier B Yes No Rating _____
- Carrier C Yes No Rating _____
- Carrier D Yes No Rating _____
- Carrier E Yes No Rating _____
- Worker's Comp Carrier Yes No Rating _____
- Disability Carrier Yes No Rating _____

The insurance certificates provided comply with the contract documents and Schedule A:

1. Commercial General Liability (CGL)
 - a. Additional Insureds in accordance with Schedule A
 - b. Limits in accordance with Schedule A
 - c. Occurrence based policy
2. Acor 855 Certificate of Liability Insurance Addendum has been reviewed and meets requirements.
3. Automobile Liability
4. Excess/Umbrella Liability (if applicable)
5. Workers' Compensation and Disability
 - a. SUNY is listed as certificate holder
 - b. Campus verified coverage on the Workers Compensation Board Website
6. Builder's Risk (for Construction)
7. Contractors Pollution Liability
 - a. Additional Insureds in accordance with Schedule A
 - b. Limits in accordance with Schedule A
 - c. Policy is in addition to the CGL policy
8. Professional Liability (for architecture and engineering)

Name and signature (Campus Representative)_____
Date Reviewed

BUILDER'S RISK INSURANCE BREAKDOWN

Instructions: This optional form may be used by the contractor to determine the total value of Builder's Risk Insurance required. Because certain aspects of the project are not insurable, those items do not have to be included in the total value of the builder's risk coverage.

Date: _____

Title of Project: _____

Location of Project: _____

Project No.: _____

Name of Contractor: _____

Address of Contractor: _____

Estimated Completion Date: _____

Contract Amount: _____

\$ _____

Non-insurable items _____

(amounts to be determined from Contractor's approved breakdown):

1. Cost of the contractor's Performance and Labor and Materials Bonds \$ _____

2. Cost of trees, shrubbery, lawn grass, plants and the maintenance of same \$ _____

3. Cost of demolition \$ _____

4. Cost of excavation

5. Cost of foundations, piers or other supports which are below the undersurface of the lowest basement floors, or where there is no basement, which are below the surface of the ground. Concrete and Masonry Work \$ _____

6. Cost of Underground flues, pipes or wiring \$ _____

7. Cost of earthmoving, grading, and the cost of paving, roads, walks, parking lots and athletic fields \$ _____

8. Cost of bridges, tunnels, dams, piers, wharves, docks, retaining walls and radio and/or television towers and antennas \$ _____

Total Non-insurable items: \$ _____

Amount of Builder's Risk Insurance to be procured: \$ _____

LABOR AND MATERIAL BOND

KNOW ALL PERSONS BY THESE PRESENTS, that _____

(hereinafter called the "Principal") and _____

(hereinafter called the "Surety") are held and firmly bound to the State University of New York (hereinafter called the University) in the full and just sum of:

_____ dollars (\$ _____)
(in words) *(in figures)*

good and lawful money of the United States of America, for the payment of which sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract bearing date on the _____ day of _____, 20_____, with the University for the work contained in Project No. _____, a copy of which Contract is annexed to and hereby made a part of this Bond as though herein set forth in full; and

WHEREAS, the University has required this Bond guaranteeing prompt payment of monies due to all persons furnishing the Principal or any subcontractor of the Principal with labor or materials in the prosecution of the work provided in such Contract;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall promptly pay all monies due to all persons furnishing the Principal or any subcontractor of the Principal with labor or materials in the prosecution of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, the said Surety, for value received, hereby stipulates and agrees that no change, extension, alteration or addition to the terms of the said Contract or Specifications accompanying the same, shall in any way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension, alteration or addition; and further.

PROVIDED, HOWEVER, the place of trial of any action on this Bond shall be in the county in which the said Contract was to be performed, or if said Contract was to be performed in more than one county, then in any such county, and not elsewhere; and further

PROVIDED, HOWEVER, this Bond shall be enforceable in accordance with the terms and provisions of Section 137 of the State Finance Law.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and the Surety has caused this instrument to be signed by its attorney in-fact on this _____ day of _____, 20__

Principal By _____

Surety By _____

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS, that _____

(hereinafter called the "Principal") and _____

(hereinafter called the "Surety") are held and firmly bound to the State University of New York (hereinafter called the University) in the full and just sum of:

_____ dollars (\$ _____)
(in words) (in figures)

good and lawful money of the United States of America, for the payment of which sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract bearing date on the _____ day of _____, 20_____, with the University for the work contained in Project No. _____, a copy of which Contract is annexed to and hereby made a part of this Bond as though herein set forth in full; and

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, its representatives or assigns, shall well and faithfully comply with and perform all the terms, covenants and conditions of said Contract on its part to be kept and performed and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to the true intent and meaning of said Contract, including repair and/or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the University from all cost and damage which it may suffer by reason of failure to do so, and shall fully reimburse and repay the University for all outlay and expense which the University may incur in making good any such default, and shall protect the said University against, and pay any and all amounts, damages, costs and judgments which may or shall be recovered against said University or its trustees, officers, agents or employees or which the said University may be called upon to pay to any person or corporation by reason of any damages arising or growing out of the doing of said work, or the repair of maintenance thereof, or the manner of doing the same, or the neglect of the said Principal, or its agents, or the improper performance of the said work by the said Principal, or its agents, or the infringement of any patent or patent rights by reason of the use of any materials furnished or work done as aforesaid or otherwise, then this obligation shall be null and void, otherwise to remain in full force and effect;

PROVIDED, HOWEVER, the said Surety, for value received, hereby stipulates and agrees, if requested to do so by the University, to fully perform and complete the work mentioned and described in said Contract, pursuant to the terms, conditions, and covenants thereof, if for any cause the Principal fails or neglects to so fully perform and complete such work and the Surety hereby further agrees to commence such work of completion within ten (10) calendar days after written notice thereof from the University and to complete such work within ten (10) calendar days from the expiration of the time allowed the Principal in the Contract for the completion thereof. The surety shall fully perform and complete said work on its own, or through a contractor approved by the University, according to the terms, conditions and covenants of said Contract and specifications.

PROVIDED, HOWEVER, the Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety and its Bond shall be in no way impaired or affected by an extension of time, modification, omission, addition, or change in or to the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer of any work to be performed or any monies due or to become due thereunder or by the University's takeover, use,

PERFORMANCE BOND (Page 2)

occupancy or operation of any part or all of the work covered by the Contract; and said Surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, transfers, takeovers, uses, occupancies or operations, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by or in relation to said Principal.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and the Surety has caused this instrument to be signed by its attorney-in-fact on this _____ day _____ of, 20___.

Principal

By

Surety

By

ACKNOWLEDGMENTS FOR LABOR AND MATERIAL BOND AND PERFORMANCE BOND

(Acknowledgment by Principal, unless it is a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known and known to me to be the person(s) described in and who
executed the foregoing instruments and acknowledged that he / she executed the same.

Notary Public

(Acknowledgment by Principal, if a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known, who, being duly sworn, did depose and say
that he / she resides in _____

;

that he / she is the _____

of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said corporation; that the seal
affixed to said instruments is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he / she
signed their name thereto by like order.

Notary Public

(Acknowledgment by Surety Company)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came _____
_____, to me known, who, being by me duly sworn, did depose and say
that he / she resides in _____;

that he / she is the _____

of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said corporation; that the
seal affixed to said instruments is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation, and that
he / she signed their name thereto by like order; and that the liabilities of said company do not exceed its assets as ascertained in the manner
provided by the laws of the State of New York.

Notary Public

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

You have selected the For-Profit Construction questionnaire, commonly known as the “CCA-2,” which may be printed and completed in this format or, **for your convenience, may be completed online using the [New York State VendRep System](#).**

COMPLETION & CERTIFICATION

The person(s) completing the questionnaire must be knowledgeable about the vendor’s business and operations. An owner or official must certify the questionnaire and the signature must be notarized.

NEW YORK STATE VENDOR IDENTIFICATION NUMBER (VENDOR ID)

The Vendor ID is a ten-digit identifier issued by New York State when the vendor is registered on the Statewide Vendor File. This number must now be included on the questionnaire. If the business entity has not obtained a Vendor ID, contact the IT Service Desk at ITServiceDesk@osc.state.ny.us or call 866-370-4672.

DEFINITIONS

All underlined terms are defined in the “New York State Vendor Responsibility Definitions List,” found at <http://www.osc.state.ny.us/vendrep/documents/questionnaire/definitions.pdf>. These terms may not have their ordinary, common or traditional meanings. Each vendor is strongly encouraged to read the respective definitions for any and all underlined terms. By submitting this questionnaire, the vendor agrees to be bound by the terms as defined in the "New York State Vendor Responsibility Definitions List" existing at the time of certification.

RESPONSES

Every question must be answered. Each response must provide all relevant information which can be obtained within the limits of the law. However, information regarding a determination or finding made in error which was subsequently corrected or overturned, and/or was withdrawn by the issuing government entity, is not required. Individuals and Sole Proprietors may use a Social Security Number but are encouraged to obtain and use a federal Employer Identification Number (EIN).

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

BUSINESS ENTITY INFORMATION				
<u>Legal Business Name</u>		<u>EIN</u> _____		
Address of the <u>Principal Place of Business</u> (street, city, state, zip code)		<u>New York State Vendor Identification Number</u>		
		Telephone ext.		Fax
		Website		
Authorized Contact for this Questionnaire				
Name		Telephone ext.		Fax
Title		Email		
Additional <u>Business Entity</u> Identities: If applicable, list any other <u>DBA</u> , <u>Trade Name</u> , <u>Former Name</u> , Other Identity, or <u>EIN</u> used in the last five (5) years, the state or county where filed and the status (active or inactive).				
Type	Name	EIN	State or County where filed	Status

I. BUSINESS CHARACTERISTICS				
1.0 <u>Business Entity</u> Type – Check appropriate box and provide additional information:				
a) <input type="checkbox"/> <u>Corporation</u> (including <u>PC</u>)	Date of Incorporation			
b) <input type="checkbox"/> <u>Limited Liability Company</u> (<u>LLC</u> or <u>PLLC</u>)	Date Organized			
c) <input type="checkbox"/> <u>Limited Liability Partnership</u>	Date of Registration			
d) <input type="checkbox"/> <u>Limited Partnership</u>	Date Established			
e) <input type="checkbox"/> <u>General Partnership</u>	Date Established	County (if formed in NYS)		
f) <input type="checkbox"/> <u>Sole Proprietor</u>	How many years in business?			
g) <input type="checkbox"/> Other	Date Established			
If Other, explain:				
1.1 Was the <u>Business Entity</u> formed in New York State?				<input type="checkbox"/> Yes <input type="checkbox"/> No
If “No,” indicate jurisdiction where the <u>Business Entity</u> was formed:				
<input type="checkbox"/> United States	State			
<input type="checkbox"/> Other	Country			

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

I. BUSINESS CHARACTERISTICS			
1.2 Is the <u>Legal Business Entity</u> publicly traded?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
If "Yes," provide the <u>CIK code</u> or Ticker Symbol:			
1.3 Is the <u>Business Entity</u> currently <u>registered to do business in New York State</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<i>Note: Select "Not Required" if the Business Entity is a Sole Proprietor or General Partnership</i>			
If "No," explain why the <u>Business Entity</u> is not required to be <u>registered to do business in New York State</u> :			
1.4 Is the responding <u>Business Entity</u> a <u>Joint Venture</u> ? Note: If the submitting <u>Business Entity</u> is a <u>Joint Venture</u> , also submit a separate questionnaire for each <u>Business Entity</u> comprising the <u>Joint Venture</u> .	<input type="checkbox"/> Yes <input type="checkbox"/> No		
1.5 If the <u>Business Entity's</u> <u>Principal Place of Business</u> is not in New York State, does the <u>Business Entity</u> maintain an office in New York State?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<i>(Select "N/A" if <u>Principal Place of Business</u> is in New York State.)</i>			
If "Yes," provide the address and telephone number for one office located in New York State.			
1.6 Is the Business Entity a New York State certified <u>Minority-Owned Business Enterprise</u> , or <u>Women-Owned Business Enterprise</u> , or <u>New York State Small Business</u> , or federally certified <u>Disadvantaged Business Enterprise</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
If "Yes," check all that apply:			
<input type="checkbox"/> New York State certified <u>Minority-Owned Business Enterprise</u> (MBE)			
<input type="checkbox"/> New York State certified <u>Women-Owned Business Enterprise</u> (WBE)			
<input type="checkbox"/> <u>New York State Small Business</u>			
<input type="checkbox"/> Federally certified <u>Disadvantaged Business Enterprise</u> (DBE)			
1.7 Identify each person or business entity that is, or has been within the past five (5) years, <u>Principal Owner</u> of 5.0% or more of the firm's shares; a Business Entity Official; or one of the five largest shareholders, if applicable. <i>(Attach additional pages if necessary.)</i>			
<u>Joint Ventures</u> : Provide information for all firms involved.			
Name <i>(For each person, include middle initial)</i>	Title	Percentage of ownership (Enter 0%, if not applicable)	Employment status with the firm
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)**

II. AFFILIATE and JOINT VENTURE RELATIONSHIPS		
2.0 Are there any other <u>construction</u> -related firms in which, now or in the past five years, the submitting <u>Business Entity</u> or any of the individuals or business entities listed in question 1.7 either owned or owns 5.0% or more of the shares of, or was or is one of the five largest shareholders or a director, officer, partner or proprietor of said other firm? (<i>Attach additional pages if necessary.</i>)		<input type="checkbox"/> Yes <input type="checkbox"/> No
Firm/Company Name	Firm/Company EIN (If available)	Firm/Company's Primary Business Activity
Firm/Company Address		
Explain relationship with the firm and indicate percent of ownership, if applicable (enter N/A, if not applicable):		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting <u>Business Entity</u> has in common with this firm?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Individual's Name (<i>Include middle initial</i>)	Position/Title with Firm/Company	
2.1 Does the <u>Business Entity</u> have any <u>construction</u> -related <u>affiliates</u> not identified in the response to question 2.0 above? (<i>Attach additional pages if necessary.</i>)		<input type="checkbox"/> Yes <input type="checkbox"/> No
Affiliate Name	Affiliate EIN (If available)	Affiliate's Primary Business Activity
Affiliate Address		
Explain relationship with the affiliate and indicate percent of ownership, if applicable (<i>enter N/A, if not applicable</i>):		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting Business Entity has in common with this affiliate?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Individual's Name (<i>Include middle initial</i>)	Position/Title with Firm/Company	
2.2 Has the <u>Business Entity</u> participated in any <u>construction-related Joint Ventures</u> within the past three (3) years? (<i>Attach additional pages if necessary.</i>)		<input type="checkbox"/> Yes <input type="checkbox"/> No
Joint Venture Name	Joint Venture EIN (If available)	Identify parties to the Joint Venture

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

III. CONTRACT HISTORY

3.0 Has the Business Entity completed any construction contracts? Yes No

If "Yes," list the ten most recent construction contracts the Business Entity has completed using Attachment A – Completed Construction Contracts, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3294s.doc.

If less than ten, include most recent subcontracts on projects up to that number.

3.1 Does the Business Entity currently have uncompleted construction contracts? Yes No

If "Yes," list all current uncompleted construction contracts by using Attachment B – Uncompleted Construction Contracts, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3295s.doc.

Note: Ongoing projects must be included.

IV. INTEGRITY – CONTRACT BIDDING

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

4.0 Been suspended or debarred from any government contracting process or been disqualified on any government procurement? Yes No

4.1 Been subject to a denial or revocation of a government prequalification? Yes No

4.2 Had any bid rejected by a government entity for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid? Yes No

4.3 Had a proposed subcontract rejected by a government entity for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid? Yes No

4.4 Had a low bid rejected on a government contract for failure to make good faith efforts on any Minority-Owned Business Enterprise, Women-Owned Business Enterprise or Disadvantaged Business Enterprise goal or statutory affirmative action requirements on a previously held contract? Yes No

4.5 Agreed to a voluntary exclusion from bidding/contracting with a government entity? Yes No

4.6 Initiated a request to withdraw a bid submitted to a government entity or made any claim of an error on a bid submitted to a government entity? Yes No

For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, project(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

V. INTEGRITY – CONTRACT AWARD

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

5.0 Defaulted on or been suspended, cancelled or terminated for cause on any contract? Yes No

5.1 Been subject to an administrative proceeding or civil action seeking specific performance or restitution (except any disputed work proceeding) in connection with any government contract? Yes No

5.2 Entered into a formal monitoring agreement, consent decree or stipulation settlement as specified by, or agreed to with, any government entity? Yes No

5.3 Had its surety called upon to complete any contract whether government or private sector? Yes No

5.4 Forfeited all or part of a standby letter of credit in connection with any government contract? Yes No

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

V. INTEGRITY – CONTRACT AWARD

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

For each “Yes,” provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity/owners involved, project(s), contract number(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

VI. CERTIFICATIONS/LICENSES

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

- | | |
|--|--|
| 6.0 Had a revocation or <u>suspension</u> of any business or professional permit and/or license? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 6.1 Had a denial, decertification, revocation or forfeiture of New York State certification of <u>Minority-Owned Business Enterprise</u> , <u>Women-Owned Business Enterprise</u> or a federal certification of <u>Disadvantaged Business Enterprise</u> status, for other than a change of ownership? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

For each “Yes,” provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

VII. LEGAL PROCEEDINGS/GOVERNMENT INVESTIGATIONS

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

- | | |
|--|--|
| 7.0 Been the subject of a criminal <u>investigation</u> , whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or <u>federal</u> law? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7.1 Been the subject of:
(i.) An indictment, grant of immunity, <u>judgment</u> or conviction (including entering into a plea bargain) for conduct constituting a crime; or
(ii.) Any criminal <u>investigation</u> , felony indictment or conviction concerning the formation of, or any business association with, an allegedly false or fraudulent <u>Minority-Owned Business Enterprise</u> , <u>Women-Owned Business Enterprise</u> , or a <u>Disadvantaged Business Enterprise</u> ? | <input type="checkbox"/> Yes <input type="checkbox"/> No

<input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7.2 Received any <u>OSHA</u> citation, which resulted in a final determination classified as <u>serious</u> or <u>willful</u> ? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7.3 Had a <u>government entity</u> find a willful prevailing wage or supplemental payment violation? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7.4 Had a New York State Labor Law violation deemed willful? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7.5 Entered into a consent order with the New York State Department of Environmental Conservation, or a <u>federal</u> , state or local government enforcement determination involving a violation of <u>federal</u> , state or local environmental laws? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

VII. LEGAL PROCEEDINGS/GOVERNMENT INVESTIGATIONS

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

7.6 Other than previously disclosed, been the subject of any <u>citations</u> , notices or violation orders; a pending administrative hearing, proceeding or determination of a violation of: <ul style="list-style-type: none"> • <u>Federal</u>, state or local health laws, rules or regulations; • <u>Federal</u>, state or local environmental laws, rules or regulations; • Unemployment insurance or workers compensation coverage or <u>claim</u> requirements; • Any labor law or regulation, which was deemed willful; • Employee Retirement Income Security Act (ERISA); • <u>Federal</u>, state or local human rights laws; • <u>Federal</u>, state or local security laws? 	<input type="checkbox"/> Yes <input type="checkbox"/> No
--	--

For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

Note: Information regarding a determination or finding made in error, which was subsequently corrected or overturned, and/or was withdrawn by the issuing government entity, is not required.

VIII. LEADERSHIP INTEGRITY

If the Business Entity is a Joint Venture Entity, answer "N/A - Not Applicable" to questions in this section.

Within the past five (5) years has any individual previously identified or any individual currently or formerly having the authority to sign, execute or approve bids, proposals, contracts or supporting documentation on behalf of the Business Entity with any government entity been:

8.0 <u>Sanctioned</u> relative to any business or professional permit and/or license?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.1 <u>Suspended, debarred or disqualified</u> from any <u>government contracting process</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.2 The subject of a criminal <u>investigation</u> , whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or <u>federal</u> law?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.3 Charged with a misdemeanor or felony, indicted, granted immunity, convicted of a crime or subject to a judgment for: <ul style="list-style-type: none"> (i.) Any business-related activity, including but not limited to fraud, coercion, extortion, bribe or bribe-receiving, giving or accepting unlawful gratuities, immigration or tax fraud, racketeering, mail fraud, wire fraud, price-fixing or collusive bidding; or (ii.) Any crime, whether or not business-related, the underlying conduct of which related to truthfulness, including but not limited to the filing of false documents or false sworn statements, perjury or larceny 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

For each "Yes," provide an explanation of the issue(s), the individual involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)**

IX. FINANCIAL AND ORGANIZATIONAL CAPACITY		
9.0 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> received any <u>formal unsatisfactory performance assessment(s)</u> from any <u>government entity</u> on any contract?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, the <u>government entity</u> involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.1 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> had any <u>liquidated damages</u> assessed over \$25,000?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, relevant dates, the contracting party involved, the amount assessed and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.2 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> had any <u>liens, claims or judgments</u> over \$25,000 filed against the <u>Business Entity</u> which remain undischarged or were unsatisfied for more than 90 days? (Note: Including but not limited to tax warrants or liens. Do not include UCC filings.)		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, relevant dates, the Lien holder or Claimants' name(s), the amount of the <u>lien(s)</u> and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.3 In the last seven (7) years, has the <u>Business Entity</u> or any <u>affiliate</u> initiated or been the subject of any bankruptcy proceedings, whether or not closed, or is any bankruptcy proceeding pending?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, the bankruptcy chapter number, the court name and the docket number. Indicate the current status of the proceedings as "Initiated," "Pending" or "Closed." Provide answer below or attach additional sheets with numbered responses.</i>		
9.4 What is the <u>Business Entity's</u> Bonding Capacity?		
a. Single Project		b. Aggregate (All Projects)
9.5 List <u>Business Entity's</u> Gross Sales for the previous three (3) Fiscal Years:		
1st Year (Indicate year) Gross Sales	2nd Year (Indicate year) Gross Sales	3rd Year (Indicate year) Gross Sales
9.6 List <u>Business Entity's</u> Average Backlog for the previous three (3) fiscal years: (Estimated total value of uncompleted work on outstanding contracts)		
1st Year (Indicate year) Amount	2nd Year (Indicate year) Amount	3rd Year (Indicate year) Amount
9.7 Attach <u>Business Entity's</u> most recent annual <u>financial statement</u> and accompanying notes or complete Attachment C – Financial Information, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3296s.xls . (This information must be attached.)		

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)**

X. FREEDOM OF INFORMATION LAW (FOIL)

10.0 Indicate whether any information provided herein is believed to be exempt from disclosure under the Freedom of Information Law (FOIL).
Note: A determination of whether such information is exempt from FOIL will be made at the time of any request for disclosure under FOIL. Attach additional pages if necessary.

Yes No

If "Yes," indicate the question number(s) and explain the basis for the claim.

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)**

Certification

The undersigned: (1) recognizes that this questionnaire is submitted for the express purpose of assisting New York State government entities (including the Office of the State Comptroller (OSC)) in making responsibility determinations regarding award or approval of a contract or subcontract and that such government entities will rely on information disclosed in the questionnaire in making responsibility determinations; (2) acknowledges that the New York State government entities and OSC may, in their discretion, by means which they may choose, verify the truth and accuracy of all statements made herein; and (3) acknowledges that intentional submission of false or misleading information may result in criminal penalties under State and/or Federal Law, as well as a finding of non-responsibility, contract suspension or contract termination.

The undersigned certifies that he/she:

- is knowledgeable about the submitting Business Entity’s business and operations;
- has read and understands all of the questions contained in the questionnaire;
- has not altered the content of the questionnaire in any manner;
- has reviewed and/or supplied full and complete responses to each question;
- to the best of his/her knowledge, information and belief, confirms that the Business Entity’s responses are true, accurate and complete, including all attachments, if applicable;
- understands that New York State government entities will rely on the information disclosed in the questionnaire when entering into a contract with the Business Entity; and
- is under an obligation to update the information provided herein to include any material changes to the Business Entity’s responses at the time of bid/proposal submission through the contract award notification, and may be required to update the information at the request of the New York State government entities or OSC prior to the award and/or approval of a contract, or during the term of the contract.

Signature of Owner/Official _____

Printed Name of Signatory _____

Title _____

Name of Business _____

Address _____

City, State, Zip _____

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

_____ Notary Public

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT A – COMPLETED CONSTRUCTION CONTRACTS**

Vendor Name:

NYS Vendor ID:

Question 3.0: List the ten most recent construction contracts the Business Entity has completed. If less than ten, include most recent subcontracts on projects up to that number:						
1.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
2.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
3.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
4.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
5.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT A – COMPLETED CONSTRUCTION CONTRACTS**

Vendor Name:

NYS Vendor ID:

Question 3.0: List the ten most recent construction contracts the Business Entity has completed. If less than ten, include most recent subcontracts on projects up to that number:						
6.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
7.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
8.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
9.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	
10.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable	

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B – UNCOMPLETED CONSTRUCTION CONTRACTS**

Vendor Name:

NYS Vendor ID:

Question 3.1: List all current uncompleted construction contracts:								
1.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others		Uncompleted Amount	
2.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others		Uncompleted Amount	
3.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others		Uncompleted Amount	
4.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others		Uncompleted Amount	

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B – UNCOMPLETED CONSTRUCTION CONTRACTS**

Vendor Name:

NYS Vendor ID:

Question 3.1: List all current uncompleted construction contracts:								
5.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others	Uncompleted Amount		
6.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others	Uncompleted Amount		
7.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others	Uncompleted Amount		
8.	Agency/Owner						Award Date	Completion Date
	Contact Person			Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable				EIN of JV, if applicable	
				Total Contract Amount	Amount Sublet to others	Uncompleted Amount		

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B – UNCOMPLETED CONSTRUCTION CONTRACTS**

Vendor Name:

NYS Vendor ID:

Question 3.1: List all current uncompleted construction contracts:							
9.	Agency/Owner					Award Date	Completion Date
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
			Total Contract Amount	Amount Sublet to others	Uncompleted Amount		
10.	Agency/Owner					Award Date	Completion Date
	Contact Person		Telephone No.	Designer Architect and /or Design Engineer			
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
			Total Contract Amount	Amount Sublet to others	Uncompleted Amount		
Grand Total All Uncompleted Contracts						\$0.00	

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C - FINANCIAL INFORMATION**

NYS Vendor ID: _____

As of Date: _____

ASSETS

Current Assets

1. Cash		\$	-	

2. Accounts receivable - less allowance for doubtful accounts	\$	-		
Retainers included in accounts receivable	\$	-		
Claims included in accounts receivable not yet approved or in litigation	\$	-		
Total Accounts Receivable	\$	-		
3. Notes receivable - due within one year	\$	-		
4. Inventory - materials	\$	-		
5. Contract costs in excess of billings on uncompleted contracts	\$	-		
6. Accrued income receivable				
Interest	\$	-		
Other (list) _____	\$	-		
_____	\$	-		
Total Accrued Income Receivable	\$	-		
7. Deposits				
Bid and Plan _____	\$	-		
Other (list) _____	\$	-		
_____	\$	-		
Total Deposits	\$	-		
8. Prepaid Expenses				
Income Taxes	\$	-		
Insurance	\$	-		
Other (list) _____	\$	-		
_____	\$	-		
Total Prepaid Expenses	\$	-		
9. Other Current Assets				
Other (list) _____	\$	-		
_____	\$	-		
Total Other Current Assets	\$	-		
10. Total Current Assets				\$ _____
11. Investments				
Listed securities-present market value	\$	-		
Unlisted securities-present value	\$	-		
Total Investments				\$ _____

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C - FINANCIAL INFORMATION**

NYS Vendor ID: _____

12. Fixed Assets

Land	\$	-	
Building and improvements	\$	-	
Leasehold improvements	\$	-	
Machinery and equipment	\$	-	
Automotive equipment	\$	-	
Office furniture and fixtures	\$	-	
Other (list) _____	\$	-	
	\$	-	
Total			\$ -
Less: Accumulated depreciation			\$ -
Total Fixed Assets - Net			\$ -

13. Other Assets

Loans receivable			
Officers	\$	-	
Employees	\$	-	
Shareholders	\$	-	
Cash surrender value of officers' life insurance	\$	-	
Organization expense – net of amortization	\$	-	
Notes receivable - due after one year	\$	-	
Other (list) _____	\$	-	
	\$	-	
Total Other Assets			\$ -

14. TOTAL ASSETS

\$ -

\$ -

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C - FINANCIAL INFORMATION**

NYS Vendor ID: _____

LIABILITIES

Current Liabilities

15. Accounts payable	\$	-
16 a. Loans from shareholders - due within one year	\$	-
16 b. Other Loans - due within one year	\$	-
17. Notes payable - due within one year	\$	-
18. Mortgage payable - due within one year	\$	-
19. Other payables - due within one year		
Other (list) _____	\$	-
_____	\$	-

Total Other Payables - due within one year	\$	-
20. Billings in excess of costs and estimated earnings	\$	-
21. Accrued expenses payable		
Salaries and wages	\$	-
Payroll taxes	\$	-
Employees' benefits	\$	-
Insurance	\$	-
Other	\$	-
Total Accrued Expenses Payable	\$	-
22. Dividends payable	\$	-
23. Income taxes payable		
State	\$	-
Federal	\$	-
Other	\$	-
Total Income Taxes Payable	\$	-
24. Total current liabilities	\$	-
25. Deferred income taxes payable		
State	\$	-
Federal	\$	-
Other	\$	-
Total Deferred Income Taxes	\$	-
26. Long Term Liabilities		
Loans from shareholders - due after one year	\$	-
Other Loans - due within one year		
Principle	\$	-
Interest	\$	-
Notes payable - due after one year	\$	-
Mortgage - due after one year	\$	-
Other payables - due after one year	\$	-
Other (list) _____	\$	-
_____	\$	-
Total Long Term Liabilities	\$	-

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C - FINANCIAL INFORMATION**

NYS Vendor ID: _____

27. Other Liabilities			
Other (list) _____	\$	-	
_____	\$	-	
Total Other Liabilities _____	\$	-	
28. TOTAL LIABILITIES			\$ _____

NET WORTH

29. Net Worth (if proprietorship or partnership)			\$ _____
30. Stockholders' Equity			
Common stock issued and outstanding	\$	-	
Preferred stock issued and outstanding	\$	-	
Retained earnings	\$	-	
Total	\$	-	
Less: Treasury stock	\$	-	
31. TOTAL STOCKHOLDERS' EQUITY			\$ _____
32. TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY			\$ _____

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a

Prime Contractor's Certification (AC 2947)

1. That I am an officer of _____
and am duly authorized to make this affidavit on behalf of the prime contractor on public contract
No. _____.
2. That I fully comprehend the terms and provisions of Section 220-a of the Labor Law.
3. That, except as herein stated, there are no amounts due and owing to or on behalf of laborers
employed on the project by the contractor. (Set forth any unpaid wages and supplements, if none,
so state).

Name

Amount

-
-
-
4. That the contractor hereby files every verified statement(s) required to be obtained by the
contractor from the subcontractor(s).
 5. That, upon information and belief, except as stated herein, all laborers (exclusive of executive
or supervisory employees) employed on the project have been paid the prevailing wages and
supplements for their services through _____, (if more than one subcontractor
list name and date separately) the last day worked on the project by their subcontractor(s), (Set
forth any unpaid wages and supplements, if none, so state and utilize clause 5 (A)).

Name

Amount

-
-
-
- (5A) That the contractor has no knowledge of amounts owing to or on behalf of any laborers of its
subcontractor(s).

New York State Labor Law, Section 220-a

Prime Contractor's Certification (AC 2947) – page 2

6. In the event it is determined by the Commissioner of Labor that the wages or supplements or both of any such subcontractor(s) have not been paid or provided pursuant to the appropriate schedule of wages and supplements, then the contractor shall be responsible for payment of such wages and supplements pursuant to the provision of Section 223 of the Labor Law.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____ : SS.:

On this _____ day of _____ 20_____

Before me personally came _____ to me known and known to me to be the person described in and who executed for foregoing instrument and acknowledged that she/he executed the same

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR 2309(c); Real Property Law, 311, 312).

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a

Subcontractor's Certification (AC 2948)

1. That I am an officer of _____
a subcontractor on public contract No. _____ and I am
duly authorized to make this affidavit on behalf of the firm.

2. That I make this affidavit in order to comply with the provisions of Section 220-a of the Labor Law.

3. That on _____ we received from _____
the prime contractor a copy of the initial/revised schedule of wages and supplements
Prevailing Wage Schedule Case Number _____ (PRC) specified in the public
improvement contract.

4. That I have reviewed such schedule(s), and agree to pay the applicable prevailing wages and
to pay or provide the supplements specified therein.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____: SS.:

On this _____ day of _____, 20____
before me personally came _____ to me
known and known to me to be the person described in and who executed for foregoing instrument and
acknowledged that she/he executed the same.

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR 2309(c); Real Property Law, 311, 312).

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDSD
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a

Sub-subcontractor's Certification (AC 2958)

1. That I am an officer of _____
a subcontractor to _____ a subcontractor
of _____, the prime contractor on public improvement
contract No. _____ and I am duly authorized to make this affidavit on behalf of the
firm.
2. That I make this affidavit in order to comply with the provisions of Section 220-a of the Labor Law.
3. That on _____ we received from _____
the (subcontractor of the) (contractor) a copy of the (initial) (revised) schedule of wages and
supplements Prevailing Rate Schedule Case Number _____ (PRC) specified in the public
improvement contract.
4. That I have reviewed such schedule(s), and agree to pay the applicable prevailing wages and
to pay or provide the supplements specified therein.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____ :SS.:

On this _____ day of _____ 20 _____ before me personally came
_____ to me
known and known to me to be the person described in and who executed for foregoing instrument
acknowledged that she/he executed the same.

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR 2309(c); Real Property Law, 311, 312).



OFFICE OF THE STATE COMPTROLLER
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a
Subcontractor's Certification

1. That I am an officer of _____
a subcontractor on Public Contract No. _____ and I am duly authorized to
make this affidavit on behalf of the firm.
2. That I make this affidavit in order to comply with the provisions of Section 220-a of the
Labor Law.
3. That on _____, we received from _____
(the prime contractor) a copy of the initial/revised schedule of wages and supplements
Prevailing Rate Schedule Case Number _____ (PRC) specified in the
public improvement contract.
4. That I have reviewed such schedule(s), and agree to pay the applicable prevailing wages
and to pay or provide the supplements specified therein.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK }
COUNTY OF } SS

On this _____ day of _____
before me personally came _____
to me known and known to me to be the person described in and who executed the foregoing
instrument and he/she acknowledged that he/she executed the same.

Notary Public

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR § 2309(c); Real Property Law, § 311,312).



Contractor Certification to Covered Agency

(Pursuant to Section 5-a of the Tax Law, as amended, effective April 26, 2006)

ST-220-CA

(12/11)

For information, consult Publication 223, *Questions and Answers Concerning Tax Law Section 5-a* (see *Need Help?* on back).

Contractor name		For covered agency use only Contract number or description	
Contractor's principal place of business	City	State	ZIP code
Contractor's mailing address (if different than above)		Estimated contract value over the full term of contract (but not including renewals)	
Contractor's federal employer identification number (EIN)	Contractor's sales tax ID number (if different from contractor's EIN)		\$
Contractor's telephone number	Covered agency name		
Covered agency address		Covered agency telephone number	

I, _____, hereby affirm, under penalty of perjury, that I am _____

(name)

(title)

of the above-named contractor, that I am authorized to make this certification on behalf of such contractor, and I further certify that:

(Mark an X in only one box)

The contractor has filed Form ST-220-TD with the Department of Taxation and Finance in connection with this contract and, to the best of contractor's knowledge, the information provided on the Form ST-220-TD, is correct and complete.

The contractor has previously filed Form ST-220-TD with the Tax Department in connection with _____

(insert contract number or description)

and, to the best of the contractor's knowledge, the information provided on that previously filed Form ST-220-TD, is correct and complete as of the current date, and thus the contractor is not required to file a new Form ST-220-TD at this time.

Sworn to this ____ day of _____, 20 ____

(sign before a notary public)

(title)

Instructions

General information

Tax Law section 5-a was amended, effective April 26, 2006. On or after that date, in all cases where a contract is subject to Tax Law section 5-a, a contractor must file (1) Form ST-220-CA, *Contractor Certification to Covered Agency*, with a covered agency, and (2) Form ST-220-TD with the Tax Department before a contract may take effect. The circumstances when a contract is subject to section 5-a are listed in Publication 223, Q&A 3. See *Need help?* for more information on how to obtain this publication. In addition, a contractor must file a new Form ST-220-CA with a covered agency before an existing contract with such agency may be renewed.

Note: Form ST-220-CA must be signed by a person authorized to make the certification on behalf of the contractor, and the acknowledgement on page 2 of this form must be completed before a notary public.

When to complete this form

As set forth in Publication 223, a contract is subject to section 5-a, and you must make the required certification(s), if:

- i. The procuring entity is a *covered agency* within the meaning of the statute (see Publication 223, Q&A 5);
- ii. The contractor is a *contractor* within the meaning of the statute (see Publication 223, Q&A 6); and
- iii. The contract is a *contract* within the meaning of the statute. This is the case when it (a) has a value in excess of \$100,000 and (b) is a contract for *commodities* or *services*, as such terms are defined for purposes of the statute (see Publication 223, Q&A 8 and 9).

Furthermore, the procuring entity must have begun the solicitation to purchase on or after January 1, 2005, and the resulting contract must have been awarded, amended, extended, renewed, or assigned *on or after April 26, 2006* (the effective date of the section 5-a amendments).

Individual, Corporation, Partnership, or LLC Acknowledgment

STATE OF }
: SS.:
COUNTY OF }

On the ___ day of _____ in the year 20___, before me personally appeared _____,
known to me to be the person who executed the foregoing instrument, who, being duly sworn by me did depose and say that
_he resides at _____,
Town of _____,
County of _____,
State of _____; and further that:

[Mark an X in the appropriate box and complete the accompanying statement.]

- (If an individual): _he executed the foregoing instrument in his/her name and on his/her own behalf.
(If a corporation): _he is the _____ of _____, the corporation described in said instrument; that, by authority of the Board of Directors of said corporation, _he is authorized to execute the foregoing instrument on behalf of the corporation for purposes set forth therein; and that, pursuant to that authority, _he executed the foregoing instrument in the name of and on behalf of said corporation as the act and deed of said corporation.
(If a partnership): _he is a _____ of _____, the partnership described in said instrument; that, by the terms of said partnership, _he is authorized to execute the foregoing instrument on behalf of the partnership for purposes set forth therein; and that, pursuant to that authority, _he executed the foregoing instrument in the name of and on behalf of said partnership as the act and deed of said partnership.
(If a limited liability company): _he is a duly authorized member of _____, LLC, the limited liability company described in said instrument; that _he is authorized to execute the foregoing instrument on behalf of the limited liability company for purposes set forth therein; and that, pursuant to that authority, _he executed the foregoing instrument in the name of and on behalf of said limited liability company as the act and deed of said limited liability company.

Notary Public

Registration No.

Privacy notification

The Commissioner of Taxation and Finance may collect and maintain personal information pursuant to the New York State Tax Law, including but not limited to, sections 5-a, 171, 171-a, 287, 308, 429, 475, 505, 697, 1096, 1142, and 1415 of that Law; and may require disclosure of social security numbers pursuant to 42 USC 405(c)(2)(C)(i).

This information will be used to determine and administer tax liabilities and, when authorized by law, for certain tax offset and exchange of tax information programs as well as for any other lawful purpose.

Information concerning quarterly wages paid to employees is provided to certain state agencies for purposes of fraud prevention, support enforcement, evaluation of the effectiveness of certain employment and training programs and other purposes authorized by law.

Failure to provide the required information may subject you to civil or criminal penalties, or both, under the Tax Law.

This information is maintained by the Manager of Document Management, NYS Tax Department, W A Harriman Campus, Albany NY 12227; telephone (518) 457-5181.

Need help?

Visit our Web site at www.tax.ny.gov
• get information and manage your taxes online
• check for new online services and features

Telephone assistance
Sales Tax Information Center: (518) 485-2889
To order forms and publications: (518) 457-5431

Text Telephone (TTY) Hotline (for persons with hearing and speech disabilities using a TTY): (518) 485-5082

Persons with disabilities: In compliance with the Americans with Disabilities Act, we will ensure that our lobbies, offices, meeting rooms, and other facilities are accessible to persons with disabilities. If you have questions about special accommodations for persons with disabilities, call the information center.

Contractors Release

The undersigned hereby acknowledges that pursuant to Contract/Purchase Order Number _____ dated ____ / ____ / _____, where in the undersigned agreed to perform the work contained in Project Number _____ titled _____ the State University of New York has paid or will pay the undersigned, or entity represented by or through the undersigned, the sum of _____ (\$ _____) dollars.

The said amount is the full and entire sum due from the State University of New York to the undersigned under the above contract, except for monies retained by the University pursuant to the provisions of contract, including, but not limited to, money, if any, due to the undersigned by reason of extra work, labor or materials furnished or performed in connection with, relating to, or arising out of the subject matter of said contract. In consideration of such payment, the undersigned hereby releases and discharges the State of New York and the State University of New York, their officers, agents and employees, of and from all claims of liability to the undersigned for anything furnished or performed in connection therewith, relating to or arising out of the contract or out of the work covered by said contract, including, but not limited to, all claims for extra work, labor or materials and for any prior act, neglect, or default on the part of the State of New York or the State University of New York or any of their officers, agents, or employees in connection therewith, except for the aforesaid retained monies.

The undersigned further acknowledges that neither the aforesaid payment nor acceptance by the State University of New York of the work covered by the above contract shall in any way or manner operate as, or constitute, a release or waiver of the undersigned's obligations, undertakings, or liabilities under said contract or in any way affect or limit the same.

In witness whereof, the undersigned has caused its name to be subscribed and its seal affixed this _____ day of _____ 20____.

Name of Contractor

Signature (Officer of the Company)

Name

Title

Division 1 - General Requirements

SECTION A - Description of Work

1. Work to be Done

The work to be done under the Contract, in accordance with the Contract Documents, consists of performing, installing, furnishing and supplying all materials, equipment, labor and incidentals necessary or convenient for the construction of Project Number C071086A, titled **East Gym Addition – General Construction**, and carry out all of the duties and obligations imposed upon the Contractor by the Contract Documents.

It is the policy of New York State and SUNY to provide for the meaningful participation of minority-owned business enterprises (MBEs) and women-owned business enterprises (WBEs) in all contracts associated with this IFB, and to provide equal employment opportunities (EEO) for minorities and females in the work force of all State and Federally assisted and/or funded projects and/or contracts. This policy requires the State University to implement an affirmative action program and to develop project specific MBE/WBE and EEO program goals in the performance of any work. MBEs and WBEs will be afforded a full opportunity to submit qualifications in response to this IFB and will not be discriminated against on the basis of race, color, sex or national origin. The goals for this IFB are 6% Minority Business Enterprise (MBE), 24% Women's Business Enterprise (WBE), 6% SDVOB.

Please reference <https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp?TN=ny&XID=4687> for a listing of MWBE vendors.

Vendor acknowledges that effective August 1, 2017, Binghamton University is a tobacco-free campus to provide a healthy environment for its community members and as such the use of sale of tobacco products in or on Binghamton University-owned or Binghamton University-leased property is prohibited. This policy applies to faculty, staff, students, contractors, vendors and visitors. The use of tobacco products, including but not limited to, cigarettes, electronic nicotine delivery systems, cigars, hookah-smoked products, clove cigarettes, bidis, kreteks, smokeless tobacco and snus, is not permitted on any University-owned or leased property, which includes but is not limited to, buildings, University grounds, parking areas, walkways, recreational and sporting facilities and state-owned vehicles on University property. Vendors agrees that it and its employees, agents and subcontractors are all subject to this policy and will abide by same. Failure if vendor or any of its employees, agents and subcontractors to comply with this policy shall be considered a breach of contract. Thank you for your support of Binghamton University as a tobacco free campus.

The main features of the work shall include, but not be limited to the following:

Binghamton University is adding an Addition on the existing East Gym on main campus. The building is a two story structure (no basement) for playing courts and running track. Work consists of but is not limited to site preparation and restoration, concrete foundation, steel, exterior shell, and interior fit out including all new mechanical, plumbing, fire protection, and electric. Some tie-in of utilities will be required at the existing building. This is a multiple prime contract.

2. Work Not Included:

Work not included in the work of the Contract are those items marked "N.I.C."; movable furnishings, except those specifically specified or indicated on the Drawings; and items marked "by others".

SECTION B - Alternates

1. General

- a. Refer to Proposal Form. State thereon the amount to be added to or deducted from the Total Bid for the Alternates described herein.
- b. Extent and details of the Alternates are indicated on the Drawings, and described in the Specifications.
- c. Where reference is made in the description of the Alternate to products, materials, or workmanship, the specification requirements applicable to similar products, materials or workmanship in the Total Bid shall govern the products, materials, and workmanship of the Alternate as if these specification requirements were included in full in the description of the Alternates.

2. Alternates

- a. **Alternate No. 1: Provide Construction Access Road including providing a bridge to Murray Hill Road.**
Add to base bid purchase of and all work associated with the access road and bridge work as outlined in the contract documents.
- b. **Alternate No. 2: Provide increased capacity of Emergency Generator.**
Add to base bid purchase of and all work associated with increasing the size of the emergency generator as called out in the contract documents.

SECTION C - Special Conditions

1. Time Progress Schedule

- a. The Contractor shall schedule the Work for expeditious completion in accordance with Section 3.01(2) of the Agreement. The proposed schedule must be established in cooperation with the Campus and account for Campus calendar restrictions listed in this

section that affect the Contractor's access to the work areas and construction activities. At each periodic meeting, the Time Progress Schedule required by Section 3.02 of the Agreement shall be reviewed for compliance with phasing requirements. Revise and update the Time Progress Schedule to properly depict the work required to maintain continuity of campus operations.

- b. First phases of work shall include appropriate time in the schedule for: (1) understanding Campus operations, training crews, acclimating trades and Campus to sequence and apportionment of activities; (2) additional meetings (up to twice a week during the first twelve weeks after the Notice to Proceed) with the Owner, consultant and the Contractor's principals, project manager and those of its significant subcontractors; (3) re-sequencing activities to recover from start-up delays in the progressive operation of interrelated work and (4) other activities commonly associated with the start-up of field work.
- c. Academic Calendar: The Contractor is advised that the Campus intends to maintain a full institutional program throughout the Project duration. The Campus will make continuous use of adjacent spaces, buildings and site, except where work is scheduled or specified to occur. All Contract work must be scheduled and performed without causing unscheduled interruption of the normal institutional activities and processes. The Contractor shall coordinate his work with the following Campus Calendar, and No Utility shutdowns will be permitted during Registration, Study Periods, Exam Periods, or Commencement.

<http://www.binghamton.edu/academics/academic-calender.html>

- d. The work site will be available to begin construction immediately upon Notice to Proceed or on _____. Unless otherwise indicated, normal working hours on the campus are between 7:00 AM and 4:00 PM. Sequence the work in phases to meet the following interim milestones/dates:
- e. On the Date of Substantial Completion in the Proposal, access to the work area for any uncompleted work and for punch list items shall be restricted to after 5:00 PM and prior to 7:00 AM and comply with the following:
 - 1. Methods of performing work shall not hinder or disrupt the Campus' occupancy, reduce Campus provided levels of cleanliness and ambient environmental conditions and affect building systems, services, and utilities serving the building unless, upon completion of each shift's work that is performed outside of normal Campus work hours, the Contractor provides cleaning to return the work areas to a similar level of cleanliness as normally provided by the Campus, returns spaces to their normal ambient environmental conditions and restores building systems, services, and utilities serving the occupancy.
 - 2. No material or equipment shall remain inside the building unless in the active use and control of Contractor personnel.
 - 3. The Contractor shall provide all utility relocations and re-routings necessary to maintain the existing utilities at their current level of service, including limiting their shutdowns for tie-ins and cutovers to those periods specified. All new work shall be in place, tested and accepted prior to performing a shutdown for the required tie in.
- f. Time Delay Allowance: In addition to the requirements of Article III of the Agreement, the base bid contract duration to perform the work specified in the proposal shall include not less than five (5) consecutive and/or non-consecutive eight hour working days in the Time Progress Schedule for delays that are of no fault of the Contractor or any of its subcontractors or suppliers, or caused by events or conditions that could not be reasonably anticipated. Provide notice of delay per Section

3.04 and request use of this time allowance. When approved by Consultant, the time allowance is expended for each work day that the contractor is unable to work and all delay time used is tracked in the Time Progress Schedule. After this base bid time allowance for delay is expended, comply with the requirements of Article III for any additional delays.

2. Cutting and Patching

- a. The Contractor shall do all cutting, fitting, and patching of its work that may be required to make its several parts come together properly and fitted as shown upon or reasonably implied from the Drawings and Specifications for the completed project.
- b. Any cost caused by defective or ill-timed work shall be borne by the Contractor. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor or existing work without the consent of the University.
- c. Existing construction, finishes, equipment, wiring, etc., that is to remain and which is damaged or defaced by reason of work done under this contract shall be restored by the Contractor to a condition satisfactory to the University, or replaced with new, at no additional cost.
- d. Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by the conditions and in each case shall be subject to approval by the University.
- e. Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the materials and methods to be employed shall be subject to approval by the University.
- f. All new, altered, or restored work in the building shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required by the drawings.

3. Clean-Up

- a. **Periodic Cleaning:** The Contractor shall at all times during the progress of the work keep the Site free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workmen to limits prescribed by law or by the Contract Limit Lines, except as the latter may be extended with the approval of the University. Cleaning of the structure(s), once enclosed, must be performed daily and removal of waste matter or rubbish must be performed at least once a week.
- b. **Final Clean Up:** Upon completion of the work covered by the Contract, the Contractor shall leave the completed project ready for use without the need of further cleaning of any kind and with all work in new condition and perfect order. In addition, upon completion of all work, the Contractor shall remove from the vicinity of the work and from the property owned or occupied by the State of New York, the State University of New York or the University, all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to it or used under its direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the University at the expense of the Contractor, and it and its surety shall be liable therefor.

4. Temporary Access and Parking

- a. Access to the building sites for delivery of construction material, personnel and/or equipment shall be made only from the Bunn Hill service entrance drive. Construction material delivery access to the Library Building shall be made at the loading dock on the east side of the building.
- b. The Contractor and his employees shall protect all permanent improvements to remain, all curbs, pavements and other improvements adjacent to work areas liable to injury.
- c. Prior to bidding each project, it shall be the responsibility of the Project Coordinator to schedule a meeting with Campus Parking Services to discuss the location for parking and staging areas for that particular project. This group will work together to determine the best location for contractor parking and staging and will designate parking lots which will be assigned for this use. Specific lots will be suggested based on campus needs and the availability of spaces during the timeframe of construction. The following campus standards will be incorporated into the documentation provided to the contractors for inclusion in the project.
- d. **Cost**
 - **Annual** – Contractor permits are available from Parking Services for \$160.00 per year per academic year (valid from Aug 15th to the following year Aug 11th).
 - **Semester Only** - Contractor permits are available for the Fall (valid from Aug 15th to Jan 12th) or Spring (valid from Jan 13th to May 31st) semester for \$105.00.
 - **Summer Only** – Contractor permits for summer parking (valid from May 17th to Aug 15th) are available for \$80.00.
 - **One Calendar Month** – valid for 30 days from purchase \$70.00
- e. Permit validity dates are subject to change based on the Academic Calendar Year
- f. **Contractor Parking Areas** – Contractor permits are **ONLY** valid in the following location during the Fall, Spring, and summer Semesters. Contact the Parking Services Office for special requests for contractor parking.
 - a. Lot G1
 - b. Lot ZZ North
 - c. Lot ZZ South

Contractors need to know the License Plate information of the vehicle they wish to register.

- g. **Parking Violations** – contractors must follow all rules and regulations. These rules and regulations can be found on our website at <https://www.binghamton.edu/services/transportation-and-parking/parking> Contractors will be responsible for all violations.

4.1 Additional Parking Requirements

- a. **Loading Dock Regulations:**

Campus loading docks may be used for intermittent loading and unloading of Contractor's materials, personnel and tools but not for parking of the delivery vehicle. All other vehicles (workers and company owned) are to use University parking lots and be subject to all applicable campus parking regulations and fees. Loading and unloading at campus loading docks is to be coordinated with the Project Coordinator. Temporary parking for loading or unloading at locations other than an existing loading dock shall be arranged with prior approval by the campus and should also be coordinated with the Project Coordinator.

- b. **Parking in Construction Site Staging Areas:**

Generally, parking at the construction site is prohibited. If a space can be made available in the staging area, one Contractor vehicle will be allowed for each Prime Contractor assigned to the project. All remaining vehicles (worker, company, supplier, subcontractor, or vendor owned) will be subject to all applicable campus parking regulation and fees as stated above. The contractor shall keep access routes and parking areas free of debris and other obstructions resulting from the work.

c. **Parking and Traffic Violations**

The University requires that all vehicles conform to New York State Department of Motor Vehicle rules and regulations regarding registration, insurance, and safety inspections. In addition, violations of the Vehicle and Traffic Law or any other applicable traffic ordinance will be processed in accordance with the requirements of the applicable law.

The University seeks to assure that safe and accessible parking is available for intended users and that University business may be conducted in a safe and orderly fashion. In addition, access at all times must be available for emergency and critical service equipment.

The responsibility for finding a valid parking space, as well as determining whether a parking permit is valid, rests with the vehicle operator. Since parking spaces are limited, purchase of a parking permit does not assure a parking space. Lack of an available space is not justification for violating University parking regulations.

Vehicles must be parked within the boundaries of a valid parking space. This means that there is no parking on crosswalks, on sidewalks, on off-pavement areas, at yellow curb areas, beyond the end of a marked row, in bus or loading zones, and in traffic lanes or barricaded or closed areas. Personal notes of explanation left on vehicles or the fact that other vehicles are parked illegally do not constitute justification for parking in violation of the regulations.

Tickets will be issued, and parking fines assessed, for the following violations:

1. Parking in a fire-safety zone: \$100
2. * No current permit: \$40
3. Parking in disabled zone: \$150
4. * Overtime parking (meters): \$40
5. No Parking restricted area: \$40
6. Commuter lot overnight: \$40
7. Forged altered permit: \$50
8. * State registration expired: \$40
9. * State inspection expired: \$40
10. Official business violation: \$40
11. Plate not properly displayed: \$40.
12. First-year not permission: \$40
13. Multiple vehicles-one permit: \$50
14. Not a valid parking space: \$40
15. Permit not valid in area: \$40
16. Parked on or over the line: \$40
17. Over posted time – no flashers: \$40

*Citation may be eligible for waiving with a courtesy card: see Rules and Regulations – courtesy cards.

Generally, the Contractor shall restrict parking to one company owned vehicle in a conventional parking space in the vicinity on the Library Building. Such parking of the vehicle shall not be at the library loading dock. The dock may be used for intermittent loading and unloading of Contractor's materials, personnel and tools but not for interim parking of the delivery vehicle. All other vehicles (workers and company owned) are to utilize University parking lots and be subject to all applicable campus parking regulations and fees. Loading and unloading at the loading dock is to be coordinated with the Owner's project coordinator.

5. Field Meetings

Periodic job meetings will be scheduled by the Consultant and the University during the course of construction. The Contractor, and, upon request of the Consultant and the University, its principal subcontractors and manufacturer's representatives, shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship, or any other subject on which the Consultant and the University might reasonably require information.

6. Operating Instructions and Manuals

The Contractor shall furnish three (3) complete sets of operating instructions and manuals which shall include definite and specific instructions on all mechanical and electrical systems involved in the Project. Said instructions and manuals should set forth: (1) the manner of operation; (2) the necessary precautions and care to be followed; (3) periodic prevention maintenance requirements; and (4) a complete set of spare parts lists, catalogs, service manuals and manufacturing data on said systems. Said instructions and manuals are to be made available by the Contractor for review and comment by the University a minimum of six (6) weeks prior to the scheduled completion of the Project.

7. Utility Shutdowns and Cut Overs

- a. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the University, for its approval, a proposed schedule of all utility shutdowns and Cut overs of all types which will be required to complete the Project; said schedule should contain a minimum of two (2) week's advance notice prior to the time of the proposed

shutdown and cut over. Most campuses of the State University of New York are in full operation 12 months of the year, and shutdowns and Cut overs, depending upon their type, generally must be scheduled on weekends, at night, or during holiday periods. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or Cut overs.

- b. Temporary Connections: In the event the Contractor shall disrupt any existing services, the Contractor shall immediately make temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All work must be acceptable to the University.

8. Temporary Power for Construction Activities

Electrical energy will be available at no cost to the Contractor from existing outlets or panels from locations approved by the College. This power may be used for small power tools (not exceeding 1/2 HP), etc., and the Contractor shall not exceed the capacity of the existing circuits being used. The Contractor shall be responsible for providing all necessary connections, cables, etc. and removal of the same at completion of construction with approval from the University. The Contractor shall in no way modify the existing circuits at the panel boards to increase capacities of the circuits. If the required power load exceeds the capacities of the available power sources, the Contractor shall be responsible and pay for furnishing and installing all necessary temporary power poles, cables, fused disconnect switches, transformers and electric meters necessary to provide a temporary power system for the project, and remove the same at completion. Install all temporary wiring and equipment and make all connections in conformity with the National Electrical Code. Make all replacements required by temporary use of the permanent wiring system. Provide ground fault protection.

9. Sanitary Facilities

The Contractor will be permitted to use existing toilet and janitor closet facilities as designated by the College provided the existing facilities are not misused, defaced, or left in an unsanitary condition. If the University deems that the existing facilities have been subject to misuse or left unsanitary, the Contractor shall be informed and caused to install and maintain (at its own cost) temporary, sanitary facilities at approved locations. The Contractor shall also be held responsible for the cost of cleaning and repair of any damage to said existing facilities and adherence to health and sanitary codes of the State of New York.

10. Temporary Heat

- a. In those locations where it is required by the conditions of the work, the Contractor shall provide and pay for all temporary heating, coverings and enclosures necessary to properly protect all work and materials against damage by dampness and cold, dry out the work, and facilitate the completion thereof. Fuel, equipment, materials, operating personnel and the methods used therefor shall be at all times satisfactory to the University and adequate for the purpose intended. The Contractor shall maintain the critical installation temperatures, provided in the technical provisions of the specifications hereof, for all work in those areas where the same is being performed.
- b. Maintenance of proper heating, ventilation and adequate drying out of the work is the responsibility of the Contractor. Any work damaged by dampness, insufficient or abnormal heating shall be replaced to the satisfaction of the University by and at the sole cost and expense of the Contractor.
- c. The Contractor shall provide all necessary, temporary heating for the efficient and effective work by itself and all trades engaged in the work. Unless otherwise specified, the minimum temperature shall be 50 degrees F at all places where work is actually being performed within the project (where enclosed). Before and during the placing of wood finish and the application of other interior finishing, varnishing, painting, etc., and until final acceptance by the University of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 68 degrees F nor more than 78 degrees F.

11. Temporary Light

The contractor shall install, maintain and remove Underwriter's Label temporary lighting sockets, light bulbs, and intermittent power sockets as approved by the University. The minimum temporary lighting to be provided is at the rate of 1/4 watt per square foot and be maintained for 24 hours, 7 days per week at stairs and exit corridors; in all other spaces, temporary lighting is to be maintained during working hours. Installation shall be in accordance with the National Electric Code.

12. Temporary Water for Construction Purposes

Water for construction is available through the campus system without charge to the Contractor from location designated by the College. The Contractor shall obtain the necessary permission, make all connections, as required, furnish and install all pipes and fittings, and remove the same at completion of work. The Contractor must provide for waste water discharge and shall take due care to prevent damage to existing structures or site and the waste of water. All pipes and fittings must be maintained in perfect condition at all times.

13. Conducting Work

- a. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operation and academic schedule.
- b. Safe and direct entrance to and exiting from the existing buildings shall be maintained at all times during regular hours while construction is in progress.

- c. No construction work will start in any area until the Contractor has all the required materials on- site.
- d. The Contractor and its employees shall comply with College regulations governing conduct, access to the premises, and operation of equipment.
- e. The building shall not be left "open" overnight or during any period of inclement weather. Temporary weather tight closures shall be provided for/by the Contractor to protect the structure and its contents.

14. Safety and Protective Facilities

- a. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Staff, students, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- b. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.

15. Protection of Existing Structures, Vegetation and Utilities

The Contractor, during the course of its work, shall not damage any buildings, structures and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric power and lighting and telephone cables, lawns, curbs, plants and other improvements. Any damage resulting from the Contractor's operations shall be repaired or replaced at its expense.

16. Abbreviations and References

The following abbreviations may be used in these Specifications:

N.A.	Not Applicable
N.I.C	Not in Contract.
Fed. Spec. or F.S.	Federal Specifications
SUCF	State University Construction Fund
University or SUNY State University of New York	
College	A Campus of the State University of New York

17. Use of Elevators

The Contractor shall be permitted to make temporary use of elevators designated by the University and provided such use does not interfere with the normal activities of the College. Large and heavy items shall not be placed in elevators, and suitable padding shall be provided whenever a cab is used for construction purposes. Elevator pits shall be kept free of debris and dust by frequent cleaning out. The elevators shall be restored to original condition satisfactory to the University at the end of construction activities. Use of the top of the elevator may be permitted after obtaining approval of the University.

18. Salvage of Materials

Remove and legally dispose of all debris and other materials resulting from the alterations to State University property. The following items shall remain the property of the University and shall be stored at the site as directed by the University:

19. Storage of Materials

- a. The Contractor shall store materials and equipment within the contract limits in areas on the site as designated by the University.
- b. All materials shall be stored in a neat and orderly manner, and shall be protected against the weather by raised floored weatherproof temporary storage facility or trailer.
- c. Security for stored materials shall be the responsibility of the Contractor.
- d. Storage of materials is not permitted on the roof of any building.

20. Shop Drawings and Samples - (Refer to Section 2.19 of the Agreement)

- a. The Contractor shall submit to the University for its approval five (5) sets of prints of all shop drawings required by the specifications. Those marked:
 - “REJECTED” are not in accordance with the Contract Documents and shall be resubmitted.

"REVISE AND RESUBMIT" Contractor shall correct and resubmit.

"MAKE CORRECTIONS NOTED": The contractor shall comply with corrections and may proceed. Resubmittal is not required.

"APPROVED - NO EXCEPTIONS TAKEN": The contractor may proceed.

- b. All shop drawings and/or submittals used on the construction site must bear the impression of the consultant's review stamp as well as the General Contractor's review stamp, indicating the status of review and the date of review.
- c. All shop drawings shall reflect actual site conditions and accurate field dimensions. Dimensioned shop drawings shall be submitted for all fabricated items. Incomplete submittals will be rejected without review.
- d. All shop drawings, submittals and samples shall include:
 - 1). Date and revision dates.
 - 2). Project title and number.
 - 3). Names of:
 - Contractor
 - Subcontractor
 - Supplier
 - Manufacturer
 - 4). Identification of products or materials: Include Department of State (DOS) file number, manufacturers' name and market name of all covered products and applicable materials in accordance with Part 1120 of the Code. This information may be obtained by contacting the DOS, Office of Fire Prevention and Control: 518 474-6746 [voice] and 518 474-3240 [FAX]

21. U.S. Steel

All structural steel, reinforcing steel, or other major steel items to be incorporated in the work shall, if this Contract is in excess of \$100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

22. Non-Asbestos Products

- a. All materials specified herein shall contain no asbestos.
- b. Provide "Contains No Asbestos" permanent labels applied to the exterior jacket of all pipe insulation at 20 foot intervals with a minimum of one (1) label for each service in each work area.

23. Material Safety Data Sheet

The contractor shall submit MSDS (Material Safety Data Sheet) for all chemicals, solvents, and materials specified or proposed to be used on this project.

24. Architect's/Engineer's Seal

In accordance with Rules and Regulations of the New York State Education Law, Title 8, Part 69.5(b), to all plans, specifications and reports to which the seal of an architect has been applied, there shall also be applied a stamp with appropriate wording warning that it is a violation of the law for any person, unless acting under the direction of a licensed architect, to alter an item in any way. If an item bearing the seal of an architect is altered, the altering architect shall affix to his item the seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration.

25. Construction Permit

The Code Compliance Manager for the State University Campus will, as required by law, issue a Construction Permit for this Project. The project is not subject to any local building code or permit requirements, except for work that the Contractor is to perform on property located outside of the boundaries of the campuses of the State University of New York.

26. Other Contracts

There may be other contracts let for work to be done in adjacent areas and, as such, this Contractor and such other contractors shall coordinate their work to conform with progressive operation of all the work covered by such contracts, and afford each other reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and the execution of their work.

27. Asbestos

If the work to be done under this contract contains the abatement of asbestos the following shall apply:

- a. Applicable Regulations - All work to be done under this Contract shall be in compliance with Part 56 of Title 12 of the Official

Compilation of Codes, Rules and Regulations of the State of New York (cited as 12 NYCRR Part 56) as amended effective November 9, 1994.

- b. Applicable Variance - The abatement contractor is responsible for obtaining any variance not issued to date that he feels may be applicable to the policies/procedures as set forth in 12 NYCRR Part 56.
- c. Owner Project Fact Sheet -The Contractor shall complete and submit as much information as possible on the Asbestos Material Fact Sheet to the University in triplicate prior to the project startup completion of the Fact Sheet shall be submitted prior to acceptance.
- d. Patent Infringement - The State University of New York and the State University Construction Fund have been given notice by a law firm representing GPAC, Inc. that the use of its process/procedure for asbestos containment and removal constitutes a patent infringement. All potential contractors are hereby notified that they may have to obtain a license to use certain patented Negative Air Containment systems, and that any liability of the University in connection therewith is covered by Section 2.21 of the Agreement. Therefore, all potential contractors are hereby notified that after opening of the bids they must advise the University as to the system they intend to use for Negative Air Containment and provide the University with either a copy of their license to use the same or written documentation, signed by an authorized officer of their surety, that their performance bond guarantees the Contractor's indemnification covering patent claims.
- e. Air Monitoring - All work to be done under this Contract shall be in compliance with Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (cited as 12 NYCRR Part 56), as currently amended, and applicable federal and state regulations.

The Owner shall be responsible for hiring and paying an independent third party firm to perform the requirements of air monitoring as called for in 12 NYCRR Part 56 and as permitted in Section 2.17 of the Agreement.

- f. Testing - The University and Campus reserve the right to employ an independent testing laboratory to perform testing on the work and air sampling. The Contractor shall be required to cooperate with the testing laboratory.
- g. Disposal Procedures - It is the responsibility of the asbestos contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The asbestos contractor must comply fully with these regulations, all appropriate U.S. Department of Transportation, EPA and Federal, State and local entities' regulations, and all other then current legal requirements. Submit originals or copies of all pertinent manifests in triplicate to the University.
- h. Submittals - Prior to commencement of the work on this project, the Contractor must submit the following to the University:
 - 1). Copy of original insurance policy.
 - 2). Copy of Department of Labor notification.
 - 3). Owner Fact Sheet.
 - 4). Copy of EPA notification.
- i. Special Requirements -
 - 1) Size, location, and quantities of all pipes, joints, ducts, valves, tees, etc. must be field verified by all prospective bidders. Information given on the drawings and specifications is for general orientation and information only.
 - 2) The Contractor shall have at least one English-speaking supervisor on the site at all times while the project is in progress.
 - 3) Prior to the commencement of work involving asbestos demolition, removal, renovation, the Contractor must submit to the University the name of its on-site asbestos supervisor responsible for such operations, together with documentation that such supervisor has completed an Environmental Protection Agency-approved training course for asbestos supervisors.

28 Sustainable Design Reporting

When submission of environmental product declarations (EPDs) is required by the technical specifications, in addition to the individual EPD submittals, submit a list summarizing the materials/products covered by each EPD submittal and the estimated total quantities used/installed of such covered materials during the Work completed to date. As directed by the Consultant, the list shall be submitted/updated annually and at Substantial Completion. If the submitted EPDs do not show the kgCO₂ per the quantity unit used/installed for a covered material, provide such

information upon request of the Consultant. Using the list and other information, the Consultant will calculate the estimated total kgCO₂ (kilograms of carbon dioxide) emission equivalent for each covered material/product used/installed.

29 Wage Rates and Supplements

The following are the rates of wages and supplements determined by the Industrial Commissioner of the State of New York as prevailing in the locality of the site at which the work will be performed:

Wage Schedules can be accessed online using PRC # [2024004397](https://labor.ny.gov/workerprotection/publicwork/OWSuccess.shtm) at <https://labor.ny.gov/workerprotection/publicwork/OWSuccess.shtm>. If the Contractor is unable to access the prevailing wage schedule for the PRC# listed above, please contact the University for a copy of the wage rate schedule.

(The Consultant or Campus must request an Original Wage Schedule MUST BE REQUESTED from the Bureau of Public Work using the following website

<https://apps.labor.ny.gov/wpp/showPublicNewProject.do?method=showIt>

SECTION D - Special Conditions

1. Cutting and Patching

- a. The Contractor shall do all cutting, fitting, and patching of its work that may be required to make its several parts come together properly and fitted as shown upon or reasonably implied from the Drawings and Specifications for the completed project.
- b. Any cost caused by defective or ill-timed work shall be borne by the Contractor. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor or existing work without the consent of the University.
- c. Existing construction, finishes, equipment, wiring, etc., that is to remain and which is damaged or defaced by reason of work done under this contract shall be restored by the Contractor to a condition satisfactory to the University, or replaced with new, at no additional cost.
- d. Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by the conditions and in each case shall be subject to approval by the University.
- e. Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the materials and methods to be employed shall be subject to approval by the University.
- f. All new, altered, or restored work in the building shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required by the drawings.

2. Clean-Up

- a. Periodic Cleaning: The Contractor shall at all times during the progress of the work keep the Site free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workmen to limits prescribed by law or by the Contract Limit Lines, except as the latter may be extended with the approval of the University. Cleaning of the structure(s), once enclosed, must be performed daily and removal of waste matter or rubbish must be performed at least once a week.
- b. Final Clean Up: Upon completion of the work covered by the Contract, the Contractor shall leave the completed project ready for use without the need of further cleaning of any kind and with all work in new condition and perfect order. In addition, upon completion of all work, the Contractor shall remove from the vicinity of the work and from the property owned or occupied by the State of New York, the State University of New York or the University, all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to it or used under its direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the University at the expense of the Contractor, and it and its surety shall be liable therefor.

3. Temporary Access and Parking

- a. Access to the building sites for delivery of construction material, personnel and/or equipment shall be made only from the Bunn Hill service entrance drive. Construction material delivery access to the Library Building shall be made at the loading dock on the east side of the building.
- b. The Contractor and his employees shall protect all permanent improvements to remain, all curbs, pavements and other improvements adjacent to work areas liable to injury.
- c. Prior to bidding each project, it shall be the responsibility of the Project Coordinator to schedule a meeting with Campus Parking Services to discuss the location for parking and staging areas for that particular project. This group will work together to determine the best location for contractor parking and staging and will designate parking lots which will be assigned for this use. Specific lots will be suggested based on campus needs and the availability of spaces during the timeframe of construction. The following campus standards will be incorporated into the documentation provided to the contractors for inclusion in the project.

- d. **Cost**
- **Annual** - Contractor Hang Tags are available from Parking Services for \$140.55 per year.
 - **Semester Only** - Contractor Hang Tags are available from Parking Services for \$95.00 per year.
 - **Summer Only** – Contractor Hang tags for summer parking only, will be available at the reduced rate of \$43.00 / summer. This rate will be good for any period of time, from commencement up to the date of the incoming freshman arrivals.
- Please note the following: Price includes registration fee
Evening hours are 5:00PM-12:00AM
Permit is restricted to certain lots*
- e. In order to park on Campus all contractor employee vehicles must display a Contractor Hang Tag and be parking in the appropriate areas.
- f. Due to the fluid nature of the parking at the University any of the areas listed below, at times, may be restricted due to events occurring on the campus that require the use of lots that are listed below. Alternate arrangements will be made during such time periods.
- **Academic Year** - Contractor hang tags are only valid in the following locations during the academic year.
 - ✓ Lot E1
 - ✓ Lot J – Southern Section Only
 - ✓ Lot ZZ South – Western Section Only
 - ✓ Connector Road (Only when this is specifically signed for Contractor Parking)
 - **Summer** – Contractor hang tags are only valid in the following locations during the summer.
 - ✓ Lot E1
 - ✓ Lot J – Southern Section Only
 - ✓ Lot ZZ South
 - ✓ Lot S4
 - ✓ Lot S5
 - ✓ Lot M1
 - ✓ Lot H – Lot may be closed when needed for Event Center Parking
 - ✓ Lot Y4
 - ✓ Lot Y5
- g. **Vehicle Registration** – Vehicle Registration is not required.
- h. **Transferability** – Hang tag may be transferred to other contractor vehicles as desired.
- i. **Parking Violations** – contractors must follow all rules and regulations regarding parking and vehicle traffic laws and regulations. Contractor will be responsible for all violations.

3.1 Additional Parking Requirements

a. Loading Dock Regulations:

Campus loading docks may be used for intermittent loading and unloading of Contractor’s materials, personnel and tools but not for parking of the delivery vehicle. All other vehicles (workers and company owned) are to use University parking lots and be subject to all applicable campus parking regulations and fees. Loading and unloading at campus loading docks is to be coordinated with the Project Coordinator. Temporary parking for loading or unloading at locations other than an existing loading dock shall be arranged with prior approval by the campus and should also be coordinated with the Project Coordinator.

b. Parking in Construction Site Staging Areas:

Generally, parking at the construction site is prohibited. If a space can be made available in the staging area, one Contractor vehicle will be allowed for each Prime Contractor assigned to the project. All remaining vehicles (worker, company, supplier, subcontractor, or vendor owned) will be subject to all applicable campus parking regulation and fees as stated above. The contractor shall keep access routes and parking areas free of debris and other obstructions resulting from the work.

c. Parking and Traffic Violations

The University requires that all vehicles conform to New York State Department of Motor Vehicle rules and regulations regarding registration, insurance, and safety inspections. In addition, violations of the Vehicle and Traffic Law or any other applicable traffic ordinance will be processed in accordance with the requirements of the applicable law.

The University seeks to assure that safe and accessible parking is available for intended users and that University business may be conducted in a safe and orderly fashion. In addition, access at all times must be available for emergency and critical service equipment.

The responsibility for finding a valid parking space, as well as determining whether a parking permit is valid, rests with the vehicle operator. Since parking spaces are limited, purchase of a parking permit does not assure a parking space. Lack of an available space is not justification for violating University parking regulations.

Vehicles must be parked within the boundaries of a valid parking space. This means that there is no parking on crosswalks, on sidewalks, on off-pavement areas, at yellow curb areas, beyond the end of a marked row, in bus or loading zones, and in traffic lanes or barricaded or closed areas. Personal notes of explanation left on vehicles or the fact that other vehicles are parked illegally do not constitute justification for parking in violation of the regulations.

Tickets will be issued, and parking fines assessed, for the following violations:

1. Parking in a tow-away zone: \$40
2. Parking in a fire-safety zone: \$100
3. No current, appropriately displayed vehicle registration decal: \$40
4. No current, appropriately displayed University parking permit: \$40
5. Parking on the grass: \$40
6. Unauthorized parking in a disabled zone: \$100
7. Overtime parking: \$20
8. Parking in a restricted area: \$40
9. All other violations: \$40
10. Parking in Tow Away Commuter/Snow Lot: \$25
11. Parking while displaying a stolen, forged, altered, or illegally obtained parking permit or registration decal: \$50
12. Parking while displaying an expired DMV registration or vehicle inspection: \$40

The first ticket issued for no current vehicle registration decal displayed and/or no current University parking permit displayed may be waived if the permit/registration is purchased at Parking Services within five calendar days of ticket issuance. Nonaffiliated visitors may pay the visitor rate of \$5 within five days if ticketed for no current campus parking permit displayed.

Generally, the Contractor shall restrict parking to one company owned vehicle in a conventional parking space in the vicinity on the Library Building. Such parking of the vehicle shall not be at the Library loading dock. The dock may be used for intermittent loading and unloading of Contractor's materials, personnel and tools but not for interim parking of the delivery vehicle. All other vehicles (workers and company owned) are to utilize University parking lots and be subject to all applicable campus parking regulations and fees. Loading and unloading at the loading dock is to be coordinated with the Owner's project coordinator.

4. Field Meetings

Periodic job meetings will be scheduled by the Consultant and the University during the course of construction. The Contractor, and, upon request of the Consultant and the University, its principal subcontractors and manufacturer's representatives, shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship, or any other subject on which the Consultant and the University might reasonably require information.

5. Operating Instructions and Manuals

The Contractor shall furnish three (3) complete sets of operating instructions and manuals which shall include definite and specific instructions on all mechanical and electrical systems involved in the Project. Said instructions and manuals should set forth: (1) the manner of operation; (2) the necessary precautions and care to be followed; (3) periodic prevention maintenance requirements; and (4) a complete set of spare parts lists, catalogs, service manuals and manufacturing data on said systems. Said instructions and manuals are to be made available by the Contractor for review and comment by the University a minimum of six (6) weeks prior to the scheduled completion of the Project.

6. Utility Shutdowns and Cut Overs

- a. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the University, for its approval, a proposed schedule of all utility shutdowns and Cut overs of all types which will be required to complete the Project; said schedule should contain a minimum of two (2) week's advance notice prior to the time of the proposed shutdown and cut over. Most campuses of the State University of New York are in full operation 12 months of the year, and shutdowns and Cut overs, depending upon their type, generally must be scheduled on weekends, at night, or during holiday periods. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or Cut overs.
- b. Temporary Connections: In the event the Contractor shall disrupt any existing services, the Contractor shall immediately make temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All work must be acceptable to the University.

7. Temporary Power for Construction Activities

Electrical energy will be available at no cost to the Contractor from existing outlets or panels from locations approved by the College. This power may be used for small power tools (not exceeding 1/2 HP), etc., and the Contractor shall not exceed the capacity of the existing circuits being used. The Contractor shall be responsible for providing all necessary connections, cables, etc. and removal of the same at completion of construction with approval from the University. The Contractor shall in no way modify the existing circuits at the panel boards to increase capacities of the circuits. If the required power load exceeds the capacities of the available power sources, the Contractor shall be responsible and pay for furnishing and installing all necessary temporary power poles, cables, fused disconnect switches, transformers and electric meters necessary to provide a temporary power system for the project, and remove the same at completion. Install all temporary wiring and equipment and make all connections in conformity with the National Electrical Code. Make all replacements required by temporary use of the permanent wiring system. Provide ground

fault protection.

8. Sanitary Facilities

The Contractor will be permitted to use existing toilet and janitor closet facilities as designated by the College provided the existing facilities are not misused, defaced, or left in an unsanitary condition. If the University deems that the existing facilities have been subject to misuse or left unsanitary, the Contractor shall be informed and caused to install and maintain (at its own cost) temporary, sanitary facilities at approved locations. The Contractor shall also be held responsible for the cost of cleaning and repair of any damage to said existing facilities and adherence to health and sanitary codes of the State of New York.

9. Temporary Heat

- a. In those locations where it is required by the conditions of the work, the Contractor shall provide and pay for all temporary heating, coverings and enclosures necessary to properly protect all work and materials against damage by dampness and cold, dry out the work, and facilitate the completion thereof. Fuel, equipment, materials, operating personnel and the methods used therefor shall be at all times satisfactory to the University and adequate for the purpose intended. The Contractor shall maintain the critical installation temperatures, provided in the technical provisions of the specifications hereof, for all work in those areas where the same is being performed.
- b. Maintenance of proper heating, ventilation and adequate drying out of the work is the responsibility of the Contractor. Any work damaged by dampness, insufficient or abnormal heating shall be replaced to the satisfaction of the University by and at the sole cost and expense of the Contractor.
- c. The Contractor shall provide all necessary, temporary heating for the efficient and effective work by itself and all trades engaged in the work. Unless otherwise specified, the minimum temperature shall be 50 degrees F at all places where work is actually being performed within the project (where enclosed). Before and during the placing of wood finish and the application of other interior finishing, varnishing, painting, etc., and until final acceptance by the University of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 68 degrees F nor more than 78 degrees F.

10. Temporary Light

The contractor shall install, maintain and remove Underwriter's Label temporary lighting sockets, light bulbs, and intermittent power sockets as approved by the University. The minimum temporary lighting to be provided is at the rate of 1/4 watt per square foot and be maintained for 24 hours, 7 days per week at stairs and exit corridors; in all other spaces, temporary lighting is to be maintained during working hours. Installation shall be in accordance with the National Electric Code.

11. Temporary Water for Construction Purposes

Water for construction is available through the campus system without charge to the Contractor from location designated by the College. The Contractor shall obtain the necessary permission, make all connections, as required, furnish and install all pipes and fittings, and remove the same at completion of work. The Contractor must provide for waste water discharge and shall take due care to prevent damage to existing structures or site and the waste of water. All pipes and fittings must be maintained in perfect condition at all times.

12. Conducting Work

- a. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operation and academic schedule.
- b. Safe and direct entrance to and exiting from the existing buildings shall be maintained at all times during regular hours while construction is in progress.
- c. No construction work will start in any area until the Contractor has all the required materials on-site.
- d. The Contractor and its employees shall comply with College regulations governing conduct, access to the premises, and operation of equipment.
- e. The building shall not be left "open" overnight or during any period of inclement weather. Temporary weather tight closures shall be provided for/by the Contractor to protect the structure and its contents.

13. Safety and Protective Facilities

- a. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Staff, students, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- b. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.

14. Protection of Existing Structures, Vegetation and Utilities

The Contractor, during the course of its work, shall not damage any buildings, structures and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric power and lighting and telephone cables, lawns, curbs, plants and other improvements. Any damage resulting from the Contractor's operations shall be repaired or replaced at its expense.

15. Abbreviations and References

The following abbreviations may be used in these Specifications:

N.A.	Not Applicable
N.I.C	Not in Contract.
Fed. Spec. or F.S.	Federal Specifications
SUCF	State University Construction Fund
University or SUNY	State University of New York
College	A Campus of the State University of New York

16. Use of Elevators

The Contractor shall be permitted to make temporary use of elevators designated by the University and provided such use does not interfere with the normal activities of the College. Large and heavy items shall not be placed in elevators, and suitable padding shall be provided whenever a cab is used for construction purposes. Elevator pits shall be kept free of debris and dust by frequent cleaning out. The elevators shall be restored to original condition satisfactory to the University at the end of construction activities. Use of the top of the elevator may be permitted after obtaining approval of the University.

17. Salvage of Materials

Remove and legally dispose of all debris and other materials resulting from the alterations to State University property. The following items shall remain the property of the University and shall be stored at the site as directed by the University: N/A.

18. Storage of Materials

- a. The Contractor shall store materials and equipment within the contract limits in areas on the site as designated by the University.
- b. All materials shall be stored in a neat and orderly manner, and shall be protected against the weather by raised floored weatherproof temporary storage facility or trailer.
- c. Security for stored materials shall be the responsibility of the Contractor.
- d. Storage of materials is not permitted on the roof of any building.

19. Shop Drawings and Samples - (Refer to Section 2.19 of the Agreement)

- a. The Contractor shall submit to the University for its approval five (5) sets of prints of all shop drawings required by the specifications. Those marked:
 - "REJECTED" are not in accordance with the Contract Documents and shall be resubmitted.
 - "REVISE AND RESUBMIT" Contractor shall correct and resubmit.
 - "MAKE CORRECTIONS NOTED": The contractor shall comply with corrections and may proceed. Resubmittal is not required.
 - "APPROVED - NO EXCEPTIONS TAKEN": The contractor may proceed.
- b. All shop drawings and/or submittals used on the construction site must bear the impression of the consultant's review stamp as well as the General Contractor's review stamp, indicating the status of review and the date of review.
- c. All shop drawings shall reflect actual site conditions and accurate field dimensions. Dimensioned shop drawings shall be submitted for all fabricated items. Incomplete submittals will be rejected without review.
- d. All shop drawings, submittals and samples shall include:
 - 1). Date and revision dates.
 - 2). Project title and number.
 - 3). Names of:
 - a). Contractor
 - b). Subcontractor
 - c). Supplier
 - d). Manufacturer

- 4). Identification of products or materials: Include Department of State (DOS) file number, manufacturers' name and market name of all covered products and applicable materials in accordance with Part 1120 of the Code. This information may be obtained by contacting the DOS, Office of Fire Prevention and Control: 518-474-6746 [voice] and 518 474-3240 [FAX])

20. U.S. Steel

All structural steel, reinforcing steel, or other major steel items to be incorporated in the work shall, if this Contract is in excess of \$100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

21. Non-Asbestos Products

- a. All materials specified herein shall contain no asbestos.
- b. Provide "Contains No Asbestos" permanent labels applied to the exterior jacket of all pipe insulation at 20 foot intervals with a minimum of one (1) label for each service in each work area.

22. Material Safety Data Sheet

The contractor shall submit MSDS (Material Safety Data Sheet) for all chemicals, solvents, and materials specified or proposed to be used on this project.

23. Architect's/Engineer's Seal

In accordance with Rules and Regulations of the New York State Education Law, Title 8, Part 69.5(b), to all plans, specifications and reports to which the seal of an architect has been applied, there shall also be applied a stamp with appropriate wording warning that it is a violation of the law for any person, unless acting under the direction of a licensed architect, to alter an item in any way. If an item bearing the seal of an architect is altered, the altering architect shall affix to his item the seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration.

24. Construction Permit

The Code Compliance Manager for the State University Campus will, as required by law, issue a Construction Permit for this Project. The project is not subject to any local building code or permit requirements, except for work that the Contractor is to perform on property located outside of the boundaries of the campuses of the State University of New York.

25. Other Contracts

There may be other contracts let for work to be done in adjacent areas and, as such, this Contractor and such other contractors shall coordinate their work to conform with progressive operation of all the work covered by such contracts, and afford each other reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and the execution of their work.

26. Asbestos

If the work to be done under this contract contains the abatement of asbestos the following shall apply:

- a. Applicable Regulations - All work to be done under this Contract shall be in compliance with Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (cited as 12 NYCRR Part 56) as amended effective November 9, 1994.
- b. Applicable Variance - The abatement contractor is responsible for obtaining any variance not issued to date that he feels may be applicable to the policies/procedures as set forth in 12 NYCRR Part 56.
- c. Owner Project Fact Sheet -The Contractor shall complete and submit as much information as possible on the Asbestos Material Fact Sheet to the University in triplicate prior to the project startup completion of the Fact Sheet shall be submitted prior to acceptance.
- d. Patent Infringement - The State University of New York and the State University Construction Fund have been given notice by a law firm representing GPAC, Inc. that the use of its process/procedure for asbestos containment and removal constitutes a patent infringement. All potential contractors are hereby notified that they may have to obtain a license to use certain patented Negative Air Containment systems, and that any liability of the University in connection therewith is covered by Section 2.21 of the Agreement. Therefore, all potential contractors are hereby notified that after opening of the bids they must advise the University as to the system they intend to use for Negative Air Containment and provide the University with either a copy of their license to use the same or written documentation, signed by an authorized officer of their surety, that their performance bond guarantees the Contractor's indemnification covering patent claims.
- e. Air Monitoring - The abatement contractor shall be responsible for hiring and paying an independent third party firm to perform the requirements of air monitoring as called for in Subpart 56-17 of 12 NYCRR Part 56.

- f. Testing - The University and Campus reserve the right to employ an independent testing laboratory to perform testing on the work and air sampling. The Contractor shall be required to cooperate with the testing laboratory.
- g. Disposal Procedures - It is the responsibility of the asbestos contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The asbestos contractor must comply fully with these regulations, all appropriate U.S. Department of Transportation, EPA and Federal, State and local entities' regulations, and all other than current legal requirements. Submit originals or copies of all pertinent manifests in triplicate to the University.
- h. Submittals - Prior to commencement of the work on this project, the Contractor must submit the following to the University:
- 1). Copy of original insurance policy.
 - 2). Copy of Department of Labor notification.
 - 3). Owner Fact Sheet.
 - 4). Copy of EPA notification.
- i. Special Requirements -
- 1) Size, location, and quantities of all pipes, joints, ducts, valves, tees, etc. must be field verified by all prospective bidders. Information given on the drawings and specifications is for general orientation and information only.
 - 2) The Contractor shall have at least one English-speaking supervisor on the job site at all times while the project is in progress.
 - 3) Prior to the commencement of work involving asbestos demolition, removal, renovation, the Contractor must submit to the University the name of its on-site asbestos supervisor responsible for such operations, together with documentation that such supervisor has completed an Environmental Protection Agency-approved training course for asbestos supervisors.

27. Wage Rates and Supplements

The following are the rates of wages and supplements determined by the Industrial Commissioner of the State of New York as prevailing in the locality of the site at which the work will be performed:

SECTION D – SPECIAL CONDITIONS

1D-1 CUTTING AND PATCHING

- a) The Contractor shall do all cutting, fitting and patching of its work that may be required to make its several parts come together properly and fitted to receive or be received by work of other Contractors shown upon or reasonably implied from the drawings and specifications for the complete Project.
- b) Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor without the consent of the Architect and the Fund.
- c) Existing construction, finishes, equipment, wiring, etc., that are to remain and which are damaged or defaced by reason of work done under this contract shall be restored by the Contractor to a condition satisfactory to the Fund, or replaced with new, at no additional cost.
- d) Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by conditions, and in each case shall be subject to approval by the Architect.
- e) Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the material and methods to be employed shall be subject to approval by the Architect.
- f) All new, altered, or restored work in the buildings shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required by the drawings.

1D-2 CLEANUP

- a) Periodic Cleaning
 - 1) Periodic Cleaning: The Contractor shall at all times during the progress of the work keep the site free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workers to limits prescribed by law or by the Contract limit lines. Except as the later may be extended with the approval of the Architect and University. Cleaning of the structure or structures, once enclosed, must be performed daily and removal of waste matter or rubbish must be performed at least once a week.

- 2) All paved surfaces outside of the contract limit line, which are traveled by trucks hauling materials to or from the construction site, shall be cleaned no less than daily, during periods when such transport leaves any amount of dirt or debris on the pavement. Otherwise, periodic cleaning should occur at least every three days or as directed by the Architect. All road sweeping is to be done with proper dust control measures to prevent dust clouds, such as wetting down before sweeping. During major excavation, provide truck wash-down area to prevent unnecessary tracking of materials on public roads. The GC is responsible for ensuring Center Drive and the new Temporary Access Road is clean.
- b) Final Cleanup
- 1) Upon completion of the work covered by the Contract the Contractor shall leave the completed Project ready for use and occupancy without the need of further cleaning of any kind and with all work in new condition and perfect order. In addition, upon completion of all work the Contractor shall remove from the vicinity of the work and from the property owned or occupied by the State of New York, the State University of New York, all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to it or used under its direction during construction or impairing the uses or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the University at the expense of the Contractor, and it and its surety shall be liable therefore.

1D-3 FIELD MEETINGS

At least bi-weekly job meetings will be scheduled by the Architect during the course of construction. The Contractor and, upon request of the Architect, its principal subcontractors shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship or on any other subject on which the Architect or University might reasonably require information.

1D-4 OPERATING INSTRUCTION AND MANUALS

- a) The Contractor shall furnish three (1) complete set of operating instructions and manuals in hard copy and (3) electronic copies, which shall include definite and specific instruction on all mechanical and electrical systems involved in the Project. Said instructions and manuals should indicate:
 - 3) manner of operation
 - 4) necessary precautions and care to be followed
 - 5) periodic preventive maintenance requirements. All preventative Maintenance requirements are to be provided to the Campus in an electronic format. The format is to include an Excel spreadsheet listing in separate cells a minimum of the following information:
 - Name of piece of equipment
 - Manufacturer
 - Model #
 - Size Info
 - Room # location (separate line to be used for each piece of equipment in each location)
 - PM tasks needed with frequency
- 6) A complete set of spare parts lists, catalogs, service manuals and manufacturing data on said systems.
- 7) Instructions and manuals are to be made available by the Contractor for review and comment by the Architect / Engineer a minimum of six (6) weeks prior to the scheduled completion of the Project.

1D-5 UTILITY SHUTDOWNS AND CUTOVERS

- a) The Contractor is responsible for maintaining continuity of services when it becomes necessary to shut down utilities affecting the existing buildings.
- b) Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the Architect / Engineer and the University for their approval a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project. The schedule should contain a minimum of eight (8) weeks advance notice prior to the time of the proposed shutdown and cutover. The State University of New York at Binghamton is in full operation twelve (12) months of the year and shutdowns and cutovers must be scheduled on weekends, at night or during holiday periods. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or cutovers. The East Gym is occupied daily including weekends, contractor to assume major shutdowns will occur on breaks, or as approved by construction manager, Gregg Konnick.
- c) The Contractor will be required to pay the local unit of the State University any extra cost the University may incur in connection with unscheduled shutdowns and cutovers.
- d) Drainage of any system shall be made to a properly connected receptacle without causing damage to other work or property.
- e) Temporary Connections: In the event the Contractor shall disrupt any existing services, the Contractor shall immediately make temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All work must be acceptable to the University.
- g) Contractor must provide in writing an Electrical safety plan indicating locations to be grounded during Electrical shutdowns and cutovers.
- h) Maximum length of an electrical shutdown is to be six (6) hours otherwise supplemental power shall be provided by the Contractor.

1D-6 TEMPORARY POWER

a) Supplied by Contractor

- 1) Contractor will be required to coordinate with University for temporary power. Refer to Specification Section 015000 Temporary Facilities & Controls.
 - (a) The contractor shall provide all necessary temporary power for all construction activities, temporary facilities, construction trailers and staging area as required. The contractor shall be responsible for furnishing and installing all necessary generators, or temporary power poles, cables, fused disconnect, switches, transformers and electric meters.
 - (b) Temporary power and distribution shall be removed when directed by the University.

1D-7 TEMPORARY SANITARY FACILITIES

- a) The Contractor shall install, maintain and, at the completion of all work or at such earlier time as the Architect may approve, remove temporary sanitary facilities. From the commencement of work until the frame of the structure, if the Project involves a structure is erected, such facilities shall be of the chemical type, shall be placed at locations approved by the Architect and shall be screened from the campus population.
- b) The amount of sanitary facilities required shall be based on the total number of workers employed on the Project and shall be in accordance with the provisions of the Health and Sanitary Codes of the State of New York.
- c) Maintain toilet facilities in a clean and sanitary condition and conform to requirements of NYS Department of Health and to regulations of NYS Department of Labor, Board of Standards and Appeals.
- d) Existing toilets shall not be used during construction of the Project unless approved in writing by the Owner.
- e) Contractor shall provide and maintain an adequate supply of potable water, provided in containers labeled "Drinking Water" and equipped with taps and tight fitting covers. Single service cups should be provided with a sanitary dispenser and a receptacle for disposing of used cups.

1D-8 BUILDING PERMIT

The University, if the same is required by law, will issue a building permit for the Project. The Project is not subject to the local building code or permit requirements.

1D-9 TEMPORARY FIRE PROTECTION

The Contractor shall maintain existing Fire Protection requirements. Existing Buildings will be occupied by the campus during construction and must be available for their use 24 hours a day, seven days a week during the contract period unless otherwise scheduled in these documents. All existing exits and Fire Protection systems shall be continuously maintained in the occupied phases, or other measures must be taken which in the opinion of the Architect provide equal safety. Cost of labor, variances, materials, installation, maintenance and removal of such temporary Fire protection systems or modifications to the existing systems is the responsibility of the Contractor.

1D-10 CONSTRUCTION PARKING AND STAGING

- a) The Contractor and its employees shall be subject to all the rules and regulations of the SUNY campus, including parking regulations. Parking violations are subject to fines and are the sole responsibility of the Contractor or its employees. Parking will be at cost for the Contractor and its employees.
Permits can be obtained by contacting the TAPS Office:
Couper Administration Building – Ground Floor (AD-G8)
Binghamton University
PO Box 6000
Binghamton, NY 13902-6000
Office Hours:
8:30am 0 3:30pm Monday – Friday
E-mail: parking@bingahtmon.edu
Phone: 607-777-2279
Fax: 607-777-222-4646
No Parking will be allowed within the staging area. Dumpster shall be within the staging area.
- b) Temporary parking for loading and / or unloading shall be arranged with prior approval by the Campus.
- c) The Contractor shall keep access routes and parking areas used for the work clean of debris and other obstructions resulting from the work.
- d) Loading Dock Regulations:

Campus loading docks may be used for intermittent loading and unloading of Contractor's materials, personnel and tools but not for parking of the delivery vehicle. All other vehicles (workers and company owned) are to use University parking lots and be subject to all applicable campus parking regulations and fees. Loading and unloading at campus loading docks is to be coordinated with the Project Coordinator. Temporary parking for loading or unloading at locations other than an existing loading dock shall be arranged with prior approval by the campus and should also be coordinated with the Project Coordinator.

1D-11 TEMPORARY WATER FOR CONSTRUCTION PURPOSE

The Contractor shall obtain the necessary permission, make all connections, as required, furnish and install all pipes and fittings, meters, and remove connections at completion of work. The Contractor must provide for wastewater discharge and shall take due care to prevent damage to existing structures or site. All pipes and fittings must be maintained in perfect condition at all times.

1D-12 CONDUCTING WORK

- a) All work of construction to be conducted in such a manner as to interfere to a minimum degree with the Campus operating and Academic schedule.
- b) Safe and direct entrance to and exiting from the existing buildings shall be maintained at all times.
- c) No construction work will start in any area until the Contractor has all the required materials on site.
- d) The Contractor and its employees shall comply with Campus regulations governing conduct, access to the premises and operation of equipment.
- e) The size, location of all existing structures, utilities and services must be field verified by the Contractor. Information given on the Drawings and in the Project Manual Specifications is for general orientation and for information only.
- f) Before proceeding with Work, consult other drawings, details, Owner's Site Representative to determine any interference with Work.

1D-13 EXAMINATION OF SITE

- a) The Site will be made available for inspection and the bidder shall examine the site prior to submitting its bid. Failure to visit the site shall not be the cause for extra payment.
- b) It is the responsibility of the Contractor to verify and check all existing conditions and dimensions affecting the Work of this Project.

1D-14 USE OF ELEVATORS

Use of existing campus Elevators will not be permitted.

1D-15 SAFETY AND PROTECTIVE FACILITIES

- a) The Contractor shall provide all necessary safeguards to prevent hazards and accidents, to protect the Owner, the Architect, their Consultants, agents and employees, the public, the workers, the Work and property, throughout the entire period of Contract Time. The Contractor shall also provide safeguards during all hours, including those during which workers are not engaged in Work (specifically nighttime, weekends, holidays, etc.).
- b) The Contractor shall erect, operate, maintain and remove, appropriate barriers, equipment and devices, as required by codes, laws and regulations and by conditions at the Work, to protect the Owner, the Architect, their Consultants, agents and employees, the public, the workers, the Work and property, to contain waste, debris, dust and any pollutants. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.
- c) The Contractor shall provide and maintain firefighting equipment and detection devices as required by codes, laws and regulations and by industry standards.
- d) The Contractor shall be responsible for guarding and protection of his Work, materials, products, equipment and tools, throughout the entire period of Contract Time and during all hours, including those during which workers are not engaged in Work (specifically including nighttime, weekends, holidays, etc.).
- e) Normal and Emergency access to and egress from the Work Areas, the premises, existing buildings, and the Site shall be clearly identified, lighted, posted, communicated, maintained and shall be kept free and unobstructed. Safe and direct entrance to and egress from the work areas affected shall be maintained at all times during all hours while construction is in progress. If for any reason a means of egress from is to be blocked off the Contractor shall get prior approval from the Fund.
- f) The operation of the fire alarm, telegraph, security, gongs, bells and telephones must not be interfered with, except for scheduled interruptions. (See Shutdown Procedures)
- g) The Contractor shall comply with all applicable codes, laws and regulations pertaining to safety, workers protection and posting requirements.
- h) The Contractor shall provide all Signage necessary to facilitate any and all redirection of vehicles or pedestrian traffic in and around all Construction activities. Contractor shall maintain such Signage for the duration of the construction activities. The University's Project Coordinator shall coordinate, define, and approve all required signage.
- i) The Contractor shall insure the availability of medical and of industrial hygiene personnel for advice and consultation and directions on matters of occupational safety and health.
- j) Dust Control: Prevent the nuisance of dust to surrounding areas, and provide sufficient means and equipment for minimizing, controlling, collection and disposing of dust.
- k) Noise Control: Prevent the nuisance of noise to occupants of adjacent buildings and of surrounding facilities, and provide sufficient mean and equipment of minimizing noise.

- l) The University will provide Padlocks for Security access gates of Construction Site and Staging areas. The University lock-shop will issue keys to the Contractor, SUCF site representatives, Campus Coordinator and ULED.
- m) Key Access to existing building spaces will be reviewed, determined and authorized by the Campus Project Coordinator.
 - 1) The Contractor shall complete the "Contractor Key Loan Request Form" and associated small scale buildings plans indicating spaces where access is requested a minimum of ten (10) business days before access is required.
 - 2) The Campus Project Coordinator will set up a time for the distribution and signature signing of Keys at the University Lockshop.
 - 3) Upon conclusion of associated work or Project, the Contractor shall return the keys to the Lockshop.

1D-16 PROTECTION OF EXISTING STRUCTURES, UTILITIES, AND VEGETATION

- a) The Contractor, during the course of his Work, shall not damage: buildings, structures, utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, active sewers, drains and electric power and lighting and telephone cables, lawns, curbs, plants, trees or other improvements. Any damage resulting from the Contractor's operations shall be repaired or replaced at his expense.
- b) The Contractor shall protect all permanent improvements to remain, all curbs, pavements and other improvements adjacent to work areas liable to injury.
- c) Protect all roof areas where work of this contract may damage them with ¾" plywood with tightly butted joints. All walk-pads shown for new work shall be installed as soon as practicable.
- d) If disconnection of utilities are required to be made in conjunction with the Work, the Contractor shall notify the Owner and shall insure that the necessary connections and /or disconnection's, allow the orderly and safe conduct of the Work have been made prior to the start of Work. The Contractor shall reconnect temporarily disconnected or disconnect temporarily utilities, as applicable to allow proper and safe continued use.
- e) Any conduit or other piping entering Campus buildings must enter with the pipe pitching away from the building for at least ten feet, or must have provision to drain away surface water which will follow the piping.

1D-17 STORAGE OF MATERIALS

- a) The Contractor shall store materials and equipment within the contract limits in areas on the site designated by the Architect.
- b) All materials shall be stored in a neat and orderly manner, and shall be protected against the weather by raised flooring, weatherproof temporary facilities or trailer.
- c) Security for stored equipment and materials shall be the responsibility of the Contractor.
- d) Storage on the roof shall be as directed by and in conjunction with Architect.
- e) The University will not be responsible for the storage of materials. No materials shall be stored in existing University buildings.
- f) Deliver Materials to the job site in their manufacture's original container, with labels intact and legible.
 - 1) All materials shall be new, conforming to standards as herein specified.
 - 2) Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 3) Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Fund.

1D-18 MATERIAL SAFETY AND DATA SHEET

- a) Contractor shall submit MSDS (Material Safety Data Sheet) for all chemicals, solvents, and materials specified or proposed to be used on this project.
- b) Provide engineering controls and work practices required to maintain the permissible exposure limit for Campus personnel, students, and the public to that required by the PESH Air containment Standard.
- c) Copies shall be retained on site, in the Contractor site trailer, with the Architects site representative, and the Campus Office of Environmental Health and Safety.

1D-19 LABORATORY TESTING SERVICES

- a) The Architect may engage the services of a testing laboratory during the progress of the work, at no expense to the Contractor. The service of the testing laboratory shall in no way relieve the Contractor of any of its responsibilities under the terms of its Agreement with the University, nor give rise to any claim or right of the Contractor as a result of the conduct or curtailment of such tests.
- b) The Contractor shall cooperate with the testing laboratory in providing access to the work, material for samples and time to perform the work.
- c) The listing of such tests in the technical specifications is for the Contractor's convenience only and in no way restricts the Engineer's the right to all other testing and inspection in accordance with Article II of the Agreement, and to vary the amounts and types of testing at any time before or during the progress of the work.

1D-20 SCAFFOLDING

- a) The Contractor shall erect and maintain scaffolding and protective bridging of the type and quantity sufficient to perform the work. Comply with all applicable State and Federal standards, especially 29CFR 1926.450-454, sub part L, including all recommendations in the non-mandatory appendices.
- b) Prevent birds from nesting in scaffolding.

1D-21 WAGE RATES AND SUPPLEMENTS

- a) Prevailing Rates of Wages and Supplements, determined by the Department of Labor of the State of New York as prevailing in the locality of the Site at which the Work will be performed, are attached hereinafter.
- b) Prevailing Wage Rates and Supplements are subject to change, in accordance with the law. Updated / new determinations of Prevailing Wage Rates and Supplements will be furnished when received from NYS Department of Labor.
- c) Neither the Fund nor the Architect or their Consultants make any representation concerning the completeness or / and accuracy of the contents of said Prevailing Wage Rates and Supplements, and assume no responsibility for errors and/or omissions contained therein.
- d) It shall be the obligation of the Bidder and Contractor to review the Schedule of Prevailing Wage Rates and Supplements and to obtain such further information from NYS Dept. of Labor, or other available sources, as he may deem necessary, concerning any present or future Wage Rates and Supplements, in order to accurately prepare his Bid and to comply with the laws of the State of New York.

1D-22 ABBREVIATIONS AND REFERENCES

The following abbreviations may be used in these Specifications:

N.A.	Not Applicable
N.I.C.	Not in Contract
Fed. Spec. or F.S.	Federal Specifications
SUCF or Fund	State University Construction Fund
SUNY	State University of New York
College	A Campus of State University of New York

1D-23 DEFINITIONS

- a) These definitions are intended also to supplement those contained on the first page of the Agreement of this Contract,
 - 1) "Not in Contract", "N.I.C." indicates equipment furnished by the Owner and installed under another construction contract or by another contractor, or operations at the site not included as part of this Contract.
 - 2) Provide, Provided - mean that the Contractor shall furnish and install all materials and labor for the item so specified.

1D-24 EXISTING CONDITIONS

- a) Photographs: Prior to the start of any work the Contractor shall photograph any and all damaged or misaligned materials or surfaces which may in any way be misconstrued as having occurred during the implementation of this Contract. The Contractor shall submit a copy of these photographs to the Architect for record, prior to the start of any work.
- b) Field Measurements: Make field measurements wherever required for accurate fabrication of built-in or attached products. Do not delay job progress. Allow for trimming where field measurements cannot be made prior to fabrication.

1D-25 PHASING AND SEQUENCING

- a) Not Used.

1D-26 CONCURRENT PROJECTS

The Contractor is advised of other contracts let by the University and Fund consisting of work to be done with, adjoining and adjacent to the site on which the work covered by this Contract is to be performed. The Contractor shall comply with Sections 2.16 "Other Contracts", on page A-6 of the Agreement as to the Contractor's responsibilities for coordination sequencing storage and execution of the work.

1D-27 EMERGENCY NOTIFICATION AND PROJECT ROSTER

- a) Emergency Phone Numbers to be used for Life or Property Emergencies. The following phone numbers must be used to contact Ambulance, Fire Department, and Police.
 - 1) On Campus Phone: # 911, will connect with campus University Law Enforcement Department (ULED)
 - 2) Cell Phone: # 777-2222, will connect with on campus (ULED)
 - 3) Reporting Instructions are as follows: "Identify yourself and say where you are: My name is _____, I am at (Building and room, or address), and I want to report a (Fire, Accident)."
- b) Project Roster: The Contractor shall produce, distribute and maintain a Project Roster of Primary contacts, Contractors and Sub-contractors. The Roster shall list the following: The Campus will make a form available to the contractor for this information.
 - 1) Project Title

- 2) Project Construction Fund number
- 3) Anticipated Date of Completion
- 4) Date and revised dates
- 5) Line Numbers for individual contacts
- 6) Function of Contact (Individual title)
- 7) Name of Contact
- 8) Company Name & Business Address
- 9) Business Phone #'s: Telephone, Fax, Pager, Car and E-Mail address
- 10) Emergency Phone #: for 24 hour emergency

1D-28 UNACCEPTABLE MATERIALS AND PRODUCTS

- a) All materials and products specified herein and /or used on Work of this Project shall not contain Asbestos, Lead, or PCB, and their packaging shall be labeled accordingly by manufacturers.
- b) Provide "Contains No Asbestos" permanent labels applied to the exterior jacket of all pipe insulation at 20 foot intervals with a minimum of one (1) label for each service in each work area.
- c) The University shall have a 3rd party inspector on site periodically sampling incoming materials for the presence of Asbestos. Contractor will be required to coordinate with and provide any information necessary to the inspector.

1D-29 WORKER PROTECTION

- a) General and regulatory requirements
 - 1) Comply with requirements of worker protection.
 - 2) Comply with governing codes, laws and regulations and industry standards.
- b) Respirators and Filters
 - 1) Respirators and filters shall be selected by Contractor.
 - 2) Choice of respirators and cartridges shall correspond to type of Work performed to protect workers from hazardous exposure during removal of lead-based paint, from fibers during handling of non-combustible filler blanket, from respirable dust during sanding of wood moorings from chemical vapors during sealing/finishing the new flooring and painting game lines and logo.
 - 3) Packing boxes of the respirators (masks) and of disposable filters shall show the logo of NIOSH & of MSHA and shall also indicate that this equipment are for use in environments encountered or expected to be encountered during the Work
- c) Personal protective equipment (PPE).
 - 1) Provide per OSHA regulations.

1D-30 SERVICES OF LICENSED ELECTRICIAN

- a) Provide and maintain electrical mechanical shutdown and lockout tag-out of applicable system during construction.
- b) Provide all necessary electrical disconnections of relocated/removed existing equipment and reconnections of reinstalled equipment (as applicable).
- c) Provide and maintain a correct and a safe utilization by Contractor of all electrical power supplies, of connected tools and equipment, of portable lighting.
- d) All electrically powered tools, equipment and portable lighting shall be connected only to circuitry protected at source by Ground Fault Interrupters (GFI).
- e) Where Contractor's cords or temporary wiring traverses through areas outside Contract Limit Lines, provide "pancake" protections to eliminate tripping hazards.
- f) Conduct periodic inspections of both electrical wiring and electrically powered equipment to identify damaged, worn-out or "tired" equipment

1D-31 TEMPORARY MATERIALS

Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions and must not violate requirements of applicable codes and standards.

1D-32 TEMPORARY STAIRS, LADDERS, RUNWAYS, RAMPS, AND HOISTS

- a) Comply with governing regulations and applicable standards.
- b) Provide and maintain all equipment such as temporary stairs, ladders, ramps, runways, chutes, etc. as required for the proper execution of the Work. Use of Owner's equipment is prohibited.
- c) Contractor's responsibilities and liabilities include providing, and proper use, of temporary stairs, ladders, ramps, scaffolding, lifts and other construction aids encompassing all related safety issues.

1D-33 TEMPORARY ENCLOSURES

Provide and be responsible for all temporary enclosures required for protecting the Project from the exterior, for providing passageways, for the protection of openings both exterior and interior and any other location where temporary enclosures and protection may be required.

ID-34 TEMPORARY FENCE, CORDONING-OFF, AND WARNING SIGNS

- a) Provide, install and maintain 8' high construction fencing around construction/staging area as indicated on the contract documents. Such fencing shall effectively enclose the designated construction/staging area and prevent unauthorized entry into the construction area.
- b) Construction fence shall be installed prior to the start of any work and shall be maintained in accordance with University standards throughout the entire duration of the project. Coordinate discrepancies between site conditions and contract documents with the University's Representative. Upon completion of project, unless otherwise noted, Contractor is responsible for the disassembly and removal of construction fencing from campus, as well as restoration of lawns, pavement, and/or concrete areas under which the fencing was installed.
- c) Maintenance of fencing is required at all times during the entire duration of the project. Contractor shall insure, at minimum, at the start and finish of every shift, that top rails are even, panels are straight with adjacent panels, panels are perpendicular/level with the ground, and wire-tires holding panels together are present and adequately tied. Contractor shall re-inspect and adjust fencing after heavy rains and/or winds, or as otherwise required. Where portable chain-link fencing is authorized by the University, adequate sand bags shall be provided in order to secure/hold fencing in place.
- d) Areas in and around the fencing shall be maintained in accordance with University standards; including but not limited to mowing of lawn, snow removal, dust mediation, etc. Staging areas shall be neat and orderly; unneeded materials and debris shall be removed from the staging areas at a minimum of weekly, or more often as deemed necessary. Storm manholes within construction fencing shall be properly maintained to prevent debris from entering the manhole. Contractor will be held responsible to clean manholes if they are found to have debris relating to construction activity.
- e) Utility Markings - Prior to the installation of any post-driven permanent fence, the Contractor is responsible for hiring a Utility Marking company to identify and mark underground utilities which may exist below the purposed fencing/staging footprint. If utilities are found to impede the installation of fence, as is shown on the contract documents, the University's Representative shall be contacted. The University's Representative will assist the contractor, to the best of its ability, to provide the contractor with existing site surveys. Damage done to underground utilities due to inadequate investigation or markings will be the responsibility of the contractor to remediate.
- f) Provide warning signs, securely anchored to the fence with galvanized steel, tamperproof anchor bolts at each entrance to the site. Sign shall read; **Construction Area. Do Not Enter. Authorized Personnel Only.** Provide additional warning signs, as required by governing codes, laws and regulations.
- g) The costs associated with this section shall be included in the Base Bid and shall be broken out as a separate line item in the Schedule of Values.
- h) Do not fence in Yard Fire Hydrants or other utilities that may require access.

Permanent Chain-Link Fence

- 1) Minimum 2", 1.048 thick, black coated galvanized steel chain link fence. No fabric or vinyl privacy slats.
- 2) Minimum 8' high fence with black coated galvanized steel pipe posts.
 - a) Posts- Minimum 2-3/8" OD line posts and 2-7/8" OD corner and pull posts. Terminal and corner posts of fence shall be post driven, 24" into ground. Spacing of line posts at 8' maximum.
 - b) Top Rail – 1-5/8" OD, black coated steel.
 - c) Gate Posts – 3" OD, SS40 Steel, black coated, set in concrete 14" diameter and 42" deep.
 - d) Gate – 1-5/8" OD. Double leaf with mid-rail, heavy duty strap hinges, drop bar, latch/hasp, black coated steel.
 - e) Tension wire – black coated to match fence and posts. Sufficiently spaced to provide adequate support in holding panels together and upright. Minimum 3 ties per panel connection.
 - f) Accessories – stretcher bars, rail ends, post caps, etc., as needed to complete work.

Portable Chain-Link Fencing

- 1) Acceptable only at the discretion of the University's Representative, in locations were Permanent Chain Link Fencing cannot be used.
- 2) Minimum 2", 1.048 thick, black coated galvanized steel chain link fence. No fabric or vinyl privacy slats.

- 3) Minimum 8' high fence with black coated galvanized steel pipe posts.
 - a) Posts- Minimum 2-3/8" OD line posts and 2-7/8" OD corner and pull posts. Sand bags at base of all posts to adequately hold posts/panels in place. Spacing of line posts at 8' maximum.
 - b) Top Rail – 1-5/8" OD, black coated steel.
 - c) Gate Posts – 3" OD, SS40 Steel, black coated.
 - d) Gate – 1-5/8" OD. Double leaf with mid-rail, heavy duty strap hinges, drop bar, latch/hasp, black coated steel.
 - e) Tension wire – black coated to match fence and posts. Sufficiently spaced to provide adequate support in holding panels together and upright. Minimum 3 ties per panel connection.
 - f) Accessories – stretcher bars, rail ends, post caps, etc., as needed to complete work.

Plastic "Snow" Fence

- 1) The use of green 48" high plastic/polyresin perimeter fence will be authorized for use at the discretion of the University's Representative. The use of orange plastic/polyresin fence is strictly prohibited on campus.
- 2) 60" high, 14 gauge, steel U-Posts, powder coated green or black shall be used. No wood stakes/posts will be permitted. Maximum post spacing 8'.
- 3) Maintenance of the vinyl fence is required at all times during its use. Contractor shall inspect fencing at the start and finish of every shift. Contractor shall re-inspect and adjust fencing after heavy rains or winds, or as otherwise required. Fencing shall be installed taught to prevent the fabric from falling over. Posts shall be adequately spaced and driven into the ground.

1D-35 TEMPORARY ACCESS AND DIRECTIONS

N/A

1D-36 REPAIR OF PARKING AREAS

- a) Contractor shall protect all permanent improvements to remain, including curbs, pavement and other improvements adjacent to work areas liable to injury.
- b) Repair of any damage caused to the parking lot assigned to the Contractor as a result of the Contractor's action shall be the responsibility of the Contractor
- c) Asphalt pavement specs need to include minimum pavement depths as follows:
 - 1) gravel base, 10" compacted item # 4
 - 2) asphalt binder, 3" type # 3
 - 3) asphalt topping, 1-1/2" type # 6
- d) All curbing along roadsides is to be granite curb to match existing.
- e) 4' wide curb cuts with texture identification are to be included at intersections of walks and roads.

1D-37 SCHEDULE

- a) Reference specification section 013200, Construction Progress Documentation for project scheduling requirements. Section 013200 requirements shall supersede all other construction scheduling references made within these documents.
- b) The Contractor shall schedule the work for expeditious completion as per the Agreement. The proposed schedule must be established in cooperation with the University.
- c) All schedules are to be created using professional software (i.e. Microsoft Project).
- d) By the first scheduled construction job meeting, the Contractor shall have prepared a tentative construction schedule. At each subsequent job meeting, the overall schedule shall be reviewed and an updated schedule prepared for the work to be completed by the next meeting.
- e) The updated master schedule and work schedule shall be provided to the Owner, Architect, and Campus representative along with the monthly applications for payment.
- f) Academic Calendar: The Contractor is advised that the College intends to maintain a full educational program during the normal school year throughout the Project duration. The College will make use of adjacent buildings and site, except where work is scheduled or specified. The Contractor is directed to acknowledge that all Contract work must be scheduled without the interruption of the normal educational process. The Contractor shall coordinate his work with the following University calendar, and no utility shutdowns will be permitted during Registration, Study Periods, Exam Periods, or Commencement. Baseball games and other functions at the Stadium may also affect scheduling of utility shutdowns.

1D-38 COOPERATION WITH THE UNIVERSITY

- a) Adjacent buildings and grounds will be in use during the term of this Contract. The Contractor shall cooperate with the University in order that the work shall cause as little disturbance and inconvenience as possible. The University's representative shall be local contact for the coordination. The Contractor shall anticipate that certain conditions may develop during construction, which will necessitate changes in procedures and scheduling of work to meet such conditions.
- b) The Contractor shall coordinate all construction activities to allow adequate access to and from building doors. The location and method of access may be varied by the Contractor to allow for his operations but shall always be coordinated with the College and Architect's Representative. The Contractor shall provide all barricades, bridges, warning lights and other safety methods to maintain continuous safe access to the public.

1D-39 SUBSTANTIAL COMPLETION

- a) Substantial Completion shall include, but not be limited to the following requirements;
 - 1) Work covered by the contract (including any modifications for additional work) has reached a point of completion to which the project or structure can be beneficially occupied by the University and used for the purposes for which it was intended.
 - 2) Resolution, corrective action, and all work, including Punch list items, have been completed to the satisfaction of the University. Punch list times must be completed to at least 90% of the entire Punch list item's construction value.
 - 3) Work has been completed on all life safety and NYS Building Code items.
 - 4) Quantity of As-built Documentation & O&M Manuals in electronic to be turned over in triplicate. (1) copy to be provided in hard copy. Provide (1) set of each drawing set and (1) set s of O&M Manuals, (1) Sets of Warranty Binders in hard copy and (3) electronic copies of each. Provide updated REVIT file reflecting all as-built conditions on each CD. Refer to Specification Section 017700, 017823, 017839, & 17900 for additional requirements. All must meet the approval of the University and/or the Consultant(s). At least one copy for the As-built drawings has been submitted in electronic format, using a version of AutoCAD or Revit acceptable to the University.
 - 5) Turnover stock, as required under the contract, has been delivered to the designated University representative.
 - 6) Required trainings and systems testing have been completed; attended by appropriate University Personnel. Balancing and commissioning is completed; final reports submitted and approved by the University and/or the Consultant(s).
 - 7) Complete, to the approval of the University, spreadsheets containing detailed information pertaining to the proper operation and preventive maintenance of actual equipment, systems, and materials installed. Four (4) spreadsheets in total shall be completed and submitted by the Contractor in electronic format. (See attached, Appendix A, for sample spreadsheet). The University will provide templates, in electronic format, to the Contractor. It shall be the responsibility of the Contractor to complete these forms prior to closeout and substantial completion consideration.
- b) Written notification, by the Contractor, shall be given to the University and the Consultant(s) at which time it is believed substantial completion has been reached. Should the University and the Consultant(s) determine the above requirements have been met, they shall advise the Contractor, in writing as to the official substantial completion date. This shall be the date for which all warranties will begin.
- c) Granting substantial completion shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any uncompleted work (including untested or deferred work), or unaccepted or corrective work, nor shall it in any way affect, limit or preclude the issuance, at anytime thereafter, a punch list citing uncompleted or corrective work for which the Contractor is to promptly complete and/or correct.

1D-40 ACTIVITY IN A STATE HIGHWAY RIGHT-OF-WAY

- a) A Highway Work Permit must be obtained from the New York State Department of Transportation (NYSDOT) prior to the commencement of work on any activity in the state highway right-of-way. Further information regarding Highway Work Permits can be obtained by contacting the NYSDOT Broome County Residency at [\(607\) 775-0522](tel:6077750522).

1D-41 SITE UTILITY SURVEY REQUIREMENTS

1. Survey (Pre Construction)

- a) A licensed surveyor, to be designated and paid for by the Contractor, shall establish one (1) fixed benchmark and one (1) fixed baseline at the project site. The Contractor shall work from the benchmarks and baselines shown on the drawings and established at the site, by the aforesaid surveyor, to establish any and all other supplementary benchmarks and baselines that are required in order for the Contractor to lay out the contractual work. This survey shall be transmitted to Binghamton University as a current version AutoCAD file.

- b) The Contractor shall furnish, at their expense, any and all equipment, tools, materials, and labor, as may be required in laying out any part of the work.
- c) If, for any reason, benchmarks are disturbed by the Contractor or any of its subcontractors or sub-sub-contractors, it shall be the responsibility of the Contractor to have them re-established by the designated licensed surveyor, without cost to the University. Binghamton University and/or the Consultant may require that construction be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or work in progress.
- d) Costs associated with Pre Construction survey responsibilities shall be identified as a separate line item in the Contractor's Schedule of Values.

2. Record Survey (Post Construction)

- a) Prior to the University's final acceptance of the project, a licensed surveyor, to be designated and paid for by the Contractor, shall update Binghamton University's original AutoCAD survey to show all new construction relating to the project. The existing AutoCAD survey file will be provided to the Contractor, by the University, unless otherwise specified elsewhere in the Contract Documents.

The "Record" survey, provided by the Contractor, shall show the following information;

- 1) Final location(s) and arrangement(s) of all underground utilities, connections to the building, and/or re-routing of existing utilities, including but not limited to, sanitary, storm, heating, electric, signal, gas and/or water.
- 2) Final location(s) and arrangement(s) of all site conditions, including but not limited to buildings, loading docks, roads, pedestrian walks, parking lots, stairs, and/or retaining walls.
- 3) Any changes in topography, landscaping, property lines, and "right-of-ways."

To ensure compatibility, the "Record" survey shall conform to the same layering structure of the survey which was provided by the University.

- b) Any and all costs relating to updating and importing the "Record" survey into the existing University's survey is the responsibility of the Contractor.
- c) The "Record" survey shall be transmitted to the University as a current version AutoCAD file, along with the rest of the project's closeout documentation.
- d) Final payment to the Contractor will not be relinquished until the "Record" survey has been approved by the University.
- e) Costs associated with Post Construction survey responsibilities shall be identified as a separate line item in the Contractor's Schedule of Values.

1D-42 LOCATING UNDERGROUND UTILITY MARKINGS

- a) The Contractor shall be responsible for hiring a Utility Location/Marking Company to have all subsurface structures and utilities marked out prior to commencing any construction activities. Request that underground utilities be located and marked within and adjacent to the construction limits.
- b) Contractor is also responsible to contact Dig Safely NY (UFPO) to inform them of the location and type of construction activities which will be taking place.

- c) The Contractor is responsible for maintaining markings once they are made.
- d) Extreme caution shall be used when excavating in marked areas and uncovering existing utilities that are at or adjacent to proposed new work. Means to uncover these utilities, including hand digging to protect said utilities, shall be implemented, to prevent damage. Be alert for potentially unknown underground utilities.
- e) Upon the discovery of any unmarked utilities, the Contractor is to immediately stop excavation and notify the University's Representative. The University's Representative will request assistance from appropriate campus personnel to assist in identification and tracing of the unidentified utility, to the best of their ability.
- f) Do not interrupt existing utilities serving facilities occupied by the Owner, or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify the University's Representative not less than (3) three working days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without written permission from the University's Representative.
- g) Any damage to marked underground utilities shall be repaired by the contractor, at no cost to the campus. Repairs are to be made immediately. Repairs must be made in accordance with the standards of construction of the University, code, and other applicable laws and regulations. The campus shall inspect and approve all repairs prior to burial. Temporary services are to be provided until permanent repairs are completed.
- h) The Contractor shall keep record data relating to the location and elevation of existing services and utilities and include this data in the project as-built drawings.



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Binghamton University
Johanne Ferraro, Capital Budget Specialist
4400 Vestal Pkwy E
Binghamton NY 13902

Schedule Year 2023 through 2024
Date Requested 10/06/2023
PRC# 2023012019

Location Johnson City
Project ID#
Project Type Demolition of existing casework, walls, ceilings, flooring and a staircase, the construction of new walls, ceiling and flooring, a new staircase, new doors, new cabinetry and new finishes, as well as

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2023 through June 2024. 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 12226

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission; a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion [online](#).

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

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 from 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 www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, 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

Binghamton University
Johanne Ferraro, Capital Budget Specialist
4400 Vestal Pkwy E
Binghamton NY 13902

Schedule Year 2023 through 2024
Date Requested 10/06/2023
PRC# 2023012019

Location Johnson City
Project ID#
Project Type Demolition of existing casework, walls, ceilings, flooring and a staircase, the construction of new walls, ceiling and flooring, a new staircase, new doors, new cabinetry and new finishes, as well as

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.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
 Bureau of Public Work
 State Office Campus, Bldg. 12
 Albany, NY 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

Broome County General Construction

Boilermaker **10/01/2023**

JOB DESCRIPTION Boilermaker **DISTRICT 1**

ENTIRE COUNTIES

Albany, Broome, Chenango, Columbia, Delaware, Essex, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

WAGES

Per hour	07/01/2023	01/01/2024
		Additional
Boilermaker	\$ 40.09	+ \$1.31*

(*) To be allocated at later date.

SUPPLEMENTAL BENEFITS

Per hour

Journeyman	\$25.95
	+ 1.49**

(**) This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the day observed by the State or Nation shall be observed, and when Christmas Day and New Year's fall on Saturday, Friday will be observed as the holiday.

REGISTERED APPRENTICES

Wages per hour
 (1/2) year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
65%	65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th
19.35	19.35	20.29	21.23	22.17	23.13	24.06	25.01
+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**	+1.49**

(**) This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

1-197

Carpenter - Building **10/01/2023**

JOB DESCRIPTION Carpenter - Building **DISTRICT 2**

ENTIRE COUNTIES

Broome, Tioga

WAGES

Per hour:	07/01/2023	07/01/2024	07/01/2025
		Additional	Additional
Carpenter	\$ 30.00	\$ 1.30*	\$ 1.30*
Floor Coverer	30.00	1.30*	1.30*
Carpet Layer	30.00	1.30*	1.30*
Dry-Wall	30.00	1.30*	1.30*
Diver-Wet Day	36.25	0.00	0.00
Diver -Dry Day	31.00	1.30*	1.30*
Diver Tender	31.00	1.30*	1.30*

*To be allocated at a later date

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):

- Pile Drivers/Dock Builders shall receive \$0.25 per hour over the journeyman's rate of pay when performing piledriving/dock building work.

- Certified welders shall receive \$1.00 per hour over the journeyman's rate of pay when the employee is required to be certified and performs DOT or ABS specified welding work
- When an employee performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require employees to be furnished and use or wear required forms of personal protection, then the employee shall receive his regular hourly rate plus \$1.50 per hour.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):
 - 0' to 80' no additional fee
 - 81'to 100' additional \$.50 per foot
 - 101'to 150' additional \$0.75 per foot
 - 151'and deeper additional \$1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
 - 0' to 50' no additional fee
 - 51' to 100' additional \$.75 per foot
 - 101' and deeper additional \$1.00 per foot
- Diver rates applies to all hours worked on dive day.

SHIFT WORK

On Agency/Owner mandated shift work, the following rates will be applicable:

- 1st Shift - Regular Rate
- 2nd Shift - Premium of 7% of base wage per hour
- 3rd Shift - Premium of 14% of base wage per hour

Shift work shall be defined as implementing at least two (2) shifts in a twenty-four (24) consecutive hour period. Shift work must be for a minimum of three (3) consecutive days.

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 21.16

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

Note: Any holiday which occurs on Sunday shall be observed the following Monday. If Christmas falls on a Saturday, it shall be observed on the prior Friday.

REGISTERED APPRENTICES

CARPENTER APPRENTICES

Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

\$ 12.50	\$ 12.50	\$ 15.10	\$ 15.10
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PILEDRIVER/DOCK BUILDER APPRENTICES

Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
65%*	70%*	75%*	80%*

*Pile Driver/Dock Builder apprentices shall receive an additional \$0.25 per hour worked when performing piledriving/dock building work.

Supplemental Benefits per hour:

\$ 12.50	\$ 12.50	\$ 15.10	\$ 15.10
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LINOLEUM, RESILIENT TILE, AND CARPET LAYER APPRENTICES

Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

\$ 12.50	\$ 12.50	\$ 15.10	\$ 15.10
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ADDITIONAL AMOUNTS PAID PER HOUR WORKED TO APPRENTICES FOR SPECIFIC TYPES OF WORK PERFORMED:

- Certified welders shall receive \$1.00 per hour over the apprentices rate of pay when the apprentice is required to be certified and performs DOT or ABS specified welding work
- When an apprentice performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require the apprentice to be furnished and use or wear required forms of personal protection, then the apprentice shall receive his regular hourly rate plus \$1.50 per hour.

2-277B-Bro

Carpenter - Building / Heavy&Highway **10/01/2023**

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES

Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2023	07/01/2024
		Additional
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	\$ 34.48	\$ 2.25*

*To be allocated at a later date

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 26.30

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5) on HOLIDAY PAGE
 Overtime: See (5, 6, 16) on HOLIDAY PAGE

Notes:

When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. When a holiday falls upon a Sunday, it shall be observed on the following Monday.

An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES

Wages per hour (1300 hour terms at the following percentage of Journeyman's wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

1st term	\$ 17.56
2nd term	18.04
3rd term	20.06
4th term	20.54

2-42AtSS

Carpenter - Heavy&Highway **10/01/2023**

JOB DESCRIPTION Carpenter - Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Broome, Cayuga, Chemung, Cortland, Delaware, Jefferson, Lewis, Onondaga, Oswego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Yates

WAGES

Per hour	07/01/2023	05/01/2024
		Additional
Carpenter	\$ 35.78	\$ 2.75*

Piledriver	35.78	2.75*
Diver-Wet Day	60.78	2.75*
Diver-Dry Day	36.78	2.75*
Diver-Tender	36.78	2.75*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):

- When project owner mandates a single irregular work shift, the employee will receive an additional \$3.00 per hour. A single irregular work shift can start any time from 5:00 p.m. to 1:00 a.m.
- State or Federal designated hazardous site, requiring protective gear shall be an additional \$2.50 per hour.
- Certified welders when required to perform welding work will receive an additional \$2.50 per hour.

ADDITIONAL NOTES PERTAINING TO DIVERS/TENDERS:

- Divers and Tenders shall receive one and one half (1 1/2) times their regular diver and tender rate of pay for Effluent and Slurry diving.
- Divers and tenders being paid at the specified rate for Effluent and Slurry diving shall have all overtime rates based on the specified rate plus the appropriate overtime rates (one and one half or two times the specified rate for Slurry and Effluent divers and tenders).
- The pilot of an ADS or submersible will receive one and one-half (1 1/2) times the Diver-Wet Day Rate for time submerged.
- All crew members aboard a submersible shall receive the Diver-Wet Day rate.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):
 - 0' to 50' no additional fee
 - 51'to 100' additional \$.50 per foot
 - 101'to 150' additional \$0.75 per foot
 - 151'and deeper additional \$1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
 - 0' to 50' no additional fee
 - 51' to 100' additional \$.75 per foot
 - 101' and deeper additional \$1.00 per foot
- Diver rates applies to all hours worked on dive day.

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 26.30

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

- In the event a Holiday falls on a Saturday, the Friday before will be observed as a Holiday. If a Holiday falls on a Sunday, then Monday will be observed as a Holiday. Employee must work scheduled work day before and after the Holiday.
- The employee must work their scheduled workday before and their scheduled workday after the holiday to receive holiday pay.

REGISTERED APPRENTICES

CAPRENTER APPRENTICES

Wages per hour (1040 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th	5th
65%	70%	75%	80%	85%

Supplemental Benefits per hour:

\$ 17.56	\$ 18.04	\$ 20.01	\$ 20.49	\$ 20.97
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PILEDRIWER/DOCKBUILDER APPRENTICES

Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
65%	70%	80%	85%

Supplemental Benefits per hour:

\$ 17.56	\$ 18.04	\$ 20.49	\$ 20.97
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NOTE ADDITIONAL AMOUNTS PAID PER HOUR WORKED TO APPRENTICES FOR SPECIFIC TYPES OF WORK PERFORMED:

- When project owner mandates a single irregular work shift, the employee will receive an additional \$3.00 per hour. A single irregular work shift can start any time from 5:00 p.m. to 1:00 a.m.

- State or Federal designated hazardous site, requiring protective gear shall be an additional \$2.50 per hour.
- Certified welders when required to perform welding work will receive an additional \$2.50 per hour.

2-277HH-Bro

Electrician

10/01/2023

JOB DESCRIPTION Electrician

DISTRICT 2

ENTIRE COUNTIES
 Broome

PARTIAL COUNTIES

Chenango: Entire County except the Townships of Columbus, New Berlin and Sherburne.
 Delaware: Only the Townships of Davenport, Delhi, Deposit, Franklin, Hamden, Masonville, Meredith, Sidney, Tompkins and Walton Townships, and that portion of Colchester and Hancock Townships north of the east branch of the Delaware River.
 Otsego: Only the Townships of Butternuts, Hartwick, Laurens, Maryland, Milford, Morris, Oneonta, Otego, Unadilla and Westford.
 Tioga: Only the Townships of Berkshire, Newark Valley, Owego, Richford and Tioga.

WAGES

Per hour:	07/01/2023	06/01/2024 Additional	06/01/2025 Additional
Electrician (base wage)	\$ 39.43	\$ 2.75*	\$ 3.00*
Cable Splicer	46.18	2.75*	3.00*

*To be allocated at a later date

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):

Additional \$ 0.50 per hour when required to work underground, such as in tunnels for roads, railroads, or water.
 Additional \$ 0.50 per hour when required to work at a height of 40 feet above the ground or roof level.

SHIFT WORK:

When shift work is mandated in the job specifications or by the contracting agency, the following journeyman hourly rates apply. The starting hours of a shift may be adjusted up to two (2) hours in order to meet the needs of the contracting agency.

Between the hours of 8:00AM and 4:30PM	\$ 39.43
Between the hours of 4:30PM and 1:00AM	46.25
Between the hours of 12:30AM and 9:00AM	51.81

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 29.28 plus 3% of wage
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OVERTIME PAY

See (B, *E, Q) on OVERTIME PAGE

*Double time after 8 hours on Saturday.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, *8, 16) on HOLIDAY PAGE

When a dated holiday falls on a Saturday it shall be celebrated on Friday. When a dated holiday falls on a Sunday, it shall be celebrated on Monday.

*Good Friday may be celebrated the following Monday by mutual agreement of Employer and Employees.

REGISTERED APPRENTICES

WAGES: Terms at the following percentages of Journeyman's wage.

1st	2nd	3rd	4th	5th
0-2000 Hrs	2000-3500 Hrs	3500-5000 Hrs	5000-6500 Hrs	6500-8000 Hrs
45%	50%	58%	68%	78%

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):

Additional \$ 0.50 per hour when required to work underground, such as in tunnels for roads, railroads, or water.
 Additional \$ 0.50 per hour when required to work at a height of 40 feet above the ground or roof level.

SUPPLEMENTAL BENEFITS per hour:

1st term	\$ 9.25 plus 3% of hourly wage
All other terms	\$ 25.33 plus 3% of hourly wage

2-325

Elevator Constructor **10/01/2023**

JOB DESCRIPTION Elevator Constructor

DISTRICT 6

ENTIRE COUNTIES

Broome, Cayuga, Chenango, Cortland, Franklin, Jefferson, Lewis, Onondaga, Oswego, St. Lawrence, Tioga, Tompkins

PARTIAL COUNTIES

Delaware: Only the towns of: Tompkins, Walton, Masonville, Sidney, Franklin and Deposit.

Madison: Only the towns of: Cazenovia, DeRuyter, Eaton, Fenner, Georgetown, Lebanon, Lenox, Nelson and Sullivan.

Oneida: Only the towns of: Camden, Florence and Vienna.

WAGES

Per hour:	07/01/2023	01/01/2024	01/01/2025	01/01/2026
Elevator Constructor	\$ 53.69	\$ 56.02	\$ 58.455	\$ 61.003
Helper	37.58	39.21	40.92	42.70

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 37.335*	\$ 37.885*	\$ 38.435*	\$ 38.985*
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*NOTE - add 6% of regular hourly rate for all hours worked. Add 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 a 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: 1 year terms at the following percentage of the Elevator Constructor wage.

0-6 months	6-12 months	2nd year	3rd year	4th year
50%	55%	65%	70%	80%

SUPPLEMENTAL BENEFITS per hour:

0-6 months: 6% of the hourly apprentice rate paid, no additional supplemental benefits.

All other terms: Same as Journeyman.

6-62.1

Glazier **10/01/2023**

JOB DESCRIPTION Glazier

DISTRICT 5

ENTIRE COUNTIES

Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

WAGES

Per hour: 07/01/2023

Glazier \$ 27.90

** NOTE-The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to JUNE 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four(4),Ten(10)hour days may be worked at straight time during a week Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 28.70

OVERTIME PAY

See (B, E*, E2, Q**) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

1000 hour terms

Appr. 1st term	\$17.50
Appr. 2nd term	18.50
Appr. 3rd term	19.50
Appr. 4th term	20.50
Appr. 5th term	21.50
Appr. 6th term	22.50
Appr. 7th term	23.50
Appr. 8th term	24.50

Supplemental Benefits per hour:

Appr. 1st term	\$ 12.91
Appr. 2nd term	12.91
Appr. 3rd term	18.91
Appr. 4th term	18.91
Appr. 5th term	19.91
Appr. 6th term	19.91
Appr. 7th term	20.91
Appr. 8th term	20.91

5-677z3

Insulator - Heat & Frost

10/01/2023

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 6

ENTIRE COUNTIES

Broome, Cayuga, Chemung, Chenango, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Tioga, Tompkins

WAGES

Per hour: 07/01/2023

Asbestos Installer	\$ 38.50
Insulation Installer	38.50
(On mechanical systems only)	

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED SHIFTS WORKED.

1ST SHIFT	\$ 38.50
2ND SHIFT	44.27
3RD SHIFT	46.20

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 25.09

OVERTIME PAY

See (*B1, **K, P) on OVERTIME PAGE

*NOTE: First 10 hours on Saturday.

**NOTE: Holidays that fall on Sunday are subject to double time.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (2*,4,6,28) on HOLIDAY PAGE

*Triple time for Labor Day if worked.

REGISTERED APPRENTICES

WAGES per hour: One year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th
60%	70%	80%	90%
\$ 23.10	\$ 26.95	\$ 30.80	\$ 34.65

SUPPLEMENTAL BENEFITS per hour:

\$ 22.59	\$ 22.59	\$ 25.09	\$ 25.09
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6-30-Syracuse

Ironworker

10/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 6

ENTIRE COUNTIES

Broome, Cayuga, Cortland, Onondaga, Oswego, Seneca, Tioga, Tompkins

PARTIAL COUNTIES

Chenango: Only the Townships of Lincklaen, Otselic, Pitcher, Pharsalia, German, McDonough, Preston, Norwich, Smithville, Oxford, Guilford, Greene, Coventry, Bainbridge and Afton.

Jefferson: Only the Townships of Alexandria, Theresa, Clayton, Orleans, Cape Vincent, Lyme, Brownville, Pamela, LeRay, Hounsfield, Watertown, Rutland, Adams, Henderson, Rodman, Ellisburg, Lorraine and Worth.

Madison: Only the Townships of Sullivan, Lenox, Lincoln, Fenner, Smithfield, Cazenovia, Nelson, DeRuyter and Georgetown.

Schuyler: Only the Townships of Cayuta, Catharine, Hector and Montour.

Wayne: Only the Townships of Galen, Savannah, Rose, Butler, Huron and Wolcott

WAGES

Structural, Reinforcing, Re-bar, Machinery Mover & Rigger, Ornamental & Curtain Wall, Window Wall, Pre-Glazed Metal Framed Windows Attached to Steel or Masonry Including Caulking, Fence Erector (Chain Link/Security), Sheeter/Bridge Rail, Pre-Cast Erector, Stone Derrickman, Pre-Engineered Building Erector, Welder

Per hour: 07/01/2023

Ironworker \$ 33.00

NOTE: Shift work mandated by the project owner. All shifts will be (8) hours.

1st Shift	\$ 33.00
2nd Shift	36.30
3rd Shift	37.95

WHEN A SINGLE IRREGULAR SHIFT IS WORKED, WITH START TIMES BASED ON SECOND AND THIRD SHIFTS, ADD 10 % TO THE WAGE RATE POSTED ABOVE.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 30.83

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

NOTE: Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES

WAGES per hour: One year terms at the following rates.

1st	2nd	3rd	4th
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\$ 19.50 \$ 21.50 \$ 23.50 \$ 25.50

SUPPLEMENTAL BENEFITS per hour:

1st year \$ 12.03
 2nd year 20.26
 3rd year 21.43
 4th year 22.61

6-60

Laborer - Building **10/01/2023**

JOB DESCRIPTION Laborer - Building

DISTRICT 2

ENTIRE COUNTIES

Broome, Chemung, Steuben

PARTIAL COUNTIES

Chenango: Entire County except the Townships of Sherburne, Columbus and New Berlin.
 Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock, and Colchester.
 Schuyler: Entire County except the Township of Catherine and the Village of Odessa.
 Tioga: Entire County except Townships of Candor & Spencer

WAGES

Per hour:

GROUP #1: Basic Laborer - excavation, concrete vibrator, power-driven buggy, demolition (including acetylene torch work) that is customarily done by a laborer

GROUP #2: Air Tool Operators, Mason Tenders

GROUP #3: Blaster, Rock Drill (compressor driven)

GROUP #4: Asbestos, Hazardous, Toxic Waste, Lead and Mold Remediation

	07/01/2023	07/01/2024 Additional	07/01/2025 Additional	07/01/2026 Additional
GROUP #1	\$ 26.25	\$ 1.20*	\$ 1.25*	\$ 1.25*
GROUP #2	27.25	1.20*	1.25*	1.25*
GROUP #3	28.25	1.20*	1.25*	1.25*
GROUP #4	28.25	1.20*	1.25*	1.25*

*To be allocated at a later date.

IMPORTANT NOTES:

- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.
- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman: \$ 21.50

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

When a Holiday falls on Sunday it shall be observed on the following Monday.

REGISTERED APPRENTICES

WAGES: 1000 hour terms at the following percent of Journeyman's wage

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st Term	\$ 14.60
2nd Term	15.85
3rd Term	16.73
4th Term	17.60

2-785 (7)

Laborer - Heavy&Highway

10/01/2023

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES

Chenango: Entire County except the Townships of Sherburne, Columbus and New Berlin.

Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES

Per hour:

GROUP A: Drill Helper, Flagman, Outboard and Hand Boats.

GROUP B: Basic Rate, Bull Float (where used for strike off only), Chain Saw, Concrete Aggregate Bin, Concrete Bootmen, Gin Buggy, Hand or Machine Vibrator, Jack Hammer, Mason Tender, Mortar Mixer, Pavement Breaker, Handlers of Steel Mesh, Small Generators for Laborers Tools, Installation of Bridge Drainage Pipe, Pipe Layers, Vibrator Type Rollers, Tamper, Drill Doctor, Water Pump Operators (1-1/2" & Single Diaphragm), Nozzle (Asphalt, Guniting, Seeding, and Sand Blasting), Laborers on Chain Link Fence Erection, Rock Splitter and Power Unit, Pusher Type Concrete Saw and all other Gas, Electric, and Air Tool Operators, Wrecking Laborer.

GROUP C: Drilling equipment - only where a separate air compressor unit supplies power, Acetylene Torch Operators, Asphalt Raker, Powder Man, Tail or Screw Operator on Asphalt Paver.

GROUP D: Blasters, Form Setters (slab steel forms on highways, roads, streets & airport runways), Stone or Granite Curb Setters.

GROUP E: Hazardous Waste defined as when an employee performs hazardous waste removal, lead abatement and removal, asbestos abatement and removal work on State and/or Federally designated waste site and were relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2023	07/01/2024 Additional
GROUP A	\$ 35.06	\$ 2.50*
GROUP B	35.26	2.50*
GROUP C	35.46	2.50*
GROUP D	35.66	2.50*
GROUP E	38.26	2.50*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS FOR THE FOLLOWING CONDITIONS:

- A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional \$3.00 per hour.

- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full-face replaceable cartridge respirator for more than (2) hours, then in such case said employee(s) will be paid the Group E rate for the shift.

IMPORTANT NOTES:

- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.

- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 23.85

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Saturday.
- An Employee must work the scheduled working day before and the scheduled working day after a holiday to receive holiday pay. However, an employee not able to report because of proven sickness, death in immediate family, or accident shall be entitled to holiday pay.

REGISTERED APPRENTICES

WAGES: 1000 hour terms at the following percentage of Journeyman's GROUP B wage:

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st term	\$ 21.60
2nd term	22.35
3rd term	22.73
4th term	23.10

2-785h

Laborer - Tunnel

10/01/2023

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 2

ENTIRE COUNTIES

Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES

Chenango: Entire County except the Townships of Sherburne, Columbus, and New Berlin.

Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES

Per hour:

GROUP A: Change House Man

GROUP B: Miners and all Machine Men, Safety Miner, All Shaft work, Caisson work, Drilling, Blow Pipe, all Air Tools, Tugger, Scaling, Nipper, Guniting pot to nozzle, Bit Grinder, Signal Man (top and bottom), Concrete Man, Shield Driven Tunnels, mixed face and soft ground, liner plate tunnels in free air.

GROUP C: Blaster

GROUP D: Hazardous waste removal work on a State and/or Federally designated waste site where relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2023	07/01/2024 Additional
Group A	\$ 38.24	\$ 2.50*
Group B	38.44	2.50*
Group C	41.24	2.50*
Group D	41.44	2.50*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS FOR THE FOLLOWING CONDITIONS:

- A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional \$3.00 per hour.
- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full face replaceable cartridge respirator for more then (2) hours, then in such case said employee(s) will be paid the Group D rate for the shift.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 23.85

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Friday.
- An Employee must work the scheduled working day before and the scheduled working day after a holiday to receive holiday pay. However, an employee not able to report because of proven sickness, death in immediate family, or accident shall be entitled to holiday pay.

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

If the holiday falls on Saturday, it will be celebrated on Friday. If the holiday falls on Sunday, it will be celebrated on Monday

REGISTERED APPRENTICES

WAGES: 1000 hour terms at the following percentage of Group B wage

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st Term	\$ 8.25
2nd Term	8.25
3rd Term	16.25
4th Term	23.85

2-785T

Lineman Electrician **10/01/2023**

JOB DESCRIPTION Lineman Electrician

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, Wyoming, Yates

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe, or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

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 overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. (Ref #14.01.01)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	\$ 57.40	\$ 58.90
Crane, Crawler Backhoe	57.40	58.90
Welder, Cable Splicer	57.40	58.90
Digging Mach. Operator	51.66	53.01
Tractor Trailer Driver	48.79	50.07
Groundman, Truck Driver	45.92	47.12
Equipment Mechanic	45.92	47.12
Flagman	34.44	35.34

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work". (Ref #14.02.01-A)

Lineman, Technician	\$ 57.40	\$ 58.90
Crane, Crawler Backhoe	57.40	58.90
Cable Splicer	63.14	64.79
Certified Welder,		
Pipe Type Cable	60.27	61.85
Digging Mach. Operator	51.66	53.01
Tractor Trailer Driver	48.79	50.07
Groundman, Truck Driver	45.92	47.12
Equipment Mechanic	45.92	47.12
Flagman	34.44	35.34

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates apply on switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. (Ref #14.02.01-B)

Lineman, Tech, Welder	\$ 58.72	\$ 60.22
Crane, Crawler Backhoe	58.72	60.22
Cable Splicer	64.59	66.24
Certified Welder, Pipe Type Cable	61.66	63.23
Digging Mach. Operator	52.85	54.20
Tractor Trailer Driver	49.91	51.19
Groundman, Truck Driver	46.98	48.18
Equipment Mechanic	46.98	48.18
Flagman	35.23	36.13

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. (Ref #14.03.01)

Lineman, Tech, Welder	\$ 59.91	\$ 61.41
Crane, Crawler Backhoe	59.91	61.41
Cable Splicer	59.91	61.41
Digging Mach. Operator	53.92	55.27
Tractor Trailer Driver	50.92	52.20
Groundman, Truck Driver	47.93	49.13
Equipment Mechanic	47.93	49.13
Flagman	35.95	36.85

Additional \$1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM to 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM to 1:00 AM REGULAR RATE PLUS 17.3 %
3RD SHIFT	12:30 AM to 9:00 AM REGULAR RATE PLUS 31.4 %

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid
All other Journeyman	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
 Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a

Lineman Electrician - Teledata

10/01/2023

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2023	01/01/2024	01/01/2025
Cable Splicer	\$ 37.73	\$ 39.24	\$ 40.81
Installer, Repairman	\$ 35.81	\$ 37.24	\$ 38.73
Teledata Lineman	\$ 35.81	\$ 37.24	\$ 38.73
Tech., Equip. Operator	\$ 35.81	\$ 37.24	\$ 38.73
Groundman	\$ 18.98	\$ 19.74	\$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023	01/01/2024	01/01/2025
Journeyman	\$ 5.70	\$ 5.70	\$ 5.70
	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting **10/01/2023**

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT 6**

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
 (Ref #14.01.01)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	\$ 49.32	\$ 50.54
Crane, Crawler Backhoe	49.32	50.54
Certified Welder	51.79	53.07
Digging Machine	44.39	45.49
Tractor Trailer Driver	41.92	42.96
Groundman, Truck Driver	39.46	40.43
Equipment Mechanic	39.46	40.43
Flagman	29.59	30.32

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM	REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM	REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM	REGULAR RATE PLUS 31.4%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid

All other	\$ 26.40	\$ 26.90
Journeyman	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.
 NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
 Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
 Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a-LT

Lineman Electrician - Tree Trimmer **10/01/2023**

JOB DESCRIPTION Lineman Electrician - Tree Trimmer

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, Wyoming, Yates

WAGES

Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also would include stump removal near underground energized electrical lines, including telephone and CATV lines.

Per hour:	07/01/2023	12/31/2023
Tree Trimmer	\$ 29.80	\$ 31.44
Equipment Operator	26.35	27.80
Equipment Mechanic	26.35	27.80
Truck Driver	21.95	23.15
Groundman	18.07	19.07
Flag person	14.20	14.20*

*NOTE- Rate effective on 01/01/2024 - \$15.00 due to minimum wage increase

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2023	12/31/2023
Journeyman	\$ 10.48	\$ 10.48
	*plus 4.5% of the hourly wage paid	*plus 4.5% of the hourly wage paid

* The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.

Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 15) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE

NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday.

All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building

10/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 5

ENTIRE COUNTIES

Broome, Chenango, Delaware, Otsego, Tioga

WAGES

Per hour: 07/01/2023

Building:

Bricklayer, Cement \$ 33.84

Mason, Plasterer, Stone

Mason, Tuck Pointer

** NOTE-The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to JUNE 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four(4),Ten(10)hour days may be worked at straight time during a week Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 25.76

OVERTIME PAY

See (B,E,E2*,Q) on OVERTIME PAGE

*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
\$ 21.61	\$ 26.69	\$ 27.82	\$ 30.46

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$ 21.48	\$ 21.90	\$ 24.44	\$ 25.47

5-3B - Bing - Z2

Mason - Heavy&Highway

10/01/2023

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 5

ENTIRE COUNTIES

Allegany, Broome, Chautauqua, Chemung, Chenango, Cortland, Delaware, Genesee, Livingston, Monroe, Ontario, Orleans, Otsego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

PARTIAL COUNTIES

Cattaraugus: Entire county except in the Township of Perrysburg and the Village of Gowanda only the Bricklayer classification applies.

Erie: Only the Bricklayer classification applies.

Niagara: Only the Bricklayer classification applies.

WAGES

Per hour: 07/01/2023
Heavy & Highway:
Cement Mason \$ 36.88
Bricklayer 36.88

** NOTE-The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to JUNE 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four(4),Ten(10)hour days may be worked at straight time during a week Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 23.53

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

1500 hour terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental benefits per hour:

1st term	\$ 14.03
2nd term	\$ 22.97
3rd term	\$ 23.11
4th term	\$ 23.25

5-3h

Mason - Tile Finisher

10/01/2023

JOB DESCRIPTION Mason - Tile Finisher

DISTRICT 5

ENTIRE COUNTIES

Broome, Chenango, Cortland, Delaware, Otsego, Tioga, Tompkins

WAGES

Wages
Per hour: 07/01/2023
Building:
Marble, Slate, Terrazzo \$ 31.00
and Tile Finisher

** NOTE-The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to JUNE 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four(4),Ten(10)hour days may be worked at straight time during a week Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 20.47

OVERTIME PAY

See (B,E,E2*,Q) on OVERTIME PAGE

*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd
\$ 18.60	\$ 21.70	\$ 24.80

Supplemental benefits per hour:

1st	2nd	3rd
\$ 13.29	\$ 13.58	\$ 17.93

5-3TF - Z4

Mason - Tile Setter

10/01/2023

JOB DESCRIPTION Mason - Tile Setter

DISTRICT 5

ENTIRE COUNTIES

Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES

Allegany: Towns of Alfred, Almond, Andover and Burns.

WAGES

Wages

Per Hour: 07/01/2023

Building:

Marble, Slate, Terrazzo and Tile Setter \$ 33.24

** NOTE-The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to JUNE 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four(4),Ten(10)hour days may be worked at straight time during a week Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 24.01

OVERTIME PAY

See (B,E,E2*,Q) on OVERTIME PAGE

*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Joureyman's wage:

1st	2nd	3rd	4th
\$ 19.94	\$ 23.27	\$ 26.59	\$ 29.92

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$ 13.76	\$ 14.12	\$ 23.26	\$ 23.63

5-3TS - Z4

Millwright

10/01/2023

JOB DESCRIPTION Millwright

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

THE FOLLOWING RATE APPLIES TO ANY GAS/STEAM TURBINE AND OR RELATED COMPONENT WORK, INCLUDING NEW INSTALLATIONS OR MAINTENANCE AND ANY/ALL WORK PERFORMED WITHIN THE PROPERTY LIMITS OF A NUCLEAR FACILITY.

Per hour:	07/01/2023	07/01/2024	07/01/2025
		Additional	Additional
Millwright - Power Generation	\$ 43.05	\$ 2.50	\$2.50

- NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional \$1.75 per hour provided he/she is directed to perform certified welding.
 - If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that employee shall receive an additional \$1.50 per hour.
 - An employee performing the work of a machinist shall receive an additional \$2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
 - When performing work underground at 500 feet and below, the employee shall receive an additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyman	\$ 27.40*
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*NOTE: Subject to OT premium

OVERTIME PAY

See (B, E, E2, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES

WAGES per hour: One year terms at the following percentage of Journeyman's wage:

Appr. 1st year	65 %*
Appr. 2nd year	75 %*
Appr. 3rd year	80 %*
Appr. 4th year	90 %*

*NOTE: Additional premium for the following work listed below:

Certified Welder	\$ 1.75
Hazardous Waste Work	1.50
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	\$ 11.89
Appr. 2nd year	22.75
Appr. 3rd year	24.30
Appr. 4th year	25.85

6-1163Power

Millwright 10/01/2023

JOB DESCRIPTION Millwright

DISTRICT 7

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Herkimer, Madison, Seneca, Tioga, Yates

WAGES

Per hour:	07/01/2023	07/01/2024	07/01/2025
		Additional	Additional
Building	\$ 34.11	\$ 3.00	\$ 3.00
Heavy & Highway	37.11	3.50	3.00

- NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional \$1.75 per hour provided he/she is directed to perform certified welding.
 - On Building projects, If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that employee shall receive an additional \$1.50 per hour.

- H/H work performed on hazardous waste sites where employees are required to wear protective gear shall receive an additional \$2.00 per hour over the Millwright H/H rate for all hours worked on the day protective gear was worn.
- An employee performing the work of a machinist shall receive an additional \$2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 24.43

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on a Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES

WAGES per hour: One year terms at the following percentage of Journeyman's wage:

Appr. 1st year	65 %*
Appr. 2nd year	75 %*
Appr. 3rd year	80 %*
Appr. 4th year	90 %*

*NOTE: Additional premium for the following work listed below:

Certified Welder	\$ 1.75
Hazardous Waste (Bldg)	1.50
Hazardous Waste (H/H)	2.00
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	\$ 11.64
Appr. 2nd year	20.59
Appr. 3rd year	21.87
Appr. 4th year	23.15

7-1163 Zone 2

Operating Engineer - Building

10/01/2023

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 1

ENTIRE COUNTIES

Broome, Chenango, Tioga

WAGES

CLASS A1*: Cranes, tower cranes, hydraulic cranes, locomotive crane, piledriver, cableway, derricks, whirlies, dragline, boom trucks (over 5 tons).

CLASS A:

Shovel, Excavators 18,001 lbs. and above(including rubber tire full swing), Gradalls, power road grader, all CMI equipment, front-end rubber tire loader, tractor-mounted drill (quarry master), mucking machine, concrete central mix plant, concrete pump, belcrete system, automated asphalt concrete plant, and tractor road paver, boom trucks 5 tons and under, maintenance engineer, self-contained crawler drill-hydraulic rock drill.

CLASS B:

Excavators 18,000 lbs. and under, Backhoes (rubber tired backhoe/loader combination), bulldozer, pushcat, tractor, traxcavator, scraper, LeTourneau grader, form fine grader, self-propelled soil compactor (fill roller), asphalt roller, blacktop spreader, power brooms, sweepers, trenching machine, Barber Green loader, side booms, hydro hammer, concrete spreader, concrete finishing machine, one drum hoist, power hoisting (single drum), hoist two drum or more, three drum engine, power hoisting (two drum and over), two drum and swinging engine, three drum swinging engine, hod hoist, A-L frame winches, core and well drillers (one drum), post hole digger, model CHB Vibro-Tamp or similar machine, batch bin and plant operator, dinky locomotive, skid steer loader, track excavator 5/8 cubic yard or smaller, front end rubber tired loader under four cubic yards, vacuum machine (mounted or towed).

CLASS C:

Fork lift, high lift, all terrain fork lift: or similar, oiler, fireman and heavy-duty greaser, boilers and steam generators, pump, vibrator, motor mixer, air compressor, dust collector, welding machine, well point, mechanical heater, generators, temporary light plants, electric submersible pumps 4" and over, murphy type diesel generator, conveyor, elevators, concrete mixer, beltcrete power pack (belcrete system), seeding, and mulching machines, pumps, rotating telehandler (that does not require NYS crane license).

*** In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour	07/01/2023	07/01/2024
Class A1*	\$47.71	\$49.65
Class A	45.31	47.25
Class B	44.85	46.79
Class C	42.54	44.48

(*) TONNAGE RATING PREMIUMS:

Note: Additional value subject to same premiums as shown for OT

All cranes 1000 tons and over, A1 rate plus \$7.00

All cranes 800-999 tons, A1 rate plus \$6.00

All cranes 600-799 tons, A1 rate plus \$5.00

All cranes 400-599 tons, A1 rate plus \$4.00

All cranes 200-399 tons, A1 rate plus \$3.00

All cranes 111-199 tons, A1 rate plus \$2.25

All cranes 110 tons and under, A1 rate only

Additional \$0.50 per hr over A1 rate for Tower Cranes.

Additional \$2.50 per hr over B rate for Nuclear Leader work.

Additional \$2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2023	07/01/2024
Journeyman	\$ 30.75	\$ 31.85

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If a holiday falls on Sunday, it will be celebrated on Monday. If the holiday falls on Saturday, it will be celebrated on Friday.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journeyperson's wage Class B:

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked

	07/01/2023	07/01/2024
All terms	\$ 26.15	\$ 27.25

1-158 BCT

Operating Engineer - Heavy&Highway

10/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 1

ENTIRE COUNTIES

Albany, Broome, Chenango, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

PARTIAL COUNTIES

Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie then due east to Route 115 to Bedell Road then east along Bedell Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 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 Connecticut.

WAGES

CLASSIFICATION A1*: All Cranes

CLASSIFICATION A:

Asphalt Curb Machine (Self Propelled, Slipform), Asphalt Paver, Automated Concrete Spreader (CMI Type), Automatic Fine Grader, Backhoe (Except Tractor Mounted, Rubber Tired), Backhoe Excavator Full Swing (CAT 212 or similar type), Back Filling Machine, Belt Placer (CMI Type), Blacktop Plant (Automated), Blacktop Roller, Boom truck, GPS operated Bull Dozer, Cableway, Caisson Auger, Central Mix Concrete Plant (Automated), Concrete Curb Machine (Self Propelled, Slipform), Concrete Pump, Crane, Cherry Picker, Derricks (steel erection), Dragline, Overhead Crane (Gantry or Straddle type), Pile Driver, Truck Crane, Directional Drilling Machine, Dredge, Dual Drum Paver, Excavator (All PurposeHydraulically Operated) (Gradall or Similar), Front End Loader (4 cu. yd. and Over), Head Tower (Sauerman or Equal), Hoist (Two or Three Drum), Holland Loader, Maintenance Engineer, Mine Hoist, Mucking Machine or Mole, Pavement Breaker(SP) Wertgen; PB-4 and similar type, Power Grader, Profiler (over 105 H.P.), Quad 9, Quarry Master (or equivalent), Rotating Telehandler, Scraper (Including Challenger Type), Shovel, Side Boom, Slip Form Paver (If a second man is needed, he shall be an Oiler), Tractor Drawn BeltType Loader, Truck or Trailer Mounted Log Chipper (Self Feeder), Tug Operator (Manned Rented Equipment Excluded), Tunnel Shovel

CLASSIFICATION B:

Backhoe (Tractor Mounted, Rubber Tired), Bituminous Recycler Machine, Bituminous Spreader and Mixer, Blacktop Plant (NonAutomated), Blast or Rotary Drill (Truck or Tractor Mounted), Brokk, Boring Machine, Cage Hoist, Central Mix Plant [(NonAutomated) and All Concrete Batching Plants], Concrete Paver (Over 16S), Crawler Drill (Self-contained), Crusher, Diesel Power Unit, Drill Rigs, Tractor Mounted, Front End Loader (Under 4 cu. yd.), Greaseman/Lubrication Engineer, HiPressure Boiler (15 lbs. and over), Hoist (One Drum), Hydro-Axe, Kolman Plant Loader and Similar Type Loaders (If Employer requires another man to clean the screen or to maintain the equipment, he shall be an Oiler), L.C.M. Work Boat Operator, Locomotive, Material handling knuckle boom, Mini Excavator (under 18,000 lbs.), Mixer (for stabilized base self-propelled), Monorail Machine, Plant Engineer, Prentice Loader, Profiler (105 H.P. and under), Pug Mill, Pump Crete, Ready Mix Concrete Plant, Refrigeration Equipment (for soil stabilization), Road Widener, Roller (all above subgrade), Sea Mule, Self-contained Ride-on Rock Drill(Excluding Air-Track Type Drill), Skidder, Tractor with Dozer and/or Pusher, Trencher, Tugger Hoist, Vacuum machine (mounted or towed), Vermeer saw (ride on, any size or type), Welder, Winch, Winch Cat

CLASSIFICATION C:

A Frame Winch Hoist on Truck, Articulated Heavy Hauler, Aggregate Plant, Asphalt or Concrete Grooving Machine (ride on), Ballast Regulator(Ride-on), Boiler (used in conjunction with production), Bituminous Heater (self-propelled), Boat (powered), Cement and Bin Operator, Concrete Pavement Spreader and Finisher Concrete Paver or Mixer (16' and under), Concrete Saw (self-propelled), Conveyor, Deck Hand, Directional Drill Machine Locator, Drill (Core and Well), Farm Tractor with accessories, Fine Grade Machine, Fireman, Fork Lift, Form Tamper, Grout Pump, Gunit Machine, Hammers (Hydraulic self-propelled), Hydra-Spiker (ride-on), Hydraulic Pump (jacking system), Hydro-Blaster (Water), Mulching Machine, Oiler, Parapet Concrete or Pavement Grinder, Post Hole Digger and Post Driver, Power Broom (towed), Power Heaterman, Power Sweeper, Revinus Widener, Roller (Grade and Fill), Scarifier (ride-on), Shell Winder, Skid steer loader (Bobcat or similar; including all attachments), Span-Saw (ride-on), Steam Cleaner, Tamper (ride-on), Tie Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on), Tire Repair, Track Liner (ride-on), Tractor, Tractor (with towed accessories), Vibratory Compactor, Vibro Tamp, Well Point, and the following hands-off equipment: Compressors, Dust Collectors, Generators, Pumps, Welding Machines, Light Plants and Heaters

- Note for all above classifications of Operating Engineer - In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour

	07/01/2023	07/01/2024
Class A1*	\$55.63	57.90
Class A	52.63	54.90
Class B	51.72	53.99
Class C	49.15	51.42

(*) TONNAGE RATING PREMIUMS:

- Cranes over 1000 tons, A1 rate plus \$7.00
- Cranes from 800-999 tons, A1 rate plus \$6.00
- Cranes from 600-799 tons, A1 rate plus \$5.00
- Cranes from 400-599 tons, A1 rate plus \$4.00
- Cranes from 200-399 tons, A1 rate plus \$3.00
- Cranes from 111-199 tons, A1 rate plus \$2.00
- Cranes from 65-110 tons, A1 rate plus \$1.50
- Cranes from 0-64 Tons, A1 rate only

NOTE: Additional value subject to same premiums as shown for OT

- Tower Cranes, A1 rate plus \$3.00
 - Cranes in Luffer Configuration, A1 rate plus \$5.00
 - Cranes with external ballast (tray or wagon), A1 rate plus \$5.00
- NOTE: Additional value subject to same premiums as shown for OT

Additional \$2.50 per hour for All Employees who work a single irregular work shift, of at least 5 consecutive days, starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

Additional \$2.50 per hr. for hazardous waste removal work on State and/or Federally designated waste site which require employees to wear Level C or above forms of personal protection.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2023	07/01/2024
Journey person	\$ 31.50	\$ 32.60

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: If the holiday falls on Sunday, it will be observed on Monday. If the observed Monday Holiday is worked, pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday and is worked pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday employer can choose to observe the paid holiday Saturday or give Friday off with holiday pay.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journey person's wage Class B

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour worked	07/01/2023	07/01/2024
All Terms	\$ 26.25	\$27.10

1-158H/H Alb

Operating Engineer - Survey Crew	10/01/2023
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JOB DESCRIPTION Operating Engineer - Survey Crew

DISTRICT 12

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.
 Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to Building, Tunnel and Heavy Highway.

Per hour:
SURVEY CLASSIFICATIONS:

- Party Chief - One who directs a survey party.
- Instrument Person - One who operates the surveying instruments.
- Rod Person - One who holds the rods and assists the Instrument Person.

07/01/2023

Party Chief	\$ 48.97
Instrument Person	44.99
Rod Person	33.37

Additional \$3.00/hr. for Tunnel Work
Additional \$2.50/hr. for Hazardous Work Site

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman	\$ 28.90
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OVERTIME PAY

See (B, E, P, *X) on OVERTIME PAGE

*Note: \$24.60/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES: 1000 hour terms based on the Percentage of Rod Persons Wage:

07/01/2023

0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	\$ 20.68 / PHP \$17.53
1001-2000	23.70 / " 19.95
2001-3000	26.73 / " 22.43

NOTE: PHP is premium hours paid when worked.

12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer

10/01/2023

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer

DISTRICT 12

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.

Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to feasibility and preliminary design surveying, line and grade surveying for inspection or supervision of construction when performed under a Consulting Engineer Agreement.

Per hour:

SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.

Instrument Person - One who operates the surveying instruments.

Rod Person - One who holds the rods and assists the Instrument Person.

07/01/2023

Party Chief	\$ 48.97
Instrument Person	44.99
Rod Person	33.37

Additional \$3.00/hr. for Tunnel Work.
Additional \$2.50/hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman \$ 28.90

OVERTIME PAY

See (B, E, Q, *X) on OVERTIME PAGE

*Note: \$24.10/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES: 1000 hour terms based on percentage of Rod Persons Wage:

07/01/2023

0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	\$ 20.68 / PHP \$17.53
1001-2000	\$ 23.70 / " 19.95
2001-3000	\$ 26.73 / " 22.43

NOTE: PHP is premium hours paid when worked.

12-158-545 DCE

Operating Engineer - Tunnel

10/01/2023

JOB DESCRIPTION Operating Engineer - Tunnel

DISTRICT 7

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: Northern part of Dutchess, to the northern boundary line of the City of Poughkeepie, then due east to Route 115 to Bedell Road, then east along Bedell Road to VanWagner Road, then north along VanWagner Road to Bower Road, then east along Bower Road to Rte. 44 east to Rte. 343, then along Rte. 343 east to the northern boundary of the Town of Dover Plains and east along the northern boundary of the Town of Dover Plains, to the borderline of the State of Connecticut.

Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98 and the entirety of the City of Batavia.

WAGES

CLASS A: Automatic Concrete Spreader (CMI Type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Belt Placer (CMI Type); Blacktop Plant (automated); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled slipform); Concrete Pump (8" or over); Dredge; Dual Drum Paver; Excavator; Front End Loader (4 cu. yd & over); Gradall; Head Tower (Sauerman or Equal); Hoist (shaft); Hoist (two or three Drum); Log Chipper/Loader (self-feeder); Maintenance Engineer (shaft and tunnel); any Mechanical Shaft Drill; Mine Hoist; Mining Machine(Mole and similar types); Mucking Machine or Mole; Overhead Crane (Gantry or Straddle Type); Pile Driver; Power Grader; Remote Controlled Mole or Tunnel Machine; Scraper; Shovel; Side Boom; Slip Form Paver (If a second man is needed, they shall be an Oiler); Tripper/Maintenance Engineer (shaft & tunnel); Tractor Drawn Belt-Type Loader; Tug Operator (manned rented equipment excluded); Tunnel Shovel.

CLASS B: Automated Central Mix Concrete Plant; Backhoe (topside); Backhoe (track mounted, rubber tired); Backhoe (topside); Bituminous Spreader and Mixer, Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Cage Hoist; Central Mix Plant(non-automated); all Concrete Batching Plants; Compressors (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Pump; Crusher; Diesel Power Unit; Drill Rigs (tractor mounted); Front End Loader (under 4 cu. yd.); Grayco Epoxy Machine; Hoist (One Drum); Hoist (2 or 3 drum topside); Knuckle Boom material handler; Kolman Plant Loader & similar type Loaders (if employer requires another person to clean the screen or to maintain the equipment, they shall be an Oiler); L.C.M. Work Boat Operator; Locomotive; Maintenance Engineer (topside); Maintenance Grease Man; Mixer (for stabilized base-self-propelled); Monorail Machine; Plant Engineer; Personnel Hoist; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above sub-grade); Sea Mule; Shotcrete Machine; Shovel (topside); Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Tunnel Locomotive; Vacuum Machine (mounted or towed); Welder; Winch; Winch Cat.

CLASS C: A Frame Truck; All Terrain Telescoping Material Handler; Ballast Regulator (ride-on); Compressors (4 not to exceed 2,000 c.f.m. combined capacity; or 3 or less with more than 1200 c.f.m. but not to exceed 2,000 c.f.m.); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (4 or any type combination)); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill (well); Electric Pump used in conjunction with Well Point System; Farm Tractor with Accessories; Fine Grade Machine; Fork Lift; Grout Pump (over 5 cu. ft.); Gunite Machine; Hammers (hydraulic-self-propelled); Hydra-Spiker (ride-on); Hydra-Blaster (water); Hydro-Blaster; Motorized Form Carrier; Post Hole Digger and Post Driver; Power Sweeper; Roller grade & fill); Scarifier (ride-on); Span-Saw (ride-on); Submersible Electric Pump (when used in lieu of well points); Tamper (ride-on); Tie-Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on); Track Liner (ride-on); Tractor with towed accessories; Vibratory Compactor; Vibro Tamp, Well Point.

CLASS D: Aggregate Plant; Cement & Bin Operator; Compressors (3 or less not to exceed 1,200 c.f.m. combined capacity); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (3 or less or any type or combination)); Concrete Saw (self-propelled); Form Tamper; Greaseman; Hydraulic Pump (jacking system); Junior Engineer; Light Plants; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Power Broom (towed); Power Heaterman (when used for production); Revinus Widener; Shell Winder; Steam Cleaner; Tractor.

Per hour:	07/01/2023	07/01/2024	07/01/2025
CLASS A	\$ 53.52	\$ 55.91	\$ 58.44
CLASS B	52.30	54.69	57.22
CLASS C	49.51	51.90	54.43
CLASS D	46.50	48.89	51.42

Additional \$5.00 per hour for Hazardous Waste Work on a state or federally designated hazardous waste site where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection. Fringe benefits will be paid at the hourly wage premium.

CRANES:

Crane 1: All cranes, including self-erecting.

Crane 2: All Lattice Boom Cranes and all cranes with a manufacturer's rating of fifty (50) ton and over.

Crane 3: All hydraulic cranes and derricks with a manufacturer's rating of forty nine (49) ton and below, including boom trucks.

Crane 1	\$ 57.52	\$ 59.91	\$ 62.44
Crane 2	56.52	58.91	61.44
Crane 3	55.52	57.91	60.44

SUPPLEMENTAL BENEFITS

Per hour:			
	\$ 24.20	\$ 25.05	\$ 25.90
	+ 9.60*	+ 9.85*	+ 10.10*

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (B, B2, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

If a holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

WAGES:(1000) hours terms at the following percentage of Journeyman's Class B wage.

1st term	60%
2nd term	65%
3rd term	70%
4th term	75%

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman.

7-158-832TL.

Painter

10/01/2023

JOB DESCRIPTION Painter

DISTRICT 2

ENTIRE COUNTIES

Broome, Chenango, Tioga

WAGES

Per hour:	07/01/2023	05/01/2024	05/01/2025
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		Additional	Additional
Painter	\$ 27.00	\$ 1.35*	\$ 1.60*
Taper, Paperhangers, and Vinyl hangers	28.35	1.38*	1.64*

*To be allocated at a later date.

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):

- Additional \$ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional \$ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator
- Additional \$ 0.60 per hour for Structural steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional \$ 1.00 per hour for Spray Painting
- Additional \$ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional \$ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional \$ 0.90 per hour for Sandblasting

NOTE - SEE BRIDGE PAINTER RATES FOR BRIDGES & TANKS

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:
 Journeyman \$ 23.23

OVERTIME PAY

See (B, E2, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

A Holiday that falls on a Sunday will be celebrated on Monday, a holiday that falls on a Saturday will be celebrated on Friday.

REGISTERED APPRENTICES

WAGES:

Painter: 750 hour terms at the Painter Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 18.00	\$ 19.00	\$ 20.00	\$ 21.00	\$ 22.00	\$ 23.00	\$ 24.00	\$ 25.00

Taper: 750 hour terms at the following Journeyman Taper Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th
\$ 20.00	\$ 21.00	\$ 22.00	\$ 23.00	\$ 24.00	\$ 25.00

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):

- Additional \$ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional \$ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator
- Additional \$ 0.60 per hour for Structural steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional \$ 1.00 per hour for Spray Painting
- Additional \$ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional \$ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional \$ 0.90 per hour for Sandblasting

SUPPLEMENTAL BENEFITS per hour:

Painter/Decorator:

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 6.00	\$ 7.00	\$ 8.00	\$ 9.10	\$ 11.00	\$ 11.00	\$ 13.00	\$ 14.00

Taper/Drywall Finisher:

1st	2nd	3rd	4th	5th	6th

\$ 6.00 \$ 7.00 \$ 8.00 \$ 10.00 \$ 13.00 \$ 14.00

2-178 B

Painter **10/01/2023**

JOB DESCRIPTION Painter

DISTRICT 3

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Cortland, Delaware, Erie, Genesee, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

WAGES

Per hour: 07/01/2023

Bridge	\$ 42.06
Tunnel	42.06
Tank*	40.06

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.

Tank rate applies to indoor and outdoor tanks, tank towers, standpipes, digesters, waste water treatment tanks, chlorinator tanks, etc. Covers all types of tanks including but not limited to steel tanks, concrete tanks, fiberglass tanks, etc.

Note an additional \$1.50 per hour is required when the contracting agency or project specification requires any shift to start prior to 6:00am or after 12:00 noon.

SUPPLEMENTAL BENEFITS

Per hour: \$ 30.89

OVERTIME PAY

Exterior work only See (B, E4, F*, R) on OVERTIME PAGE.

All other work See (B, F*, R) on OVERTIME PAGE.

*Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage rate:

1st	2nd	3rd	4th	5th	6th
\$ 24.00	\$ 26.00	\$ 28.00	\$ 30.00	\$ 34.00	\$ 38.00

Supplemental benefits per hour:

1st	2nd	3rd	4th	5th	6th
\$ 6.60	\$ 6.95	\$ 7.30	\$ 7.65	\$ 8.00	\$ 8.35

3-4-Bridge, Tunnel, Tank

Painter - Metal Polisher **10/01/2023**

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

	07/01/2023
Metal Polisher	\$ 38.18
Metal Polisher*	39.28
Metal Polisher**	42.18

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Journeyworker:

All classification \$ 12.34

OVERTIME PAY

See (B, E, P, T) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

07/01/2023

1st year \$ 16.00

2nd year 17.00

3rd year 18.00

1st year* \$ 16.39

2nd year* 17.44

3rd year* 18.54

1st year** \$ 18.50

2nd year** 19.50

3rd year** 20.50

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:

1st year \$ 8.69

2nd year 8.69

3rd year 8.69

8-8A/28A-MP

Plumber

10/01/2023

JOB DESCRIPTION Plumber

DISTRICT 2

ENTIRE COUNTIES

Broome, Chenango

PARTIAL COUNTIES

Cortland: Only the Township of Marathon.

Delaware: Only the Townships of Andes, Bovina, Colchester, Davenport, Delhi, Deposit, Franklin, Hamden, Hancock, Harpersfield, Kortright, Masonville, Meredith, Sidney, Stamford, Tompkins and Walton.

Madison: Only the Township of Georgetown.

Otsego: Only the Townships of Burlington, Butternuts, Decatur, Edmeston, Hartwick, Laurens, Maryland, Milford, Morris, New Lisbon, Oneonta, Otsego, Pittsfield, Unadilla, Westford and Worcester.

Tioga: Only the Townships of Newark Valley and Owego.

WAGES

Per hour: 07/01/2023

Plumber \$ 40.38

Steamfitter 40.38

Agency-mandated shift operations:

1. Shift work shall start no earlier than 6AM Monday and will conclude no later than 9AM Saturday (overtime premiums applicable after 8 hours in a shift).

2. Single irregular shiftwork, less than 3 consecutive days will be paid at the rate of time and one-half of the regular hourly rate.

3. 3 consecutive work days or more:

First Shift - No Premium (Starting 6AM-9AM)

Second Shift - Regular hourly rate plus 12%
 Third Shift - Regular hourly rate plus 18%

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 14.65
 +16.64*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over \$100 million in total construction costs (including engineering & architecture).

OVERTIME PAY

See (B, E, Q, *V) on OVERTIME PAGE

*portion of supplemental benefits subject to V code when project cost is over one hundred million (including engineering & architecture).

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

When a Holiday falls on Sunday, it will be celebrated the following day. If the holiday falls on a Saturday, it will be observed that day unless so determined by the Federal Government to be celebrated on a different day.

REGISTERED APPRENTICES

WAGES: One year terms at the following percentage of Journeyman's wage.

1st.	2nd.	3rd.	4th.	5th.
50%	55%	60%	70%	85%

SUPPLEMENTAL BENEFITS per hour:

1st term \$ 14.65
 +8.10*

All other terms \$ 14.65
 +12.64*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over \$100 million in total construction costs (including engineering & architecture).

2-112s-SF

Roofer

10/01/2023

JOB DESCRIPTION Roofer

DISTRICT 2

ENTIRE COUNTIES

Broome, Chemung, Chenango, Delaware, Otsego, Schoharie, Schuyler, Steuben, Tioga, Tompkins

WAGES

Per hour:	07/01/2023	06/01/2024	06/01/2025
		Additional	Additional
Roofer, Waterproofer	\$ 29.51	\$ 2.50**	\$ 2.50**
	+ 0.99*		

*This amount is paid for all hours worked, whether regular or premium hours.

**To be allocated at a later date

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount not subject to overtime premiums):

- On days where more than one shift is worked on the job, the hours worked after 4:30 PM and before 6:30 AM will be paid an additional \$1.90 per hour premium. This premium is not for use in emergency repair situations.
- Premium of \$1.25 per hour will be paid for the application, rip-off or handling of pitch products. The premium will be paid for pitch that is showing, covered or buried on the roof.
- Premium of \$1.25 per hour will be paid for asbestos abatement requiring a half face respirator.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 19.84

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages:

Hours per term	
0-667 Hrs.	\$ 20.66 + 0.69*
668-1335 Hrs.	22.14 + 0.74*
1336-2002 Hrs.	23.61 + 0.79*
2003-2669 Hrs.	25.08 + 0.84*
2670-3336 Hrs.	26.56 + 0.89*
3337-4000 Hrs.	28.04 + 0.94*

*This amount is paid for all hours worked, whether regular or premium hours.

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount not subject to overtime premiums):

- On days where more than one shift is worked on the job, the hours worked after 4:30 PM and before 6:30 AM will be paid an additional \$1.90 per hour premium. This premium is not for use in emergency repair situations.
- Premium of \$1.25 per hour will be paid for the application, rip-off or handling of pitch products. The premium will be paid for pitch that is showing, covered or buried on the roof.
- Premium of \$1.25 per hour will be paid for asbestos abatement requiring a half face respirator.

Supplemental Benefits:

0-667 Hrs.	\$ 16.87
668-1335 Hrs.	17.36
1336-2002 Hrs.	17.87
2003-2669 Hrs.	18.35
2670-3336 Hrs.	18.85
3337-4000 Hrs.	19.34

2-203elmi

Sheetmetal Worker

10/01/2023

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 2

ENTIRE COUNTIES

Allegany, Broome, Chemung, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

WAGES

Per hour:

	07/01/2023	05/01/2024 Additional
Sheetmetal Worker	\$ 36.84	\$ 1.75*
Polyresin Fiberglass	36.94	1.75*
CAD Operator	37.84	1.75*

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman: \$ 21.46

OVERTIME PAY

See (*B1, Q) on OVERTIME PAGE

*On Saturday, time and one half of the hourly rate for the first ten (10) hours, then two (2) times the hourly wage rate for all hours after ten (10) hours worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: Holidays are observed on the Holiday, not on the day that it is locally observed.

REGISTERED APPRENTICES

WAGES per hour:

Half Year Terms

	1st	2nd	3rd	4th	5th	6th	7th	8th
07/01/2023	22.10	22.10	23.94	25.79	27.63	29.47	31.31	33.16

SUPPLEMENTAL BENEFITS per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th
07/01/2023	1.68	1.68	17.85	17.93	18.01	18.09	18.17	18.25

2-112

Sprinkler Fitter

10/01/2023

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Washington, Wayne, Wyoming, Yates

WAGES

Per hour 07/01/2023

Sprinkler \$ 40.04
 Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journey person \$ 28.24

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
\$ 19.15	\$ 21.28	\$ 23.16	\$ 25.29	\$ 27.41	\$ 29.54	\$ 31.67	\$ 33.80	\$ 35.93	\$ 38.05

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.74	\$ 8.74	\$ 20.32	\$ 20.32	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57 1-669

Teamster - Building 10/01/2023

JOB DESCRIPTION Teamster - Building

DISTRICT 6

ENTIRE COUNTIES

Broome, Cayuga, Cortland, Delaware, Onondaga, Seneca, Tompkins, Yates

PARTIAL COUNTIES

Allegany: Only the Townships of Almond, Burns, and Alfred.
 Chenango: Only the Townships of Afton, Bainbridge, Coventry, Greene, Guilford, Oxford and Smithville.
 Madison: Only the Townships of Cazenovia, DeRuyter, Fenner, Georgetown, Lenox, Nelson and Sullivan.
 Oswego: All Townships except Redfield, Boylston and Sandy Creek.
 Otsego: Only the Townships of Butternuts, Laurens, Maryland, Millford, Morris, Oneonta, Otego, Unadilla, and Worchester.
 Steuben: Only the Townships of Prattsburg, Canisteo, Fremont, Cohoctan, Dansville, Hornell, Hartsville, Greenwood, West Union, Troupsburg, and Jasper.
 Tioga: Only the Townships of Berkshire, Candor, Newark Valley, Nichols, Owego, Richford, and Tioga. All territory east of Nichols/Smithboro to Broome County, within State of New York.

WAGES

GROUP A: Straight Trucks
 GROUP B: Tractor Trailer, Farm Tractor, Fuel Truck.
 GROUP C: Euclid.
 GROUP D: On site Mechanic.

Per hour:	07/01/2023	06/01/2024	06/01/2025
Building: (under \$ 5 million*) GROUP A,B,C,D	\$ 28.43	\$ 31.43	\$ 34.43
Building: (over \$ 5 million*) GROUP A,B	\$ 29.48	\$ 32.48	\$ 35.48
GROUP C	29.83	32.83	35.83
GROUP D	29.63	32.63	35.63

* Total project cost including General Construction, Plumbing, HVAC and Electrical

SUPPLEMENTAL BENEFITS

Per hour:

(under \$5 million*)	\$ 29.37	\$ 30.02	\$ 30.87
(over \$5 million*)	30.14	30.80	31.67

* Total project cost including General Construction, Plumbing, HVAC and Electrical

OVERTIME PAY

(D, O) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

6-317

Teamster - Heavy&Highway 10/01/2023

JOB DESCRIPTION Teamster - Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Broome, Delaware

PARTIAL COUNTIES

Chenango: Only the Townships of Smithville, Greene, Coventry, Oxford, Afton, Bainbridge and Guilford.
 Otsego: Only the Townships of Butternuts, Laurens, Maryland, Milford, Morris, Oneonta, Otego, Unadilla and Worchester.
 Tioga: Only the Townships of Nichols, Tioga, Candor, Richford, Berkshire, Newark Valley and Owego.

WAGES

Per hour:

GROUP #1: Warehousemen, Yardmen, Truck Helpers, Pickups, Panel Trucks, Flatboy Material Trucks (straight jobs), Single Axle Dump Trucks, Dumpsters, Material Checkers and Receivers, Greasers, Truck Tiremen, Mechanic Helpers and Parts Chasers, Tandems and Batch Trucks, Mechanics, Dispatcher. Semi-Trailers, Low-boy Trucks, Asphalt Distributor Trucks, Agitator, Mixer Trucks and Dumpcrete type vehicles, Truck Mechanic, Fuel Trucks.

GROUP #2: Specialized Earth Moving Equipment-Euclid type or similar off-highway where not self-loading. Straddle (Ross) Carrier, and self-contained concrete mobile truck. Off-highway Tandem Back-Dump, Twin Engine Equipment and Double-Hitched Equipment where not self-loading.

	07/01/2023	07/01/2024
Group #1	\$ 31.57	\$ 33.57
Group #2	31.66	33.66

NOTES

- An additional \$1.50 per hour shall be paid to an employee who performs hazardous waste removal work on a City, County, State and/or Federally designated waste site where employee is required to use or wear personal protective equipment.
- A single irregular work shift can star an time between 5:00pm and 1:00am. All employees who work a single irregular shift on governmental mandated night work shall be paid an additional \$2.50 per hour (applicable on projects bid on or after 07/01/2020).

SUPPLEMENTAL BENEFITS

Per hour paid:

	07/01/2023	07/01/2024
	\$ 27.26	\$ 27.76

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

If a holiday falls on Sunday, it will be celebrated Monday.

Any employee laid off within the week in which a holiday falls shall receive holiday pay.

2-317(Bing)

Welder 10/01/2023

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 07/01/2023

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

- (AA) Time and one half of the hourly rate after 7 and one half hours per day
- (A) Time and one half of the hourly rate after 7 hours per day
- (B) Time and one half of the hourly rate after 8 hours per day
- (B1) Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday.
Double the hourly rate for all additional hours
- (B2) Time and one half of the hourly rate after 40 hours per week
- (C) Double the hourly rate after 7 hours per day
- (C1) Double the hourly rate after 7 and one half hours per day
- (D) Double the hourly rate after 8 hours per day
- (D1) Double the hourly rate after 9 hours per day
- (E) Time and one half of the hourly rate on Saturday
- (E1) Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
- (E2) Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E3) Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
- (E4) Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E5) Double time after 8 hours on Saturdays
- (F) Time and one half of the hourly rate on Saturday and Sunday
- (G) Time and one half of the hourly rate on Saturday and Holidays
- (H) Time and one half of the hourly rate on Saturday, Sunday, and Holidays
- (I) Time and one half of the hourly rate on Sunday
- (J) Time and one half of the hourly rate on Sunday and Holidays
- (K) Time and one half of the hourly rate on Holidays
- (L) Double the hourly rate on Saturday
- (M) Double the hourly rate on Saturday and Sunday
- (N) Double the hourly rate on Saturday and Holidays
- (O) Double the hourly rate on Saturday, Sunday, and Holidays
- (P) Double the hourly rate on Sunday
- (Q) Double the hourly rate on Sunday and Holidays
- (R) Double the hourly rate on Holidays
- (S) Two and one half times the hourly rate for Holidays

- (S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
- (T) Triple the hourly rate for Holidays
- (U) Four times the hourly rate for Holidays
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.
- (X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

- (1) None
- (2) Labor Day
- (3) Memorial Day and Labor Day
- (4) Memorial Day and July 4th
- (5) Memorial Day, July 4th, and Labor Day
- (6) New Year's, Thanksgiving, and Christmas
- (7) Lincoln's Birthday, Washington's Birthday, and Veterans Day
- (8) Good Friday
- (9) Lincoln's Birthday
- (10) Washington's Birthday
- (11) Columbus Day
- (12) Election Day
- (13) Presidential Election Day
- (14) 1/2 Day on Presidential Election Day
- (15) Veterans Day
- (16) Day after Thanksgiving
- (17) July 4th
- (18) 1/2 Day before Christmas
- (19) 1/2 Day before New Years
- (20) Thanksgiving
- (21) New Year's Day
- (22) Christmas
- (23) Day before Christmas
- (24) Day before New Year's
- (25) Presidents' Day
- (26) Martin Luther King, Jr. Day
- (27) Memorial Day
- (28) Easter Sunday

(29) Juneteenth

**New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 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 where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 10/03/2023

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBASHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL	****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC	****2591	AVI 212 INC.		260 CROPSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL	****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL	****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025
DOL	DOL	****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	AG	****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026

NYSDOL Bureau of Public Work Debarment List 10/03/2023

Article 8

DOL	DOL	****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER PAPASTEFANO A/K/A CHRIS PAPASTEFANO		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL	****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLSTON NY 11363	01/14/2019	01/14/2024
DOL	DOL	****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		GEOFF CORLETT		415 FLAGGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
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		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	DOL	****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.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	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027

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DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
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	10/25/2022	10/25/2027
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		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	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	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 GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JORI PEDERSEN		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		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
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	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027

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DOL	DOL	****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
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		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL	****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	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	AG	****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL	****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	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	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	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	DA	****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	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

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DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		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		PETER STEVENS		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL	****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	DA	****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL	****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL	****9148	RICHARD TIMIAN	RICH T CONSTRUCTION	108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSEAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL	****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	NYC	****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DA	****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	NYC	****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL	****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	NYC	****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024

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DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		SILVANO TRAVAJA		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		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPANSTEFANOU, JR. A/K/A STEVE PAPANSTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL	****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL	****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DA	****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	****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBASHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLSTON NY 11363	01/14/2019	01/14/2024

NYS DOL Bureau of Public Work Debarment List 10/03/2023

Article 8

DOL	NYC		VIKTAR PATONICH		2630 CROPSEY AVE BROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL	****8266	WILLIAM CHRIS MCLENDON	MCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCLENDON		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	****4730	XGD SYSTEMS, LLC	TDI GOLF	415 GLAGE AVE #302STUART FL 34994	10/31/2018	10/31/2023

DOCUMENT 002600 – PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by University when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The proposed changes do not affect the overall design intent, including but not limited to certain occasions where aesthetics, function, and maintenance are the determining factor of a specified product/manufacturer.
 - 4. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than 15 days prior to date for final questions prior to bid opening.

2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.
3. Submittal Format: Submit Procurement Substitution Request shall:
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by Architect.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project.
 - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by University and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
2. In all cases the Architect shall be the sole judge as to whether a proposed product is to be approved and the contractor has the burden of proving, at its own cost and expense, to the satisfaction of the Architect, that the proposed product is similar and equal to the named product.
3. In deciding, the Architect may establish such objective and appearance criteria as it may deem proper that the proposed product must meet in order for it to be approved.

- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.
- D. The Contractor shall have and make no claim for an extension of time or damages by reason of the time taken by the Architect in considering a product proposed by the Contractor or by reason of the failure of the Architect to approve a product proposed by the Contractor.
- E. Approval shall in no way be construed as permitting any departure whatsoever from the Contract Documents, relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, sequence of work, omissions, or otherwise that may exist, relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing or deficiencies in strength, relieving the Contractor of full responsibility for satisfactory performance of all work to achieve a functionally complete facility or result and coordination with the work of all subcontractors and other contractors or, permitting departure from additional details or instructions previously furnished by the Architect.

END OF DOCUMENT 002600

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work performed by Owner.
5. Multiple Work Packages.
6. Work under Owner's separate contracts.
7. Owner-furnished/Contractor-installed (OFICI) products.
8. Contractor's use of site and premises.
9. Work restrictions.
10. Specification and Drawing conventions.
11. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

- A. Project Identification: East Gym Addition – 071086.
 1. Project Location: Binghamton University- main campus.
4400 Vestal Parkway East
Binghamton, New York 13902

- B. Owner: Binghamton University.
 - 1. Architect: William Hall
 - 2. Civil Engineer: Nick Corcoran
 - 3. Construction Manager: Gregg Konnick, Physical Facilities, Binghamton University
- C. Owner Consultants: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. Structural Engineer: Ryan Biggs Clark Davis
 - 2. MEP Engineer: Delta Engineering
- D. Contractor: (contractor to be determined per the bidding process)
- E. Construction Manager/University Representative: Gregg Konnick: Physical Facilities, Binghamton University
 - 1. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to administer the Contract for construction between Owner and each Contractor, according to a separate contract between Owner and Construction Manager.
- F. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
 - a. Construct East Gym Addition. Work includes but it not limited to earthwork, underground utilities, grading, landscaping, paving, excavation, foundation, steel, exterior shell, mechanical, electrical, plumbing, interior finishes and other work as described in the contract documents.
 - b. The purpose of this project is to construct interior courts and running track for recreation. Support spaces include but are not limited to restrooms, mechanical and electrical spaces, and storage.
- B. Type of Contract:
 - 1. Project will be a multiple prime contract.

1.6 WORK PERFORMED BY OWNER

- A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with any work performed by Owner.
- B. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.
 - 1. Furniture and Equipment procurement and installation after substantial completion.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: Each Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits on Use of Site: Confine construction operations to designated work/ contract limits as defined in the contract documents.
 - 2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
 - 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.9 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7 a.m. to 3:30 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
 - 1. Weekend Hours: Upon approval of University Representative.
 - 2. Early Morning Hours: Upon approval of University Representative.
 - 3. Work in Existing Building: Upon approval of University Representative.
 - 4. Hours for Utility Shutdowns: Upon approval of University Representative.
- C. On-Site Work Day Restrictions: Do not perform work resulting in utility shutdowns during major University events.
- D. Retain "Existing Utility Interruptions" Paragraph below for existing utilities. Coordinate with requirements for temporary utilities specified in Section 015000 "Temporary Facilities and Controls."
- E. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify University Representative not less than ten days in advance of proposed utility interruptions.
- F. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify University Representative not less than ten days in advance of proposed disruptions. Disruptions may not be allowed during major University events.
- G. Retain remaining paragraphs to correspond to Owner's requirements. Revise to suit Project. Where Owner's requirements are extensive, see and insert Owner policy and procedure documents in the Project Manual.
- H. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site and on University property is not permitted.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 011200 - MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.
- B. Specific requirements for work of each contract are also indicated in individual Specification Sections and on Drawings.
- C. Related Section:
 - 1. Division 01 Section "Summary" for the Work covered by the Contract Documents, restrictions on use of the Project site, phased construction, coordination with occupants, and work restrictions.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, the condition at which roofing is insulated and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

1.3 PROJECT COORDINATOR

- A. The Prime General Contractor shall be responsible for coordination between the General Construction Contract, Plumbing & Fire Protection Contract, HVAC Contract, Electrical Contract and the University representative for any Work by Owner.

1.4 COORDINATION ACTIVITIES

- A. Coordination activities of Project coordinator include, but are not limited to, the following:
 - 1. Provide overall coordination of the Work.
 - 2. Coordinate shared access to workspaces.
 - 3. Coordinate product selections for compatibility.
 - 4. Provide overall coordination of temporary facilities and controls including internet connections.
 - 5. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
 - 6. Coordinate construction and operations of the Work with work performed by each Contract and separate contracts.
 - 7. Prepare coordination drawings in collaboration with each contractor to coordinate work by more than one contract.

8. Coordinate sequencing and scheduling of the Work including a combined Contractors' construction schedule for entire Project.
 9. Provide photographic documentation.
 10. Provide quality-assurance and quality-control services specified in Division 01 Section "Quality Requirements."
 11. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
 12. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
 13. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project site.
 14. Provide field surveys of in-progress construction and site work and final property survey.
 15. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
 16. Coordinate cutting and patching.
 17. Coordinate protection of the Work.
 18. Coordinate fire-stopping.
 19. Coordinate completion of interrelated punch list items.
 20. Coordinate preparation of Project record documents if information from more than one contractor is to be integrated with information from other contractors to form one combined record. Refer to Specification Section 017839.
 21. Print and submit record documents if installations by more than one contractor are indicated on the same contract drawing or shop drawing. Refer to Specification Section 017839.
 22. Collect record Specification Sections from contractors, collate Sections into numeric order, and submit complete set.
 23. Coordinate preparation of operation and maintenance manuals if information from more than one contractor is to be integrated with information from other contractors to form one combined record.
- B. Responsibilities of Project coordinator for temporary facilities and controls include, but are not limited to, the following:
1. Provide common-use field office for use by all personnel engaged in construction activities. Refer to Specification Section 015000 for all requirements.
 2. Coordinate temporary power and telephone service to temporary facilities with Electrical Contractor.
 3. Waste disposal facilities, including collection and legal disposal of hazardous, dangerous, unsanitary, or other harmful waste materials.
 4. Provide a Construction Waste Management & Disposal Plan per Specification Section 017419. Coordinate the Construction Waste Management & Disposal Plan with each Contract and separate contracts.
 5. Daily and Periodic cleaning of all paved surfaces outside the contract limit line per Special Conditions Item 1D-2.
 6. Provide Temporary Erosion and Sediment Controls per Specification Section 015713.
 7. Provide snow removal as needed.

1.5 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the work, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Trenches and other excavation for the work of each contract shall be the work of the General Construction Contract.
 3. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each contract for its own work.
 4. Furnishing of access panels for the work of each contract shall be the work of each contract for its own work. Installation of access panels shall be the work of the General Construction Contract.
 5. Equipment pads for the work of each contract shall be the work of the General Construction Contract.
 6. Roof-mounted equipment curbs for the work of each contract shall be the work of the General Construction Contract.
 7. Painting for the work of each contract shall be the work of the General Construction Contract.
 8. Cutting and Patching: Each contract shall perform its own cutting; patching shall be under the General Construction Contract.
 9. Through-penetration fire-stopping for the work of each contract shall be provided by each contract for its own work.
 10. Contractors' Preliminary Construction Schedule: Within 10 working days after preliminary horizontal bar-chart-type construction schedule submittal has been received from Project coordinator, submit a matching preliminary horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
- B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
1. The General Construction Contract shall coordinate substitutions.
- C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section "Temporary Facilities and Controls," each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office, complete with necessary furniture, utilities, and telephone service.
 4. Its own storage and fabrication sheds.
 5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities. The Project Coordinator shall coordinate the laydown space for the site.
 7. General hoisting facilities for its own construction activities, up to 2 tons (2000 kg).

8. Progress cleaning of work areas affected by its operations on a daily basis.
 9. Secure lockup of its own tools, materials, and equipment.
 10. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 11. Following the Construction Waste Management & Disposal Plan implemented by the General Prime Contract.
 12. Its own first aid kit/station typically located at the job trailer.
 13. Its own postings required by the Department of Labor typically located at the job trailer.
 14. Provide and maintain its own fire extinguishers at areas where required by codes, laws and regulations and by industry standards such as but not limited to OSHA.
 15. Holding weekly “toolbox” talks and maintaining records.
- D. Temporary Heating, Cooling, and Ventilation: The General Construction Contract is responsible for temporary heating, cooling, and ventilation, including utility-use charges, temporary meters, and temporary connections.
- E. Use Charges: Comply with the following:
1. Refer to Specification Section 015000 Temporary Facilities and Controls.

1.6 GENERAL CONSTRUCTION CONTRACT

- A. Work in the General Construction Contract includes, but is not limited to, the following:
1. Civil, Site, Architectural & Structural General Construction work as indicated in Volume I of the drawings.
 2. Remaining work not identified as work under other contracts.
- B. Temporary facilities and controls in the General Construction Contract include, but are not limited to, the following:
1. Temporary facilities and controls that are not otherwise specifically assigned to the Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.

1.7 PLUMBING & FIRE PROTECTION CONTRACT

- A. Work in the Plumbing Contract includes, but is not limited to, the following:
1. Plumbing, Process Piping & Fire Protection as indicated in Volume II of the drawings.
 2. Plumbing connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.
- B. Temporary facilities and controls in the Plumbing Contract include, but are not limited to, the following:

1. Plumbing connections to existing systems and temporary facilities and controls furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.

1.8 HVAC CONTRACT

A. Work in the HVAC Contract includes, but is not limited to, the following:

1. Mechanical, Mechanical HVAC & Mechanical Piping work as indicated in Volume II of the Drawings.
2. Mechanical connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.
3. Coordinate temporary facilities in paragraph below with "General Requirements of Contracts" Article.

B. Temporary facilities and controls in the HVAC Contract include, but are not limited to, the following:

1. General connections to existing systems and temporary facilities and controls furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.
2. Temporary heat to be provided by the HVAC Contract. Other utilities required for temporary heat to be provided by EC or PC as required.

1.9 ELECTRICAL CONTRACT

A. Work in the Electrical Contract includes, but is not limited to, the following:

1. Electrical Power, Lighting, Lightning & Grounding, Auxiliary Systems, Fire Alarm and Telephone/Data work as indicated in Volume II of the Drawings.
2. Electrical connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University representative for any Work by Owner.

B. Temporary facilities and controls in the Electrical Contract include, but are not limited to, the following:

1. Electrical connections to existing systems and temporary facilities and controls furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and the University for any Work by Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011200

DOCUMENT 011201 MULTIPLE PROJECT COORDINATION**1.1 PROJECT COORDINATION**

- A. Each trade shall be responsible for the activities associated with their trade documents (drawings and specifications)
- B. The following shall be associated to each trade
 1. General construction contractor GC-trade prime ('G', 'A', 'C' and 'S' drawings, project manual)
 2. Plumbing contractor PC-trade prime ('G', 'P' and 'FP' drawings, project manual)
 3. Mechanical contractor MC-trade or M-trade prime ('G' and 'M' drawings, project manual)
 4. Electrical contractor EC-trade prime ('G' and 'E' drawings, project manual)
- C. GC-trade prime shall review the 'FP', 'P', 'M' and 'E' drawings to identify work scope associated with their trade that may not be identified on the 'G', 'A', 'C' or 'S' drawings.
- D. P-trade prime shall review the 'A', 'S', 'C', 'M' and 'E' drawings to identify work scope associated with their trade that may not be identified on the 'G' 'P' or 'FP' drawings.
- E. M-trade prime shall review the 'A', 'S', 'C', 'FP', 'P' and 'E' drawings to identify work scope associated with their trade that may not be identified on the 'G' or 'M' drawings.
- F. E-trade prime shall review the 'A', 'S', 'C', 'FP', 'P' and 'H' drawings to identify work scope associated with their trade that may not be identified on the 'G' or 'E' drawings.

1.2 FIRESTOPPING OF RATED ASSEMBLIES

- A. GC-trade prime, PC-trade prime, MC-trade prime, and EC-trade prime shall coordinate penetrations of rated assemblies with the GC to complete their work.
- B. GC-trade prime, PC-trade prime, MC-trade prime, and EC-trade prime shall 'rough' patch penetrations of rated assemblies to complete their work to comply with the assembly rating and shall be approved by the owner.
- C. GC-trade prime shall hire a skilled tradesman to complete the final patching to surfaces new and existing. The GC-trade final patching shall match existing surfaces. The PC-trade prime, MC-trade prime, and EC-trade prime shall prep surfaces to the satisfaction of the GC-trade prime to accommodate the final surface patch.
- D. GC-trade prime, PC-trade prime, MC-trade prime, and EC-trade prime shall be responsible for fire stopping all penetrations of rated assembly. The firestopping systems throughout the facility shall comply with the requirements in the project manual.
- E. GC-trade prime, PC-trade prime, MC-trade prime, and EC-trade prime shall provide proper smoke seals at corridor walls. All corridor wall penetrations shall be sealed smoke - tight as required per NFPA 101 for health care occupancies.

1.3 SCHEDULE/COORDINATION BETWEEN TRADES:

- A. GC-trade prime shall coordinate a master schedule meeting where the master schedule shall be coordinated and agreed to by the MC-trade prime, PC- trade prime, and EC-trade prime.
 - 1. GC-trade prime contractor shall establish the sequence of the general work including removals, temporary systems, installation of new work, etc.
 - 2. PC-trade prime contractor shall establish the sequence of the plumbing/fire protection work including removals, temporary systems, installation of new work, etc.
 - 3. MC-trade prime contractor shall establish the sequence of the HVAC work including removals, temporary systems, installation of new work, etc.
 - 4. EC-trade prime contractor shall establish the sequence of the electrical work including removals, temporary systems, installation of new work, etc.
- B. GC-trade prime contract shall propose a master schedule of all prime work sequence to the Owner for review and comment.
 - 1. PC-trade prime, MC-trade prime, and EC-trade prime contractors shall provide a proposed project schedule to the GC-trade prime contractor.
 - 2. GC-trade prime contractor shall develop a master schedule to coordinate the work scope from the MC-trade prime, EC-trade prime, and PC-trade prime proposed schedule.
 - 3. PC-trade prime, MC-trade prime, and EC-trade prime contractors shall coordinate the work to support the work cycle established by the GC-trade prime.
- C. The GC-trade prime shall finalize and maintain the master schedule throughout the project.
 - 1. PC-trade prime, MC-trade prime, and EC-trade prime contractors shall provide schedule updates to the GC-trade prime contractor two days prior to the project meeting (dates and time schedule updates required shall be established by the GC-trade)
 - 2. GC-trade prime contractor shall update the master project schedule the day before the project meeting and review with the Owner (date and time for master schedule updates required shall be established by the owner)
- D. Master schedule updates shall be reviewed at the project meeting.

1.4 OCCUPANCY - GENERAL WORK SEQUENCE

- A. The construction phasing shall be coordinated to allow the owner to occupy the space during construction.
- B. Existing equipment shall remain operational as long as possible to eliminate and/or reduce the need for temporary equipment by each trade.
- C. The replacement equipment shall be installed prior to the removal of the existing equipment where possible to reduce down time and switch over time.
- D. Each prime shall be responsible for temporary equipment required and the associated support coordination required by the other primes.
- E. Construction phasing shall be coordinated with the owners occupancy schedule.
- F. Refer to documents for occupied space temperatures required to be maintained during construction.

- G. M-trade prime contractor shall be responsible for providing and coordinating with other primes temporary HVAC equipment as required to maintain the established occupancy temperatures.

1.5 TEMPORARY SERVICES

- A. M-trade prime shall coordinate temporary services for HVAC in occupied areas if needed.
- B. Existing equipment may remain in operation as long as practical before the installation of temporary equipment is required.
- C. Temporary services to include but not limited to:
 - 1. Occupied space cooling and heating. Maintain occupied space temperatures at 70 degrees f. For heating and 74 degrees f. For cooling.
 - 2. Building heating water - year-round (M-trade to provide temporary equipment if required)
 - 3. Building domestic hot water - year-round (P-trade to provide temporary equipment if required)
 - 4. E-trade prime to provide temporary power (including temp ac) and lighting as required.
- D. Each trade shall provide temporary hard walls to separate work activities from occupied spaces. Unless specifically shown on the phasing plan, those shown on the phasing plan are provided by the GC contractor.

END OF DOCUMENT 003132

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

1. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

1. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

1. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
2. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
3. Execute accepted alternates under the same conditions as other work of the Contract.
4. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
5. Multiple Contracts: The alternates apply to all multiple contracts. Bidders for each Prime Contract shall enter the alternate amounts in the Bid form for work related to that Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

General Construction (provide pricing for Alternate N0.1 & No.2)

Alternates_1_ Alternate No. 1: Provide Construction Access Road including providing a bridge to Murray Hill Road.

Add to base bid purchase of and all work associated with the access road and bridge work as outlined in the contract documents.

Alternates_2_ Alternate No. 2: Provide increased capacity of Emergency Generator.

Add to base bid purchase of and all work associated with increasing the size of the emergency generator as called out in the contract documents.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 4. Section 2.20 Equivalents – Approved Equal of State University of NY Construction Agreement

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

- a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 5 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or 15 days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause:

1. Any and all submissions for “or equal” products which are submitted by the Contractor after award of Contract must be made by the Contractor within ninety (90) calendar days after the date of award. Contractor agrees it waives and relinquishes the right, claim or privilege, if any, to submit “or equal” proposals if such are made ninety (90) calendar days after the date of award of the Contract to the Contractor.
2. Requests for approval of propose equivalents will be considered by the Architect after bidding ONLY in the following cases;
 - a. The named product cannot be obtained by the Contractor due to strikes, lockouts, bankruptcies or discontinuance of manufacture and the Contractor makes a written request to the Architect for consideration of the proposed equivalent within ten (10) days of the date is ascertains it cannot obtain the named product,
 - b. The proposed equivalent is superior, in the opinion of the Architect, to the named product,
 - c. The proposed equivalent, in the opinion of the Architect, is equal to the named product, and its use is to the advantage of the University and the University receives an equitable credit.
3. Submit requests for substitution immediately on discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.
4. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Web-based Project management software package.
 - 6. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from University Representative, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in 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 ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination of Multiple Contracts: Each contractor shall cooperate with Project coordinator, who shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in 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 with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors and direction of Project coordinator to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.

7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Owner name.
 3. Owner's Project number.
 4. Name of Architect and University Representative.
 5. Date.
 6. Name of Contractor.
 7. RFI number, numbered sequentially.
 8. RFI subject.
 9. Specification Section number and title and related paragraphs, as appropriate.
 10. Drawing number and detail references, as appropriate.
 11. Field dimensions and conditions, as appropriate.
 12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 13. Contractor's signature.
 14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

- c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of 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 Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 5 days of receipt of the RFI response.
 - E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Use software log that is part of web-based Project management software. Include the following: Software log with not less than the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect and Construction Manager.
 4. RFI number, including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's or Construction Manager's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
 - F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within three days if Contractor disagrees with response.
- 1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES
- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Digital Drawing Software Program: Contract Drawings are available in Revit 2021.

- B. Web-Based Project Management Software Package: GC to provide web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion. The University shall be administrators of the software.
1. Web-based Project management software includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 2. Minutes: Consultant to be responsible for recording significant discussions and agreements achieved and produce meeting minutes. Minutes will be distributed to everyone concerned, by the Construction Manager.

- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
 3. Minutes: Consultant shall be responsible for recording and CM to distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
1. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

2. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 3. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals, unless otherwise determined.
1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction 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.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.

3. Minutes: Consultant shall be responsible for recording and construction manager to distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Project Coordinator will conduct Project coordination meetings at regular intervals, as deemed necessary by the Project Coordinator based on construction activities. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 – CONSTRUCTION PROGRESS DOCUMENTATION**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Contractor's construction schedule.
 2. Daily construction reports.
 3. Field condition reports.
- B. Related Sections:
1. Article III, Section 3.02 of the Agreement.
 2. Article IV, Section 4.08 of the Agreement.
 3. Section D – Campus Special Conditions, 1D-37 Schedule.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The amount of time between the early start date and the late start date or the early finish date and the late finish date of any of the activities in the CPM schedule.
1. Float time is not for the exclusive use or benefit of either the University or Contractor, but is a jointly owned, expiring Project resource, available to both parties as needed to meet schedule milestones and Contract completion date.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submissions: Initial submittal, complete revisions and updates shall be submitted in (3) three copies (minimum 18"x24") and on electronic media formatted for Microsoft Project. Electronic copy of schedule shall be labeled as to type of schedule (initial or updated) and contain the date of which it was created/updated.
- B. Start-up Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Summary Schedules: A Summary Schedule of the entire Project shall be provided along with the initial submittal and each update using Microsoft Project software. The Contractor shall code the activities on the initial detailed schedule to summarize the same so that the resulting Summary Schedule Activities match those listed herein.
- D. CPM Reports: Concurrent with CPM schedule, a CPM Report shall be provided along with the initial submittal and with each update. The CPM Report shall include a tabulation of each activity shown on the CPM schedule. The following information shall be furnished, as a minimum, for each activity: Activity I.D., Description, Duration (original and remaining), Man-hours, Early/Late Start, Early/Late Finish, and total float in calendar days. Reports and updating will indicate actual start and completion for completed activities and actual start, percentage complete, and remaining duration for activities in progress. Report shall also indicate actual versus planned man-hours for completed activities and activities in progress, and planned man-hours for uncompleted activities.
- E. Provide a historic schedule that shows the actual activity descriptions, man-hours and durations that occurred during the work for each activity on the diagrams. The actual critical path shall be documented and shall be clearly indicated on the historic diagrams.
- F. In addition to the requirements of Article IV, Section 4.08 of the Agreement, the Contractor shall indicate in the contract breakdown (Schedule of Values), for approval by the University, a reasonably estimated value for achieving the scheduling requirements of the section.
- G. Daily Construction Reports: Submit at weekly intervals.
- H. Field Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

- A. The Contractor shall coordinate the construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
- B. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors. Unless otherwise directed by the University, the Schedule shall be prepared by the General Contractor.
- C. Multiple Prime Contracts: Where multiple prime contractors exist, each prime contractor shall be responsible for creating and updating activities relative to their scope of the work. Unless otherwise directed by the University, the Prime General Contractor will be responsible for

compiling information from all other Primes, generating a comprehensive schedule, and updating the schedule as required per this specification section.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.
- B. Activities:
1. The detail of information shall be such that activity duration, in general, will range from (3) to (20) calendar days. Activity description and duration shall be shown for each activity on the diagrams. The critical path shall be determined and shall be clearly indicated on the diagrams.
 2. In addition to specific construction activities, the CPM schedule shall include, but not be limited to the following;
 - a. Testing Activities and Required Inspections (where applicable).
 - b. Shop drawing preparation and approval activities. Sequence submissions to provide sufficient time for the coordination of shop drawings of one trade that impact other trades, as required by Section 2.19(3) of the Agreement.
 - c. Mock-ups and pre-installation meetings, where specified.
 - d. Procurement schedule (order dates, fabrication, deliveries, and long lead items).
 - e. Special campus restrictions, i.e. University approvals for work site access, shutdowns and other impacts (noise, testing and examinations, site and building access, etc).
 - f. Requirements for any onsite shutdowns that may impact work (utility interruptions).
 - g. Training and/or instruction of University personnel.
 - h. Commissioning of major building systems including pre-functional testing, start-up, functional testing, operational scenario testing and retesting as required.
 - i. Completion of punch list activities.
 - j. Substantial and Final Completion.
 3. Initial phases of work shall include time in the schedule for training crews, acclimating trades to the sequence and apportionment of activities, additional meetings with the University, consultant(s), Contractor, and significant subcontractors, and re-sequencing activities to recover from start-up delays typically caused by normal activities associated with the startup of field work.
- C. Summary Activities: Schedule shall include summary activities applicable to the Project, including, but not limited to;
1. Mobilization
 2. Environmental & Abatement
 3. Site Preparation and Foundations
 4. Building Frame and Enclosure
 5. MEPS (Mechanical, Electrical, Plumbing, Sprinkler & Fire Systems) Rough-in and major equipment installation.

6. MEPS Systems fixtures/trim/accessories
 7. Interior General Construction
 8. Equipment and Specialties
 9. Exterior walks, parking, roads, and landscaping.
 10. Testing, Training and Commissioning.
 11. Campus Installed/ Furnished FF&E (Fixtures, Furnishings, and Equipment).
- D. Milestones: Include milestones as indicated in the Contract Documents within the schedule, Applicable milestones include, but are not limited to;
1. Notice of Award
 2. Life Safety Systems tested and accepted.
 3. Substantial Completion
 4. Certificate of Occupancy
 5. Start Date of Guarantee Period
 6. Contract Completion Date (if different from above)
 7. Final Completion Date – All punch list/outstanding items are satisfied.
 8. Other milestones required by the University or the Contractor.
- E. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Utilize Microsoft Project, for Windows XP operating system. Other computer software, developed specifically to manage construction schedules will be accepted at the discretion of the University.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. The Contractor shall prepare a construction progress schedule which shall consist of a Critical Path Method (CPM) schedule as described below and shall incorporate the Schedule Summary Activities and Milestone Dates as indicated herein.
- B. The development and updating of the Construction Progress Schedule shall be by the critical path method (CPM) and shall be computer generated using the latest version of Microsoft Project. Other computer software developed specifically to manage construction schedules will be accepted at the discretion of the University. The CPM schedule shall be prepared by a qualified individual that has prepared at least three other CPM schedules using Microsoft Project for similar contracts of similar size and complexity.
- C. The CPM schedule shall consist of resource loaded (material and labor), time-scaled logic diagrams and other data specified herein. The diagrams shall show activities of the project in detail and in summary format. Diagrams shall also show the order and interdependence of activities and the sequence in which the Work is to be accomplished, incorporating the schedule summary activities and milestone dates as indicated herein, and as further planned by the Contractor.

- D. All activities must be closed loop; tied to other activities and shall not remain open ended. Lag factor use will be limited, and if used, identified as a functional activity. The use of imposed start dates will also be limited. The retained logic mode shall be used for calculations. All logical relationships shall be finish-to-start, with the following exceptions:
1. Activities at the start of the project may be start-to-start.
 2. At a milestone or project finish, activities may be finish-to-finish.
- E. Submission and Acceptance of Schedule:
1. A preliminary schedule defining the Contractor's planned operations shall be submitted within (10) calendar days after receiving the Executed Contract. Notwithstanding any other requirements, the first request for payment (progress payment) will not be accepted until the requirements of this paragraph are met.
 2. Unless otherwise directed by the University, the complete CPM schedule, including the time-scaled logic diagrams, narrative, summary schedule, manpower schedule, and activity reports shall be submitted within (30) calendar days after receipt of the Executed Contract.
 - a. Schedule of Record: The University's Representative will review the schedule to ascertain that it meets the overall project objectives and that it contains all necessary milestone dates or other required elements. At that time, the schedule will become the Schedule of Record (SOR) and the established "Base-Line" for project monitoring purposes. Notwithstanding any other requirements, the first request for payment (progress payment) will not be accepted until the requirements of this paragraph are met.
 - 1) Review of the Schedule of Record is for the sole purpose of determining whether it meets the overall project objectives and milestone dates and to whether all related phasing, restrictions, campus supplied fixturing/equipment, or any other potential impact(s), have been addressed. The University's agreement on the SOR does not constitute approval of the Contractor's means, methods, sequencing, or duration of activities. THIS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- F. Recovery Schedule: If the actual progress of work is behind the timeline of the Schedule Of Record (SOR) by more than (15) working days that are not attributable to delays that are of no fault of the Contractor or any of its subcontractors or suppliers, or caused by events or conditions that could not be reasonably anticipated, then the Contractor shall provide a new and completely revised schedule that shall be called the Recovery Schedule. The recovery schedule shall be provided within (15) calendar days after the University's request and its purpose is to change the sequencing of activities, duration of activities, and/or other factors as required to return the actual projected schedule completion date to that of the SOR. The recovery schedule is in addition to the regular updates and other information requested during the review process specified herein. If the actual progress of the work is behind the timeline of the approved recovery schedule by more than (15) working days, then the Contractor shall provide a new and completely revised recovery schedule.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. Temperature and general weather conditions, including presence of rain or snow.
 7. Accidents/Emergency procedures
 8. Meetings and significant decisions.
 9. Unusual events.
 10. Stoppages, delays, shortages, and losses.
 11. Orders and requests by authorities having jurisdiction.
 12. Change Directives received and implemented.
 13. Services connected and disconnected.
 14. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: The Schedule shall be updated monthly (30 calendar days) and shall be submitted along with the Contractor's application for payment. For the intervening bi-weekly periods, the Contractor may "mark for progress" the SOR and submit it at the periodic job meetings, where it will be reviewed in detail.
- B. Distribution: Initial submittal, complete revisions and updates shall be submitted in three (3) copies (minimum, 18"x24"). The University shall also be given schedules on electronic media, formatted for Microsoft Project software. Electronic copy of schedule shall be labeled as to type of schedule (initial or updated) and contain the date of which it was created/updated.
1. General Contractor shall distribute copies of the approved schedule to the University's representatives, other contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Concealed Work photographs.
 - 3. Periodic construction photographs.
 - 4. Final Completion construction photographs.
 - 5. Preconstruction video recordings.
 - 6. Start-up Demonstration and Training video recordings.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within five days of taking photographs.
 - 1. Submit photos by uploading to web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in web-based Project management software site:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect and Construction Manager.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.
- C. Video Recordings: Submit video recordings within seven days of recording.
 - 1. Submit video recordings by uploading to web-based Project management software site. Include copy of key plan indicating each video's location and direction.
 - 2. Identification: With each submittal, provide the following information on web-based Project management software site:

- a. Name of Project.
 - b. Name and address of photographer.
 - c. Name of Architect and Construction Manager.
 - d. Name of Contractor.
 - e. Date video recording was recorded.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
3. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in three-ring binders. Provide label on front and spine. Include a cover sheet with label information. Include name of Project and date of video recording on each page.

1.4 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode with vibration-reduction technology. Provide supplemental lighting in low light levels or backlit conditions.
- C. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- D. File Names: Name media files with date, Project area, and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a professional photographer to take construction photographs.
- B. General: Take photographs with maximum depth of field and in focus.
 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect or University Representative.
- D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 1. Underground utilities.
 2. Underslab services.
 3. Piping.
 4. Electrical conduit.

5. Waterproofing and weather-resistant barriers.
 6. Fire-stopping and infill of unused openings in fire rate assemblies.
- E. Periodic Construction Photographs: Take photographs, in sufficient number, weekly. Select similar vantage points to show status of construction and progress since last photographs were taken.
 - F. Final Completion Construction Photographs: Take photographs, in sufficient number, after date of Substantial Completion for submission as Project Record Documents. Select similar vantage points to those used during construction and any additional vantage points indicated by the Architect or University Representative.
 - G. Additional Photographs: Architect or University Representative may request photographs in addition to periodic photographs specified.
 - H. In emergency situations, take additional photographs within 24 hours of request.

1.6 CONSTRUCTION VIDEO RECORDINGS

- A. Video Recording Photographer: Engage a qualified professional videographer to record construction video recordings.
- B. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 1. Confirm date and time at beginning and end of recording.
 2. Begin each video recording with name of Project, Contractor's name, videographer's name, and Project location.
- C. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from video recording opposite the corresponding narration segment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013234 – Building Information Modeling (BIM) Protocol

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project:
- (1) The Contract Drawings
 - (2) The Specifications
 - (3) The General Conditions
 - (4) The Addendum
 - (5) The Contract

1.2 SUMMARY

- A. The Project shall utilize 3D Modeling for the coordination of all Structural Steel, Mechanical, Plumbing, Fire Protection, Electrical, Low Voltage Systems and Exterior Envelope. The 3D coordination shall be based on a coordinated design.
- B. This specification covers the intended scope for using BIM for construction purposes. The Contractor will develop a coordinated clash-free Model including Structure, Architecture and complete MEP services. The Construction Model will be used to generate all Shop Drawings that are directly referencing the Model. The coordinated Construction Model will be used to generate points for automated layout stations which ensure that the installation is accurate and verified. The scope also includes the production of a dimensionally accurate As-Built Model including embedded Facilities Management data.
- C. The Contractor agrees to participate in the use of digital/computer based three dimensional models and other related functionality, generally referred to as Building Information Modeling (such models and functionality are referred to herein as BIM) as Commissioner may determine to be beneficial for use in facilitating coordination, sequencing, scheduling and production of as- built depictions of the Project and performance of the Work and as hereafter provided.
- D. Contractor agrees that neither the BIM nor the use of the BIM is in lieu of nor intended to relieve the Contractor of its responsibilities under the contract. It is expressly understood and agreed that, notwithstanding the requirement for submittals in connection with the BIM, traditional shop drawings and other submissions shall be required of the Contractor as per the Contract Documents.

1.3 SUBMITTAL PROCEDURES

- A. Refer to DASNY General Conditions Section 013300 “Submittal Procedures”.

1.4 QUALITY ASSURANCE

- A. Refer to DASNY General Conditions Section 014000 “Quality Requirements”.

PART 2 - PRODUCTS

2.1 CONTRACTOR SCOPE OF WORK

- A. The Contractor will be provided a Design Intent Model consisting of Architecture, Structure and MEP trades in LOD 300.
- B. Each PRIME contractor shall be responsible for their Trade Model.
 - (1) **REVIT 360 shall be the Cloud Base Platform to be Utilized.**
 - (2) Each Prime Contractor to develop their trade model on the 'CLOUD' to allow coordination among the other Primes.
 - (3) The General Contractor Shall Host the REVIT 360 CLOUD
 - a. General Contractor shall develop the Structural Model and the Architectural Model.
 - b. Plumbing Contractor shall develop the Fire Protection Model and the Plumbing Model.
 - c. Mechanical Contractor shall develop the Mechanical HVAC Model.
 - d. Electrical Contractor shall develop the Fire Alarm Model, Security Model, and the Electrical Model.
 - (4) The General Contractor shall run CLASH reports on the Trade Models
 - (5) The General Contractor shall allow the following VIEW access to the cloud BIM model.
 - a. Architect/Engineer
 - b. Commissioning Authority
 - c. DASNY
 - d. Construction Manager
 - e. Owner
- C. The Contractor will detach and create their own Construction Model. The Contractor will work collaboratively with the Commissioner to ensure all field conditions are accurately documented in the Construction Model and ensure that they are using the most up to date documents for construction phase coordination.
- D. The Contractor may not rely on the accuracy of the Design Intent Model. The Design Intent Model can be used for reference only and all dimensions must be retrieved from the hard copy Drawings and verified by the Contractor.
- E. The Contractor's Construction Model shall be coordinated with the Design Intent Drawings. Any conflicts with the Models that need to be resolved prior to fabrication and construction shall be reported in the form of a Request for Information (RFI). Clash reports may also be issued by the Contractor as background information for RFI's and submittals.
- F. The Contractor shall include required clearances for maintenance and other access, code clearances and other required clearances. In addition, all modeling to include proposed underground / utilities associated with the project scope to the extent of the property line of the site, in all directions.
- G. Clash detection and analysis: Perform clash detection to identify and highlight spatial conflicts within and between the various trades and the building. This can be performed using Navisworks or equivalent application using subcontractor Construction Models, tracking file versions used in each clash analysis.
- H. Work collaboratively with subcontractors to recommend potential solutions to conflicts.

- I. Indicate where conflict resolution requires modification of design requirements by the Commissioner.
- J. Create an As-built Models in Revit that includes complete structure, architecture Models to LOD 400. MEP equipment and accessories that require FM attribute will be modeled to LOD 400. The Models will be populated with Facilities data using parameters provided by the Commissioner. Any ducts and pipes generated using CAD based authoring software will be linked in as reference to the Revit Model.
- K. The Contractor shall provide the Commissioner with all the necessary access to review the documents and interface with Contractor's team. Coordination meetings as per the coordination schedule shall occur between the Commissioner to ensure the correct development of the Construction Model.
- L. The Contractor will insert relevant building element data as listed below in the As-Built Model. It may also be provided to the Commissioner as a separate spreadsheet. The Building Element Data must contain the following attributes for all MEP assets:
 - 1) Asset name
 - 2) Room name
 - 3) Room number
 - 4) Manufacturer
 - 5) Model Number
 - 6) Serial Number
 - 7) Installation Date
 - 8) Bar Code (if any)
 - 9) Submittal Number
 - 10) Link to O&M
 - 11) System Served
- M. Utilize the Construction Model to generate layout points for automated layout stations so the installation can be laid out and verified to ensure proper positioning per the coordinated construction Model.
- N. Allow real time access to the Construction Model by the Commissioner.
 - 1) BIM applications will be provided by the Commissioner to the Contractor to be utilized for all BIM model submission and deliverables.
 - a. Autodesk Revit 360 – V.2023
 - 2) Construction Model files for Coordination.
 - 3) During the coordination phase weekly publish all clash reports and current versions of all Coordination Models, with clash views, in dwd and PDF format to the collaboration website.

2.2 CONSTRUCTION MODEL BIM COORDINATOR

- A. The Contractor shall identify an individual assigned to be the Construction Model BIM Coordinator. This individual shall have the appropriate level of relevant BIM experience required for the project complexity and acquisition delivery strategy. In general, responsibilities should include the following:
 - 1) Overall responsibility for the Construction Model creation and information developed during construction.

- 2) Coordinates software and establishes protocol software for Construction Team for efficient delivery of project.
- 3) Acts as the main point of contact for BIM and related issues between the Contractor's Team, subcontractors, the Commissioner, the City of New York, and others as required.
- 4) Ensures that all personnel have the necessary hardware and software installed and accessible for project use.
- 5) Coordinates construction sequencing and scheduling activities, and assures they are integrated with the Construction BIM.
- 6) Facilitates use of composite trade models, provided by subcontractors, in construction coordination/clash detection meetings and provides detection reports by the identification and resolution of all hard and soft collisions.
- 7) Communicates with the Commissioner, coordinates the data extraction sets required by the construction trades and ensures that these requests are met.
- 8) Coordinates with the Commissioner to facilitate that design changes in the field have been documented and are updated in the Construction Model in a timely manner. Provides design team with hard copies of changes made in the field for future reference in confirming the as-built model.
- 9) Prior to approval and installation, works with their lead Fabrication Modelers to integrate 3D fabrication models with the Construction Model to ensure compliance with design intent.

2.3 CONSTRUCTION PHASE BIM PLAN

- A. The Contractor shall develop a Construction Phase BIM Plan: Within 21 calendar days of Notice to Proceed, the Contractor shall submit, for Commissioner's Representatives review and approval, a Construction BIM Plan. The BIM Plan shall include at the minimum:
- 1) General Requirements of Subcontractors
 - 2) Model Partitioning
 - 3) Common Coordinate System and Units
 - 4) File Naming and Versioning
 - 5) List of Construction Models to be developed
 - 6) Plan for achieving an LOD-400 in the Construction Models
 - 7) Organization Responsible for Each Construction Model
 - 8) Software and Version to be Used to Develop Each Construction Model
 - 9) Any Required Object Enablers
 - 10) Name and Contact Information for Each Organization's BIM Coordinator
 - 11) Coordination /Clash Detection Process
 - 12) Coordination /Clash Detection Schedule
 - 13) Clashes to be Run (e.g.: HVAC vs. Structure)
 - 14) Any Other Applications of the Construction Models (e.g.: 4D)
 - 15) Plan for achieving an LOD-500 As-Built Models and asset data
 - 16) Methodology for preparing the As-Built BIM Deliverables to the City of New York

2.4 ACCEPTABLE CONSTRUCTION MODELING FORMATS

- A. All software proposed for model authoring and coordination shall be submitted for approval by the Commissioner.
- B. All Software used shall be Version 2019 or above unless otherwise approved by the Commissioner.

- C. The following software, or similar, is acceptable for authoring and coordination:
- 1) Authoring
 - a) Architecture:
 - I. Autodesk Revit 2023
 - b) Structure:
 - I. Autodesk Revit 2019
 - c) Fire Protection:
 - I. Autodesk Revit 2023
 - d) Plumbing:
 - I. Autodesk Revit 2019
 - e) Mechanical:
 - I. Autodesk Revit 2023
 - f) Electrical:
 - I. Autodesk Revit 2023
 - g) Coordination Model:
 - I. Autodesk Revit 2023
 - h) As-Built Model:
 - I. Autodesk Revit 2023

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

- A. Refer to DASNY General Conditions for execution requirements.

3.2 BIM KICKOFF MEETING

- A. The Commissioner shall schedule and conduct a BIM Kickoff Meeting. BIM Modeling work by the Contractor and its subcontractors shall not commence prior to the BIM Kickoff Meeting. The Meeting shall review BIM requirements, standards and responsibilities.
- B. Attendees: Participants in the BIM Kickoff Meeting shall be familiar with the project and shall be authorized to conclude matters relating to the BIM work. At a minimum include representatives of the following parties or their designated representatives:
- 1) Commissioner Project Manager
 - 2) Construction Manager
 - 3) Construction Manager's BIM Coordinator
 - 4) Designers
 - 5) Contractor's Project Manager
 - 6) Contractor's BIM Coordinator
 - 7) BIM Coordinators of all subcontractors producing Construction BIMs
 - 8) Project Coordinators of all subcontractors producing Construction BIMs
- C. Agenda: Subjects for discussion shall include items significant to the effective use of BIM coordination techniques and correct production of Construction BIM, including but not limited to the following:
- 1) BIM expectations and project goals
 - 2) Coordination process
 - 3) Review of BIM Plan, including Model contents and standards
 - 4) Requirement to deliver equipment data in electronic format.

5) Final BIM deliverables by the Contractor.

- D. Reporting: The Commissioner shall distribute minutes of the meeting to each party present and to other concerned parties.

3.3 TRADE COORDINATION

- A. The Contractor is required to utilize 3D Fabrication Modeling Software for all shop drawings and submittals (only submittals that will develop shop drawings are required to utilize 3D modeling). The Contractor is required to fully integrate the various BIM/3D shop drawings and submittals into Construction Model; perform full clash detection on the results of the integration. The Commissioner will not be responsible for integrating shop drawings or submittals into Design Intent Model nor the Construction Model.
- B. Each Subcontractor is required to have access to the BIM software. The software is required to compile the multiple model drawings, and for the subcontractor to run their own clash detection analysis. It is also required that the coordination representative for each trade shall be equipped with a laptop and a associated license with which to attend coordination meetings. This subcontractor coordination representative shall be authorized and prepared to make live, real-time changes to the "Shop Model" in these coordination meetings, in order to review the finalized, signed off coordinated models prior to and during the fabrication/installation process.
- C. Each Trade is required to review the clash detection report generated by the BIM Coordinator prior to each coordination meeting and attend each meeting prepared to address the unresolved clashes in a constructive manner.
- D. Each Trade is required to collaborate with each other trades through e-mail, telephone, and in person, to resolve basic clashes outside of the Coordination meetings. It is expected that the daily/weekly Coordination meetings are held to address difficult work in areas that are not easily coordinated between the multiple trades themselves. At these meetings the resolution will be collectively agreed upon. This trade will adjust its respective model, and repost it with enough time for other subcontractors to review prior to the upcoming meeting. All the remaining trades are responsible to update and post the changes agreed upon at the coordination meeting within 1 week or as directed by Commissioner.
- E. The Commissioner shall review the progress of the Construction Model by the Contractor on a weekly basis to help assure that the Construction Model is maintained current throughout construction. Updates to the construction model shall include all RFI's, Change Orders, Bulletins, Commissioner's field staff reports, approved submittals, and other field reports. The Contractor shall retain responsibility for inspection and measurement.
- F. The Commissioner will participate in 3D-based submittal reviews and coordination work sessions. The Commissioner's Representatives will work collaboratively with the Contractor who will turn over an As-Built Model for all building systems at construction completion which incorporates any contract design changes that impact the original design intent model and field conditions.
- G. Approved programs will be used for model management. All clash reports and Coordination Models will be uploaded to the collaboration website.

3.4 CONTRACTOR SUBMISSION AND DELIVERABLES

- A. It is the Contractor's responsibility to provide real time access to the Construction Model to Commissioner.
- B. At the end of construction, the following deliverables shall be provided to the City
 1. All Discipline/Trade As-built models in editable format.
 2. Composite summary format.
 3. Facility asset data provided either in the model as element parameters or provided as a separate spreadsheet
 4. Final As-Built PDF for each floor and each trade with proper annotations
 5. Final As-Built DWG for each floor and each trade with proper annotations
 6. Final Civil 3D Model and PDF depicting all Utilities
- C. The Contractor is required to submit 3 copies of a USB containing all the above deliverables.

END OF SECTION 013234

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 3. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
 - 4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
 - 5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 8. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of University's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Upon request electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 - 1. Upon request Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in Revit 2021.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. University reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, University, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

1.6 SUBMITTAL FORMATS

- A. Indicate name of firm or entity that prepared each submittal on label or title block.
- B. Provide a space on coversheet or elsewhere beside title block to record Contractor's review and approval markings and action taken by Architect.
- C. Include the following information for processing and recording action taken:
 1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Construction Manager.
 5. Name of Contractor.
 6. Names of subcontractor.
 7. Name of manufacturer and/or supplier.
 8. Unique submittal number, including revision identifier.

- a. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - b. Number and title of appropriate Specification Section.
 - c. Drawing number and detail references, as appropriate.
 - d. Location(s) where product is to be installed, as appropriate.
 - e. Signature of reviewer
 - f. Other necessary identification.
- D. Place a permanent label or title block on each submittal item for identification.
- E. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- G. Paper Submittals: Unless indicated otherwise, all submittals shall be submitted via electronic submittals utilizing web-based project software management system to be chosen and procured by the University. Where paper copies are required by Architect, the initial submittal may serve as final submittal.
- H. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- I. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

- a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Paper: Prepare submittals in paper form and deliver to Architect only where requested by the Architect. Provide PDF form of submittal transmittal onto web-based project management software for tracking purposes.
 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. Three paper copies of Product Data unless otherwise indicated. Architect will return two copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.

- f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: as applicable to both paper and digital submittals - 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 30 by 42 inches.
 3. Submit Shop Drawings in the following format (if not submitted digitally):
 - a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
 - b. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.
 4. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
 - a.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as University's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit two sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- F. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, University, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.
- J. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- K. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and University, and other information specified.
- M. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- N. Certificates:
 - 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 - 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 - 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 - 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 - 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- O. Test and Research

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.
 - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required.
 - 1. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

2. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
 3. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- B. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- D. Architect will return without review submittals received from sources other than Contractor.
- E. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, University Representative, Commissioning Agent, Consultants, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed onsite to establish the standard by which the Work will be judged. **Mockups are not Samples.**
 - 1. Mockups are used for one or more of the following:

- a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems. Show interface between dissimilar materials.
 - e. Perform preconstruction testing to determine system performance.
 - f. Review coordination, testing and operation.
 - g. Demonstrate compliance with specified installation tolerances
2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- J. Installer/Applicator/Erector: Contractor or another entity engages by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations
1. Use of trade specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirement specified apply exclusively to specific trade(s).
- K. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- L. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.4 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. Mockup Shop Drawings:
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.7 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Entity responsible for performing tests and inspections.
 3. Description of test and inspection.
 4. Identification of applicable standards.
 5. Identification of test and inspection methods.
 6. Number of tests and inspections required.
 7. Time schedule or time span for tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement of whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in 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 the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in

individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
 - 1. Provide test specimens representative of proposed products and construction.
 - 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - 4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
 - 5. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 6. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, through Construction Manager, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
 - 3. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 - 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Payment for these services will be made from testing and inspection allowances specified in Section 012100 "Allowances," as authorized by Change Orders.
 3. Costs for retesting and re-inspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Commissioning Authority, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 2. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, and Construction Manager's and authorities' having jurisdiction reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014533 - SPECIAL INSPECTIONS AND STRUCTURAL TESTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the *Building Code of New York State* (BCNYS).

1.2 DEFINITIONS

- A. **Approved Agency:** An established and recognized agency engaged by the Owner or the Owner's authorized agent to perform testing and inspections. The Approved Agency shall be regularly engaged in conducting tests, providing inspection services, and providing product certifications. The Approved Agency shall have equipment and personnel to conduct and evaluate tests and conduct Special Inspections on behalf of the Owner.
- B. **Registered Design Professional in Responsible Charge (RDPRC):** Professional Engineer or Registered Architect licensed in New York State, engaged by the Owner or the Owner's authorized agent to review, coordinate, and implement the Special Inspection program. The RDPRC may or may not be employed by the Approved Agency and need not be the Project SEOR.
- C. **Special Inspector:** A qualified person employed or retained by the Approved Agency, approved by the Code Enforcement Official as having the qualifications required to perform inspections.
- D. **Structural Engineer of Record (SEOR):** Registered Design Professional Engineer whose seal appears on the Contract Documents and is responsible for the preparation of the Schedule of Special Inspections.
- E. **Geotechnical Engineer of Record (GEOR):** Registered Design Professional Engineer whose seal appears on the Geotechnical Investigation. The GEOR shall perform or oversee Special Inspection services for earthwork as indicated in the Schedule of Special Inspections. If a Geotechnical Investigation was not performed or if the GEOR is not retained to perform Special Inspection services, a licensed Geotechnical Engineer shall be retained by the Approved Agency to perform these duties.
- F. **Code Enforcement Official:** Officer or other designated authority charged with administration and enforcement of the BCNYS. For projects under jurisdiction of New York State agencies such as the Department of Education (SED), State University Construction Fund (SUCF), Office of General Services (OGS), and Dormitory Authority (DASNY), the Code Enforcement Official is an official from agency having jurisdiction.

- G. Statement of Special Inspections: Documents prepared by the SEOR and filed with and approved by the Code Enforcement Official, listing materials and work requiring Special Inspections. The Statement of Special Inspections is represented by this specification and includes the Schedule of Special Inspections.
- H. Schedule of Special Inspections: An itemized list of inspections, verifications, and tests (including frequency) required for the project, and the minimum qualifications of the Special Inspectors who will perform these services. The Schedule of Special Inspections is located at the end of this specification.
- I. Inspect and Inspection: Visual observation of materials, equipment, or construction work as defined in the Statement of Special Inspections, to determine that the work is in substantial conformance with the requirements of the Contract Documents.
- J. Continuous Special Inspection: Full-time observation of work by the Special Inspector while the work is being performed.
- K. Periodic Special Inspections: Part-time or intermittent observation of work by the Special Inspector for work that has been or is being performed and at completion of work.

1.3 QUALIFICATIONS

- A. The Approved Agency and Special Inspectors shall be accepted by the RDPRC and the Code Enforcement Official.
- B. Special Inspections shall be performed by personnel who have relevant experience for each category of inspections indicated herein.
- C. Required minimum qualifications of Special Inspectors are indicated in the SUCF Statement of Special Inspection.

1.4 SUBMITTALS

- A. The Approved Agency shall submit to the RDPRC and Code Enforcement Official for review, a copy of their qualifications including names and qualifications of each Special Inspector who will be performing inspections or tests.
- B. The Approved Agency shall disclose past or current business relationships or potential conflicts of interest with Contractor or Subcontractors whose work will be inspected or tested.

1.5 PAYMENT

- A. Owner will engage and pay for services of RDPRC, Approved Agency, and the Special Inspectors.

- B. If materials requiring Special Inspections are fabricated in a plant not within 200 miles of project site, Contractor shall be responsible for travel expenses of Special Inspectors.
- C. Contractor shall be responsible for cost of retesting or reinspection of work failing to comply with requirements of Contract Documents.

1.6 OWNER RESPONSIBILITIES

- A. Owner will provide the RDPRC and Approved Agency with complete set of Contract Documents sealed by the SEOR and approved by the Code Enforcement Official.

1.7 CONTRACTOR RESPONSIBILITIES

- A. Each Contractor responsible for construction of a seismic/wind-force-resisting system listed in the Schedule of Special Inspections and indicated in drawings shall submit SUCF Contractor's Statement of Responsibility Form to the Code Enforcement Official, to the RDPRC and SEOR prior to commencement of work on system or component.
- B. Contractor shall cooperate with the RDPRC, Approved Agency, and the Special Inspectors, so Special Inspections and testing may be performed without hindrance.
- C. As indicated in the Schedule of Special Inspections, Contractor shall notify the RDPRC and Approved Agency at least 48 hours in advance of a required inspection or test.
- D. Contractor shall provide incidental labor and facilities to provide access to work to be inspected or tested, to obtain and handle samples at site or at source of products to be tested, to facilitate tests and inspections, and for storing and curing of test samples.
- E. If Special Inspections or testing require the use of Contractor's scaffolding to access work areas, Contractor shall provide competent person to perform daily evaluation of scaffolding to verify it is safe to use. Contractor shall notify Special Inspectors of this review before each use. Contractor is responsible for safe assembly and stability of scaffolding.
- F. Contractor shall keep latest set of Construction Drawings, field sketches, accepted shop drawings, and specifications at project site for field use by Special Inspectors.
- G. Contractor shall perform remedial work if required and sign nonconformance reports stating remedial work has been completed. Contractor shall submit signed reports to the Approved Agency and RDPRC as work proceeds.
- H. The Special Inspection program shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents or from implementing an effective Quality Control program.
- I. Contractor shall be solely responsible for construction site safety.

1.8 SPECIAL INSPECTOR RESPONSIBILITIES

- A. The RDPRC shall hold a Special Inspections preconstruction meeting at least 7 days prior to initial planned date for start of construction. Attendees shall include Contractors, Approved Agency, SEOR, and Project Architect. Discussions shall include the following:
 - 1. Review of specifications and Schedule of Special Inspections for work requiring Special Inspections.
 - 2. Responsibilities of Contractors, Owner, Approved Agency, Special Inspectors, and SEOR.
 - 3. Notification and reporting procedures.
- B. RDPRC shall record and distribute minutes from the Special Inspection Preconstruction meeting.
- C. RDPRC shall review inspection and material testing reports and coordinate the services of the Approved Agency as follows:
 - 1. Verify inspections have been performed in accordance with the Schedule of Special Inspections.
 - 2. Verify reports are being distributed to the Contractor, Owner, Architect, Code Enforcement Official, and SEOR.
 - 3. Verify discrepancies have been recorded and are being tracked.
- D. Special Inspectors shall make site visits to inspect work as designated in the Statement of Special Inspections. Discrepancies will be brought to the attention of the Contractor, RDPRC and SEOR.
- E. RDPRC shall keep records of inspections and tests.
- F. RDPRC shall review Certificates of Compliance for conformance with the standards specified in the Contract Documents. Discrepancies will be brought to the attention of the Contractor and SEOR.
- G. Special Inspector shall submit the SUCF Special Inspector's Final Report Form.

1.9 LIMITS ON AUTHORITY

- A. RDPRC and Approved Agency shall not:
 - 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Have control over Contractor's means and methods of construction.
 - 3. Be responsible for construction site safety.
 - 4. Have authority to stop work.

1.10 RECORDS AND REPORTS

- A. Prepare detailed reports of each test or inspection. Include the following general information:
 - 1. Project name and number.
 - 2. Date of test or inspection.
 - 3. Name of RDPRC and Approved Agency.
 - 4. Name of Special Inspector.

5. Weather conditions.
6. Locations and elevations of specific areas tested or inspected referenced to grid lines.
7. Description of test or inspection.
8. Reference to applicable ASTM standard.
9. Summary of observations, results, and recommendations.
10. Description of areas or materials requiring retesting or reinspection.

B. Concrete compressive strength test reports shall contain the following information:

1. Name of Contractor and concrete supplier.
2. Name of concrete testing service.
3. Name of Special Inspector making and testing specimens.
4. Truck number and delivery ticket number.
5. Date and location within structure of concrete placement.
6. Concrete type, class, mix proportions of materials, and design compressive strength at 28 days.
7. Slump, air content, unit weight, and concrete temperature.
8. Total time period between batching and completing placement for each truck.
9. Compressive strength and type of break for tests.

C. Field reports for concrete inspection shall contain general information noted above plus ambient temperature and cylinder numbers.

D. Test reports for masonry materials shall include proportions, composition, and compressive strength.

1.11 COMMUNICATION

A. Special Inspector shall immediately notify Contractor, RDPRC, Approved Agency, and SEOR by telephone, fax, or e-mail of test results failing to comply with requirements of Contract Documents.

B. Special Inspector shall immediately notify Contractor of work found to be in nonconformance with Contract Documents during inspections. If nonconforming work is not corrected while Special Inspector is on-site, Special Inspector shall notify RDPRC, Approved Agency, and SEOR within 24 hours (one business day) and issue an inspection report noting the non-conformance.

C. Approved Agency shall use a log to record and track non-conforming work during construction. Non-Conformance log shall include the following information:

1. Description of non-conformance.
2. Date of non-conformance.
3. Description of SEOR response if received.
4. Status of nonconformance: 'Open' or 'Closed.'

Updated log shall be submitted to the RDPRC, SEOR, and Architect on a weekly basis. Approved Agency may use Non-Conformance Log form provided at end of this section or other similar form.

- D. If non-conforming work is not corrected at time of substantial completion of structure or other appropriate time, RDPRC shall notify Code Enforcement Official.

1.12 DISTRIBUTION OF REPORTS

- A. Approved Agency shall submit reports to RDPRC and SEOR within 7 days of inspection or test. Legible handwritten reports may be submitted if final typed copies are not available.
- B. RDPRC shall distribute reports to the Contractor, Owner, Architect, Code Enforcement Official, and SEOR within 7 days of inspections. Legible handwritten reports may be submitted if final typed copies are not available.
- C. If requested by the Code Enforcement Official, Approved Agency and RDPRC shall submit interim reports that include inspections and tests performed since beginning of construction or since previous interim report. Interim reports shall be addressed to the Code Enforcement Official with copies sent to the SEOR, Architect, and Contractor. Interim reports shall be signed by Special Inspector performing inspections.

1.13 FINAL REPORT OF SPECIAL INSPECTIONS

- A. At completion of work, each Approved Agency shall submit Agent's Final Report of Special Inspections to RDPRC stating work was completed in substantial conformance with Contract Documents and appropriate inspections and tests were performed. Approved Agency shall use Final Report of Special Inspections form at the end of this section or other similar form.
- B. At completion of work, RDPRC shall compile a Final Report of Special Inspections including each Agent's Final Report of Special Inspections. The Final Report of Special Inspections shall state required inspections have been performed and itemize nonconforming work not corrected or resolved as required by the BCNYS. Interim reports from all Special Inspectors will not be included unless specifically requested by the Owner or Code Enforcement Official. The Final Report shall be stamped by the RDPRC.
- C. RDPRC shall submit Final Report of Special Inspections to SEOR and Code Enforcement Official prior to issuance of a Certificate of Use and Occupancy. Use the form at the end of this section or other similar form.

PROJECT: Binghamton University East Gym Addition.

PROJECT NUMBER:

APPROVED AGENCY NON-CONFORMANCE LOG

Special Inspection Report No. Reference/Date	Summary of Non-Conformance	Date SEOR Response Received	Reinspection Required	Date Contractor Verification Received (See Note 1)	Status (See Note 2)

1. New items are in **bold**. For each non-conformance item above, the General Contractor or Subcontractor must sign and submit the Contractor Verification statement located in the RDP Response Report.
2. Non-conformance items remain “ OPEN” until the Contractor Verification have been received. When the signed verifications have been received by the RDP, the item will be “ CLOSED” .

Non-Conformance Item No. (See Note 1)						
	NC 1					
	NC 2					
	NC 3					
	NC 4					
	NC 5					
	NC 6					

Approved Agency’s Final Report of Special Inspections

Project Name: East Gym Addition Approved Agency: _____
 Location: Binghamton University Approved Agency Project No.: _____
 Owner: Binghamton University Special Inspector: _____
 Owner Address: 4400 Vestal Parkway East SEOR: Ryan Biggs | Clark Davis
Ryan Biggs | Clark Davis Project No.: 14423

To the best of my information, knowledge, and belief, the Special Inspections and testing required for this project and designated in the Statement of Special Inspections (which includes Specification Section 014533 and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

[Attach continuation sheets if required to complete description of uncorrected discrepancies.]

Respectfully submitted,
 Agent of the Approved Agency

 (Type or print name)

 Signature Date

 Address

City, State, Zip

Final Report of Special Inspections

Project Name: East Gym Addition Approved Agency: _____
 Location: Binghamton University Approved Agency Project No.: _____
 Owner: Binghamton University Special Inspector: _____
 Owner Address: 4400 Vestal Parkway East SEOR: Ryan Biggs | Clark Davis
Ryan Biggs | Clark Davis Project No.: 14423

To the best of my information, knowledge, and belief, Special Inspections required for this project, as indicated in the Statement of Special Inspections, (which includes Specification Section 014533 and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

[Attach continuation sheets if required to complete description of uncorrected discrepancies.]

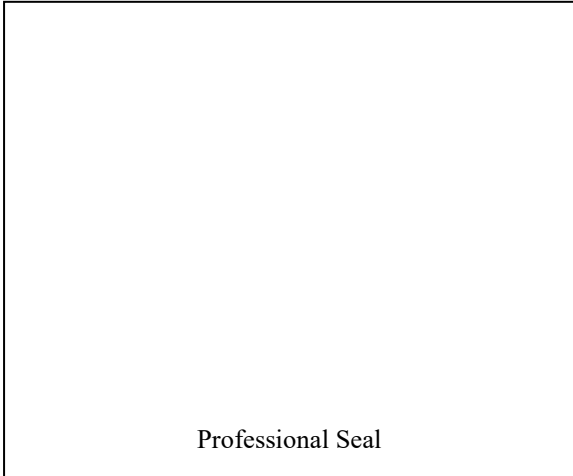
Interim reports submitted prior to this Final Report form a basis for and are to be considered an integral part of this Final Report. Upon request, the interim Testing and Special Inspection reports can be provided. Agent’s Final Reports of Special Inspections are attached and are also a part of this Final Report.

Respectfully submitted,
 Registered Design Professional in Responsible Charge

 (Type or print name)

SPECIAL INSPECTIONS AND
 STRUCTURAL TESTING

C071086



Professional Seal

Signature

Date

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 011200 "Multiple Contract Summary" for responsibilities for temporary facilities and controls for projects utilizing multiple contracts.
 - 3. Section 012100 "Allowances" for allowance for metered use of temporary utilities.

1.3 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, University's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: University will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: University will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: University will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from University's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from University's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before University's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: In accordance with Section D – Special Conditions ID-34 Temporary Fence, Cordoning-off, and Warning Signs, of the Agreement.
- B. Portable Chain-Link Fencing: In accordance with Section D – Special Conditions ID-34 Temporary Fence, Cordoning-off, and Warning Signs, of the Agreement.

2.2 TEMPORARY FACILITIES

- A. Field Offices: Building interior space can be used for field offices for duration of Project if it does not interfere with construction activities and meets the needs of B. Common-Use Field Office requirements below.
- A. Common-Use Field Office: General Contractor shall provide, of sufficient size to accommodate needs of University, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents, including file cabinets, plan tables, meeting table, chairs, etc.
 - 2. Conference room of sufficient size to accommodate meetings of (15) individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall.
 - 3. Temperature controlled. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 4. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations, as site size permits. Off-site or remote storage may be necessary. Each contractor shall provide for its own work.
 - 1. Store combustible materials apart from building in accordance to local laws, regulations, and/or codes.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Permanent HVAC System: The University will not allow the use of permanent HVAC Systems for temporary heating.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as University's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

1. Arrange with Designated University Representative for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to campus system as directed by authorities having jurisdiction.
- C. Water Service: Connect to University's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to University. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 1. Use of Permanent Toilets: Use of University's existing or new toilet facilities is not permitted.
- A. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- B. Electric Power Service: Connect to University's existing electric power service. Maintain equipment in a condition acceptable to University.
- C. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 1. Install electric power service overhead unless otherwise indicated.
 2. Connect temporary service to University's existing power source, as directed by University.
- D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- E. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment for Contractor use.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:

1. Review first subparagraph below with University's insurance carrier. Revise to suit Project.
 2. Utilize designated area within existing building for temporary field offices, as able.
 3. Maintain support facilities until Architect schedules Substantial Completion inspection.
- A. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
- B. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas, where possible. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Section 312000 "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, re-grading, proof-rolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course in accordance with Section 321216 "Asphalt Paving."
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants. These shall remain outside of the contractors staging fence, or impairment permit/bagging of hydrant as approved by the Designated University Representative shall be required.
 3. GC to provide flag person at construction entrance at Center Drive.
- A. Parking: ALL construction workers will be subject to all the rules and regulations of the University in terms of parking.
1. Refer to Special Conditions 1D-10.
- B. Storage and Staging: Use designated areas of Project site for storage and staging needs. Remote or off-site storage may be required at specific times of the project depending on site conditions/space.
- C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.

- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 2. Maintain and touch up signs, so they are legible at all times.
- E. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- H. Existing Elevator Use: Use of University's existing elevators will not be permitted.
- I. Existing Stair Usage: Use of University's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to University. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.
- J. Use of stairs for construction traffic will be permitted, provided stairs are protected and new finishes are not damaged. Should damage occur before Substantial Completion it will be the responsibility of the contractor to replace any damaged flooring.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property University to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 011000 "Summary."

- A. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.
- A. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- B. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- A. Site Enclosure Fence: Before construction operations begin and or prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As indicated on Drawings.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday. Staging fence shall be secured by University provided padlock.
- B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- A. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program. When protection cannot be maintained, fire impairment permits shall be given by the University and contractor shall see to the required extra precautions/responsibilities of the said permit.
 1. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 2. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work against moisture and mold.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

- a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
- c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. University reserves right to take possession of Project identification signs.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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 Requirements:
 - 1. Section 011000 "Summary" for Contractor requirements related to University-furnished products.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 5. Section 01770 "Closeout Procedures" for submitting warranties.
 - 6. Division 2-33 for specific requirement for warranties on products and installation specified to be warranted.

1.3 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," "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. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, 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.
- 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirement for purposes of evaluating comparable products of additional manufacturers named in the specification.
- D. **Subject to Compliance with Requirements:** Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- E. **Comparable Product Request Submittal:** An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- F. **Basis-of-Design Product Specification Submittal:** An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- G. **Substitution:** Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.4 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. **Resolution of Compatibility Disputes between Multiple Contractors:**
 - a. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- B. **Identification of Products:** Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. **Labels:** Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.5 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.6 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 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 and with adequate protection from wind.
 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 University's construction forces. Coordinate location with University.

1.7 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 standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the University or endorsed by manufacturer to University.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for University and issued in the name of the University or endorsed by manufacturer to University.
- 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 in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 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. University reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole 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 will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
2. Sole 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 will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: 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 not be considered.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: 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.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: 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 not be considered.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: 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.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. 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 may additionally indicate sizes, profiles, dimensions, and

other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "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 Section 012500 "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 a 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.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: 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 the following requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 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 Universities, if requested.
 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 – EXECUTION – REMOVALS, CUTTING, AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 2. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.
 - 3. Section D – Special Conditions

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform University Representative of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and plumbing subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
 - 2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect and the University's Representative of locations and details of cutting. Await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. 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. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Fire-suppression systems.
 - d. Plumbing piping systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Electrical wiring systems.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction 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 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 - 2. Refer to Section D – Special Conditions 1D-4 for contractor responsibilities relating to Site Utility Survey Requirements.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for manufacturer's installation tolerances and other conditions affecting performance.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the material and methods to be employed shall be subject to approval by the Architect.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to University that is necessary to adjust, move, or relocate existing utility structures, services, or other utility appurtenances located in or affected by construction that is not otherwise identified in the Contract Documents.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before

fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents, submit a request for information to Architect through the University's Representative in accordance with requirements in Section 013100 "Project Management and Coordination."
- D. Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by conditions, and in each case shall be subject to approval of the Architect.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- B. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- C. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor without the consent of the University's Representative.
 - 2. Existing construction, finishes, equipment, wiring, etc. that are to remain and which are damaged or defaced by reason of work done under this contract shall be restored by the Contractor who damaged it, to a condition satisfactory to the University, or replaced with new, at no additional cost to the University.
 - 3. All new, altered, or restored work in the buildings shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required to the Contract Documents.
 - 4. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.4 CUTTING AND PATCHING

- A. Removing, Cutting and Patching General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

2. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
3. Do not disturb any existing structure, piping, apparatus, or other construction unless required by the Contract.
4. Existing Paint: Assume existing painted surfaces to contain lead based paints. Take precautions as required to prevent spread of lead containing particles and dust.
5. Remove existing construction where indicated on the Drawings and also as required to install and connect the Work to adjacent construction in an approved manner. Remove materials and equipment superseded by the Work unless specifically indicated otherwise.
6. Cut and alter existing materials as required to perform the Work. Limit cutting to the smallest amount necessary. Core drill round holes and saw-cut other openings where possible.
7. Provide temporary shoring necessary to prevent settlement or other damage to existing construction which is to remain.
8. Perform the cutting, drilling, and removals in a manner which will prevent damage to adjoining construction which is to remain.
9. Prior to any cutting, drilling, or removals, investigate both sides of the surface involved.
10. Determine the exact location of all structural members. Do not cut, drill, or remove structural members such as joists, beams, or columns supporting construction that is to remain unless expressly required by the Work. If unforeseen obstructions are encountered, take all precautions necessary to prevent damage and obtain instructions from the Director's Representative before proceeding with the Work.

B. Patching

1. Proceed with patching after construction operations requiring cutting are complete.
2. Unless otherwise indicated, provide new materials to match the appearance and performance of existing corresponding materials as closely as practicable.
3. 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 practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
4. Patch existing construction and finishes defaced, damaged, or left incomplete due to alterations and removals. Patching, except as otherwise indicated, shall be limited to the areas which have been cut or altered.
5. Prepare existing surfaces properly to receive and, where required, bond with the Work.
6. Floors and Walls: Where walls or partitions that are removed extend one 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 in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
7. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
8. Paint patched areas and surfaces which will remain exposed by removals to match existing adjacent surfaces as closely as practicable using same type of paint. Painting, except as otherwise indicated, shall be limited to the areas which have been patched.
9. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

10. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
11. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 COORDINATION OF UNIVERSITY'S PORTION OF THE WORK

- A. Coordination: Coordinate construction and operations of the Work with work performed by University's construction personnel and University's separate contractors.
 1. Construction Schedule: Adjust construction schedule based on a mutually agreeable timetable. Notify University if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include University's construction personnel and University's separate contractors at preinstallation conferences covering portions of the Work that are to receive University's work. Attend preinstallation conferences conducted by University's construction personnel if portions of the Work depend on University's construction.

3.6 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
- C. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging non-hazardous demolition and construction waste.
 - 2. Recycling non-hazardous demolition and construction waste.
 - 3. Disposing of non-hazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction, and location of waste containers at Project site.
 - 2. Division 02 Section "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
 - 3. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.
- B. Salvage/Recycle Requirements: University's goal is to salvage and recycle as much non-

hazardous demolition and construction waste as possible. University has established minimum goals for the following materials:

1. Demolition Waste:
 - a. Asphaltic concrete paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Piping.
 - e. Supports and hangers.
 - f. Valves.
 - g. Sprinklers.
 - h. Electrical conduit.
 - i. Copper wiring.
 - j. Lighting fixtures.
 - k. Lamps.
 - l. Electrical devices.
2. Construction Waste:
 - a. Site-clearing waste.
 - b. Masonry and CMU.
 - c. Lumber.
 - d. Wood sheet materials.
 - e. Wood trim.
 - f. Metals.
 - g. Roofing.
 - h. Insulation.
 - i. Carpet and pad.
 - j. Gypsum board
 - k. Piping.
 - l. Electrical conduit.

1.5 SUBMITTALS

- A. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 1. Paper.
 2. Cardboard.
 3. Boxes.
 4. Plastic sheet and film.
 5. Polystyrene packaging.
 6. Wood crates.
 7. Plastic pails.
- B. Waste Management Plan: Submit 3 (three) copies of plan within 30 (thirty) days of date established for the Notice to Proceed.
- C. Waste Reduction Progress Reports: Provide annual reports at the end of each calendar year (12/31). Include separate reports for demolition and construction waste. Include the following information:
 1. Material category.
 2. Generation point of waste.
 3. Total quantity of waste in tons.

4. Quantity of waste salvaged, both estimated and actual in tons.
 5. Quantity of waste recycled, both estimated and actual in tons.
 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- D. Waste Reduction Calculations: Before request for Substantial Completion, submit 3 (three) copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- E. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- F. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- G. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- H. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged,

recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in hauling and tipping fees by donating materials.
 7. Savings in hauling and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.
- E. Forms: Prepare waste management plan on forms included at end of Part 3.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 1. Distribute waste management plan to everyone concerned within 3 (three) days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for University's Use:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to University.
 4. Transport items to University's storage area designated by University.
 5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated

- materials if found.
- 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
- 4. Store components off the ground and protect from the weather.
- 5. Remove recyclable waste off University's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- E. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- H. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.
 - 1. Comply with requirements in Division 32 Section "Plants" for use of chipped organic waste as organic mulch.
- C. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- D. Gypsum Board
1. Proper recycling of gypsum board is the responsibility of the contractor.
- 3.6 DISPOSAL OF WASTE
- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off University's property and legally dispose of them.

END OF SECTION 017419

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Sections:
 - 1. Division 01 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 5. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks other than what is installed by University Lockshop and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions. Return all owner provided keys to University Lockshop.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
- B. Organize list of spaces in sequential order, starting with exterior areas first] [and proceeding from lowest floor to highest floor.
- C. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
- D. Include the following information at the top of each page:
1. Project name.
 2. Date.
 3. Name of Architect and Construction Manager.
 4. Name of Contractor.
 5. Page number.
- E. Submit list of incomplete items in PDF electronic file format

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults,

- manholes, attics, and similar spaces.
- h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.
 - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - r. Leave Project clean and ready for occupancy.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 01 Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 3. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions. Format: Submit operations and maintenance manuals in the following format:
 - 2. PDF electronic file. Assemble each manual into a composite electronically-indexed file and submit three copies in electronic format for

turnover. All electronically submitted manuals shall also be posted to the Submittal Exchange project website.

- a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 3. One paper copy. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.
- B. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Agent will comment on whether general scope and content of manual are acceptable.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Agent will return copy with comments.
1. Correct or modify each manual to comply with Architect's and Commissioning Agent's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Agent's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists,

assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Agent.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.

9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and

source information, maintenance service contracts, and warranty and bond information, as described below.

- B. **Source Information:** List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. **Manufacturers' Maintenance Documentation:** Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. **Scheduled Maintenance and Service:** Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. **Maintenance and Service Record:** Include manufacturers' forms for recording maintenance.
- F. **Spare Parts List and Source Information:** Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. **Maintenance Service Contracts:** Include copies of maintenance agreements with name and telephone number of service agent.

- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - 2. Complete attached forms for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.
- H. Complete Owner provided spreadsheet attached to this Specification. For equipment - location, all indicated equipment information, type of routine maintenance and frequency of maintenance are required. Complete sheets/tabs for building materials and finishes. Provide all warranty information including length of warranty and all contact information for filing a warranty claim. All warranties begin on the date of Substantial completion.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Product Data.
 - 3. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints.
 - 2. Number of Copies: Submit three copies of record Drawings as follows:
 - a. Initial Submittal: Submit PDF electronic files of marked-up record prints and one set of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal: Submit three CD's of PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded. Three sets of drawings are required.
- B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal in triplicate.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- C. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- D. Reports: Submit written report indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings,

as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Format: Revit 2021 operating in Microsoft Windows operating system.
 3. Format: Annotated PDF electronic file with comment function enabled.
 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 5. Refer instances of uncertainty to Architect for resolution.
 6. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - a. Refer to Division 01 Section "Submittal Procedures" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into one manageable set. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file.
1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Sections:
 - 1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit three copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date of video recording.
 - 2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, three-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
 - 3. At completion of training, submit complete training manual(s) for Owner's use.

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.

- e. Equipment function.
- f. Operating characteristics.
- g. Limiting conditions.
- h. Performance curves.
2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
 - c. Maintenance: Include the following:
 - d. Inspection procedures.
 - e. Types of cleaning agents to be used and methods of cleaning.
 - f. List of cleaning agents and methods of cleaning detrimental to product.
 - g. Procedures for routine cleaning
 - h. Procedures for preventive maintenance.
 - i. Procedures for routine maintenance.
 - j. Instruction on use of special tools.
7. Repairs: Include the following:

- a. Diagnosis instructions.
- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner with at least seven days' advance notice.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

- D. Narration: Describe scenes on video recording by audio narration by microphone while dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- F. Pre-Produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. OPR and BOD documentation are included by reference for information only.

1.2 SUMMARY

- A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.
- B. Related Sections:
 - 1. Division 01 Section "Facilities Exterior Enclosure Commissioning" for commissioning process activities for building exterior enclosure, roof, and foundation systems, assemblies, equipment, and components.
 - 2. Division 01 Section "Interiors Commissioning" for commissioning process activities for building interiors construction, stairways, and finish systems and assemblies.
 - 3. Division 14 Section "Commissioning of Conveying Equipment" for commissioning process activities for conveying systems, assemblies, equipment, and components.
 - 4. Division 21 Section "Commissioning of Fire Suppression" for commissioning process activities for fire-suppression systems, assemblies, equipment, and components.
 - 5. Division 22 Section "Commissioning of Plumbing" for commissioning process activities for plumbing systems, assemblies, equipment, and components.
 - 6. Division 23 Section "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.
 - 7. Division 25 Section "Commissioning of Integrated Automation" for commissioning process activities for integrated automation systems, assemblies, equipment, and components.
 - 8. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.
 - 9. Division 27 Section "Commissioning of Communications" for commissioning process activities for communications systems, assemblies, equipment, and components.
 - 10. Division 28 Section "Commissioning of Electronic Safety and Security" for commissioning process activities for electronic safety and security systems, assemblies, equipment, and components.

1.3 DEFINITIONS

- A. BOD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- C. CxA: Commissioning Authority.
- D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. Members Appointed by Owner:
 - 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - 3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA and Contractor for information and use.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
- C. Provide the BOD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
 3. Attend commissioning team meetings held on a biweekly basis.
 4. Integrate and coordinate commissioning process activities with construction schedule.
 5. Review and accept construction checklists provided by the CxA.
 6. Complete construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
 7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
 8. Assist in final commissioning testing and acceptance.
 9. Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Provide commissioning plan.
- C. Convene commissioning team meetings.
- D. Provide Project-specific construction checklists and commissioning process test procedures.
- E. Verify the execution of commissioning process activities. All equipment will be tested 100%. No sampling methods will be used. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When equipment or systems do not meet the requirement, the CxA will report the failure in the Issues Log.
- F. Prepare and maintain the Issues Log.
- G. Prepare and maintain completed construction checklist log.
- H. Witness systems, assemblies, equipment, and component startup.
- I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 019113

SECTION 024119 - SITE PREPARATION AND DEMOLITION**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Provide all equipment, labor and materials necessary to perform all work required to prepare and clear the site and to perform any work necessary to facilitate construction of the project as indicated on the Drawings and as specified herein. It is the Contractor's responsibility to perform all work, included on the contract drawings and outlined in this specification.

1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated in the specifications or on the drawings to remain Owner's property, all other cleared materials including native sub-soil (soil beneath the topsoil layer) shall become Contractor's property and shall be removed from Project site in a legal manner.

1.3 JOB CONDITIONS

- A. Occupancy: Owner may be continuously occupying buildings or areas of buildings immediately adjacent to areas of site work. Conduct site work in a manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of activities which will impact Owner's normal operations.
- B. Condition of existing structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1. Conditions existing at time of commencement of Contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of site demolition work.
- C. Partial Demolition and Removal: Items indicated to be removed but of salvable value to Contractor may be removed from the site as work progresses. Transport salvaged items from site as they are removed.
 - 1. Storage or sale of removed items on site is not permitted.
- D. Protections: Provide and maintain temporary barricades and other forms of protection as required to protect University personnel, students, and general public from injury due to site work operations.
 - 1. Provide and maintain protective measures as required to maintain free and safe passage around perimeter of site
 - 2. Provide and maintain interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structures or element to be demolished, and adjacent facilities or work to remain.
 - 3. Protect from damage existing work that is to remain in place and becomes exposed during demolition operations.
 - 4. Protect all trees and shrubs unless noted on plans to be removed
 - 5. Remove protections at completion of work.

- E. Damages: Promptly repair damages caused to adjacent facilities by site work at no cost to Owner.
- F. Traffic: Conduct site demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities
 - 1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Explosives: Use of explosives will not be permitted.
- H. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- I. Dust Control: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding, or pollution.

1.4 PROTECTION OF PERSONS AND PROPERTY

- A. Protection of Persons and Property: The Contractor shall meet all federal, state and local safety requirements for the protection of workmen, other persons, and property in the vicinity of the demolition and clearing work and the requirements of the Special Provisions.

1.5 COORDINATION WITH ALTERNATES

- A. If Alternates are included in the contract documents, demolition of existing site elements shall be coordinated between work required for the base bid and alternates. The Contractor is responsible to assure that all demolition is completed as part of their work. In such, the Contractor shall familiarize themselves with all site conditions.

PART 2 - PRODUCTS

2.1 TEMPORARY CONSTRUCTION FENCING

- A. Temporary construction and protective fencing shall be installed as defined on the drawings and in the specifications, and in any other locations necessary for the protection of the public, of the Work, and of construction materials.

PART 3 - EXECUTION

3.1 SEQUENCING AND SCHEDULING

- A. Coordinate Site Preparation operations with the following:
 - 1. Other contractors effected by work
 - 2. Owners Representative
 - 3. Landscape Architect

3.2 SITE INVESTIGATION

- A. Visit site before bidding and inform self of site conditions affecting work. No allowance will be made in the work of this contract for failing to determine site conditions.
- B. Verify locations and protect utilities and structures, whether or not shown on the drawings. Existing utilities and structures shown on the drawings are for the Contractor's convenience and locations are not guaranteed.
- C. Verify survey information given on drawings. Notify the Landscape Architect and/or Engineer of any and all discrepancies prior to commencing work. Commencement of work will be construed as complete acceptance of survey information.
- D. Locate and protect from disturbance existing survey monuments, pins, marker and benchmarks whether or not shown on drawings. When any disturbance or damage occurs, notify Landscape Architect and/or Engineer in writing within 24 hours. Describe nature of disturbance or damage and date first occurred. Provide copies to applicable government and municipal agencies. Pay costs for restoring monument to satisfaction of said agencies, at no additional expense to the Owner.
- E. Photographic documentation: Photographically document existing features which, may be affected by the construction, inside and outside the contract limit line. Existing features include, but are not limited to: structures, pavements, curbs, utilities, lawns and vegetation, especially individual trees which are over six (6") inches in diameter and noted to remain on the drawings. Also, particular attention shall be paid to the construction access, stockpile and haul road areas.

3.3 PREPARATION

- A. Locate and clearly flag trees and vegetation to remain or to be relocated.
- B. Provide means to protect existing site conditions to remain from damage during construction.
 - 1. Restore any damaged site items to their original condition, as acceptable to the Owner at no additional expense.
- C. Provide temporary construction fencing around the complete limit of work and other locations within the construction site indicated and defined on the drawings. Post signs as required.
- D. Provide, erect, and maintain protections as required to protect general public, workers, and adjoining property owners during the entire course of construction activity.

3.2 EXISTING UTILITIES

- A. The Contractor shall notify Dig Safely NY (UFPO) to have all subsurface structures and utilities marked out in the field prior to commencing any construction activities. Request that underground utilities be located and marked within and adjacent to the construction limits.
- B. The Contractor shall carefully uncover all existing utilities that are at or adjacent to proposed new work – prior to commencing work in those areas. Means to uncover those utilities shall be applied to prevent damage to them.
- C. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify the Owners' Representative not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without written permission from the Owners' Representative.
- D. The contractor shall keep record data relating to the location and elevations of existing services and utilities and include this data in the project as-built drawings.

3.3 EROSION AND SEDIMENTATION CONTROL

- A. Erosion and sedimentation control measures shall be in place and approved by the Owners' Representative prior to commencing any site clearing or construction operations.

3.4 MAINTAINING PEDESTRIAN AND VEHICULAR TRAFFIC

- A. Do not interfere with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- B. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner's Representative and authorities having jurisdiction.
- C. Maintain clear and safe access for all student, staff and faculty to all campus buildings and facilities adjacent to the project site throughout the construction process. Coordinate all construction and school activities and special events with the Owner to avoid conflicts.
- D. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3.5 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.

3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated and approved by the Owners' Representative.
 - C. If there is a condition which requires excavation for new construction within tree protection zones and approval has been provided by the Owners' Representative, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 1. Cover exposed roots with burlap and water regularly.
 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 3. Backfill with soil as soon as possible.
 - D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Owners' Representative.
 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Owners' Representative.

3.6 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. Existing structures and utilities shall be suitably protected from damage, including but not limited to existing lighting, buildings, walls, flagpoles, plantings, fencing, and utilities.
- B. The existing pavement to remain shall be protected from damage caused by construction activities, runoff and other such impacts that will reduce the effective life of the surface and base.
 - A. Do not interfere with the use of adjacent buildings.
 - B. Cease operations and notify Owner immediately if safety of adjacent structures appears to be endangered. Take precautions to properly support structures. Do not resume operations until safety is restored to the satisfaction of the Owners' Representative.
 - C. Prevent movement, settlement or collapse of adjacent services, athletic surfaces, sidewalks, driveways, utilities and infrastructure, structures, plantings and trees. The Contractor shall repair, at no cost to the Owner, such movement, settlement, or collapse. Promptly repair any damage identified by the Owners' Representative.

3.7 PROTECTION OF CATCH BASINS FROM CONSTRUCTION DEBRIS

- A. Existing catch basins in or adjacent to construction areas shall be protected from build-up of dirt and other construction debris by construction of stone and block drop inlet protection. Do not place drainage filter fabric over the grates.

3.8 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation, to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 24 inches below exposed subgrade, except where roots and stumps will be removed as part of subsequent site excavation operations.
 - 4. Use only hand methods for grubbing within tree protection zone.
 - 5. Chip removed tree branches and dispose of off-site in a legal manner.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, to be approved by the Owners' Representative, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.9 TOPSOIL STRIPPING

- A. Remove sod and grass within the area defined on the drawings before stripping topsoil.
- B. Do not excavate wet topsoil.
- C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- D. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- E. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to prevent erosion and to drain surface water. Cover to prevent windblown dust. Stabilize stockpiles with temporary seeding as defined in the topsoil and turf specifications.
 - 1. Height of topsoil stockpiles shall not exceed 8 vertical feet.
 - 2. Do not stockpile topsoil within tree protection zones.

3. Do not remove any of the existing native topsoil from the site. At the completion of construction, if there is any excess topsoil, it shall remain the property of the Owner and shall be stockpiled on-site at a location as directed by the Owners' Representative.

3.10 DEMOLITION

- A. Perform site demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
- B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctions with construction to remain.
- C. Provide and maintain services for effective air and water pollution controls as required by local authorities having jurisdiction.
- D. Demolish foundation walls to a depth of not less than 18 inches below existing ground surface. Demolish and remove below-grade wood or metal construction.
- E. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6 inch diameter, roots or other organic matter.
- F. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Landscape Architect in written, accurate detail. Pending receipt of direction, rearrange site demolition schedule as necessary to continue overall job progress without delay.
- G. Lead contamination: If a disturbance of lead occurs, stop the work and immediately notify the Architect/ Engineer.
- H. Asbestos contamination: If a disturbance of ACM occurs, stop the work and immediately notify the Architect/Engineer.
- I. Pavements
 1. Where indicated on the Drawings and as directed by the Design Professional, existing bituminous / asphalt pavement shall be saw-cut to the full thickness of the pavement and removed to the full depth of the pavement. Unless specifically noted on the drawings removal includes the stone base material below the asphalt layers. Native soils beneath the stone base layer shall be protected.

3.11 REMOVALS AND RELOCATION

- A. Materials indicated on the Drawings or designated by the Owners' Representative to be removed and disposed shall be dismantled, removed, and legally disposed of off-site.
- B. Areas formerly occupied by removed components shall be restored to the condition of adjacent areas.

- C. Materials indicated on the Drawings or designated by the Design Professional in the field to be relocated shall be dismantled, removed, and relocated as indicated on the Drawings.

3.12 SALVAGEABLE MATERIALS

- A. Materials indicated on the Drawings or designated by the Owners' Representative to be salvaged shall be carefully removed, protected from damage, and stored at an on-site location identified by the Owners' Representative.

3.13 REMOVAL OF NON-REUSEABLE SOILS

- A. The Contractor shall be responsible to remove all non-useable soils and material from the project site, including native sub-soil (soil beneath the topsoil layer).
- B. Existing native topsoil shall not be removed from the site. At the completion of construction, if there is any excess topsoil, it shall remain the property of the Owner and shall be stockpiled on-site at a location as directed by the Owners' Representative.

3.14 DISPOSAL OF MATERIALS

- A. Material resulting from the site preparation and demolition work that has not been defined to be salvaged, relocated or stockpiled and which is unsuitable for reuse on the project, shall become the property of the Contractor and shall be legally disposed of off of the Owner's property.
- B. Debris, rubbish, and other waste material shall be disposed of promptly in a legal manner off-site and shall not be left until final cleanup of the site.
- C. All costs associated with the transporting and disposal of all debris, rubbish, etc. shall be included in the Base Bid.
- D. If hazardous non-asbestos containing materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- E. Burning of removed materials is not permitted on project site.

3.15 CLEAN-UP AND REPAIR

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by site demolition work.

END OF SECTION

SECTION 024190 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

- A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- B. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- C. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection.
- D. Storage or sale of removed items or materials on-site is not permitted.

1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.
 - 1. Maintain the existing building structure, envelope, and interior nonstructural elements of a historic building or contributing building in a historic district. Do not demolish such existing construction beyond indicated limits.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning. Ex-ray existing work and located structural members including rebar before cutting or drilling into existing material.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video and templates.
1. Comply with requirements specified in Section 013233 "Photographic Documentation."
 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Work in Historic Areas: Selective demolition may be performed only in areas of Project that are not designated as historic. In historic spaces, areas, and rooms, or on historic surfaces, the terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 024296 "Historic Removal and Dismantling."
- D. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction. and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE (STRUCTURAL)

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 033020: Concrete Slabs on Grade and Metal Deck.
- 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 117 "Specification for Tolerances for Concrete Construction and Materials"
 - 2. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete."
 - 3. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 4. ACI 304 "Guide for Measuring, Mixing, Transporting, and Placing Concrete"
 - 5. ACI 305 "Hot-Weather Concreting."
 - 6. ACI 306R "Cold-Weather Concreting."
 - 7. ACI 311 "ACI Manual of Concrete Inspection" and "Guide for Concrete Plant Inspection and 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. CRSI "Manual of Standard Practice."
 - 13. NYSDOT "Standard Specification for Construction and Materials."
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

- C. Source Limitations: To minimize irregularities in appearance or color, obtain cementitious materials of the same brand from the same manufacturer's plant. Obtain 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.
- D. Pre-installation Conference: Refer to Specification Section 014533 and Schedule of Special Inspections.
- E. Provide protection of newly cast concrete from direct exposure to sun, wind, precipitation, and excessive cold or hot temperatures starting during placement and lasting until end of curing period.
 - 1. Contractor shall be responsible for cost or repairing defects resulting from deficient protection methods.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 014533 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ Testing Agency acceptable to Engineer and Architect to perform material evaluation tests and evaluate concrete mixes prior to submitting.
 - 1. Testing Agency shall be qualified according to ASTM C 1077 and ASTM E329.
- 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.
- E. Concrete strength will be evaluated by compression testing in accordance with ASTM C39 as part of the Special Inspections. Test results shall be provided to the Contractor, Special Inspector, and Registered Design Professional (RDP) responsible for Structural Engineering. Evaluation and acceptance will be in accordance with the provisions of ACI 318, Section 26.12. Should evidence of low-strength concrete exist, or if test results indicate non-conformance with

these specifications, additional investigation as outlined in ACI 318 Section 26.12.4 may be directed by the project Registered Design Professionals (RDP). All such investigation, including the cost of the Architect's and Engineer's time, shall be at the Contractor's expense.

- F. If, after additional investigation, evidence of low-strength concrete still exists, load tests in accordance with Chapter 27 of ACI 318 may be ordered by the project Registered Design Professionals (RDP). In the event the concrete is determined to be inadequate by the project Registered Design Professionals (RDP), the Contractor shall remove it from the Project and replace it with concrete conforming to these specifications, subject to project Special Inspections and testing requirements herein. All such remedial work shall be at the Contractor's expense.
- G. The Contractor shall be fully responsible for ensuring that all concrete and concrete placement are in accordance with the Project Specifications. Failure of project Registered Design Professionals (RDP) or Testing Laboratory to detect defective work, workmanship, or materials shall in no way prevent rejection and the Contractor taking accepted corrective action when such defects are discovered.

1.6 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Show bar sizes, lengths, material grade, schedules, spacing, diagrams of bent bars, arrangements of reinforcement, splices and laps, mechanical connections, and supports for reinforcement. Include special reinforcement required for openings through concrete.
 - a. Show elevations of reinforcement for all members at minimum 1/4 inch = 1 foot scale.
 - b. Show locations of construction and control joints.
 - c. Reference Contract Drawing number and addendum number in each shop drawing.
 - d. Do not place reinforcing information from more than one design discipline (structural, civil, landscape) in each drawing.
- B. Mix Designs: Submit proposed mix designs for concrete 15 days minimum before start of concreting. Submittal must be in the Concrete Mix Design Submittal Form at end of this section for each class of concrete.
- C. Submit to Special Inspector and Engineer material certificates signed by manufacturers certifying each material complies with specifications. Submit proposed admixtures including chloride ion content prior to submitting mix design.
- D. Submit data and installation instructions for proprietary materials.
- E. Maintain copies of approved submittals on site and make available to Special Inspector and Authority having Jurisdiction for use in inspection of construction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials so as to preserve their quality and fitness for work.

1. Store reinforcement and formwork in manner to prevent bending, damage (including damage to coatings) and accumulation of dirt.
2. Store waterstops in a manner to prevent exposure to moisture, sunlight, dirt, oil, and other contaminants.

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. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form Release Agent: 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.
 1. Formulate form release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off, metal form ties, designed to prevent form deflection and spalling concrete upon removal. Provide units that will leave no metal closer than 1 inch to exposed surface.
 1. Provide ties that will leave holes no larger than 1-inch diameter in concrete surface when removed.
 2. Furnish ties with integral water-barrier plates or washers to walls indicated to receive dampproofing or waterproofing.

3. Unexposed concrete: “Type A-3 Snap Tie Standard” by Dayton Superior or accepted equivalent.
4. Exposed concrete: “Type A-3 Snap Tie Heavy” by Dayton Superior or accepted equivalent.
5. Provide galvanized or stainless steel ties for concrete elements that are reinforced with epoxy-coated reinforcing.
6. Internal wood spreaders are prohibited.

2.2 REINFORCING MATERIALS

- A. Deformed bars: ASTM A 615, Grade 60.
- B. Deformed Epoxy-Coated Reinforcing Bars: ASTM A 775.
- C. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- D. Epoxy-coated Wire: ASTM A 884.
- E. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
- F. 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 on subgrade.
 - a. Do not use clay bricks.
 - b. Do not use bricks to support epoxy-coated 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. Finish (epoxy-coated) for supports formed from reinforcing bars shall match the finish of the supported reinforcing.
 4. 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).
- G. Minimum 16-gauge annealed tie wire, ASTM A 82.
 1. Provide coated tie wire for use with epoxy-coated ~~or galvanized~~ bars. Acceptable coatings include epoxy, nylon, or vinyl. Do not use plain tie wire.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Aggregates: NYSDOT-approved, Section 703 (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, and piers 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: ASTM C 94, clean, fresh, drinkable.
- D. Fly Ash: ASTM C 618, Type F, with a loss on ignition of less than 6 percent.
- E. Ground-Granulated, Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- F. Silica Fume: ASTM C1240

2.4 ADMIXTURES

- A. Air Entraining: ASTM C 260.
- B. Water-Reducing Admixture: "Eucon MR", "Eucon WR-75", or "Eucon WR-91" by Euclid Chemical Co.; "MasterPozzoloth 200" 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.
- C. Water-Reducing and Retarding Admixture: "Eucon Retarder-75" by Euclid Chemical Co; "MasterSet R100" 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.
- D. Noncorrosive, Nonchloride Accelerator: ASTM C 494, Type C or E, and not contain more chloride ions than in municipal drinking water.

- E. High-Range, Water-Reducing Admixture (Superplasticizer): "Eucon 37" by Euclid Chemical Co. or "Sikament SPMN" 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.
- F. 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.
- G. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Registered Design Professional responsible for Structural Engineering.

2.5 RELATED MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 ounces a square yard when dry 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, Type 1, Class B with minimum 25 percent solids content. Provide test data from an Independent Testing Laboratory indicating a maximum moisture loss of 0.030 grams per square centimeter in 72 hours when applied at a coverage rate of 300 square feet per gallon. Sodium silicate compounds are not permitted. Use "Super Diamond Clear VOX" by Euclid Chemical Co. or accepted equivalent.
- D. Horizontal Joint Sealants: "MasterSeal SL2" by Master Builders; "Sikaflex-2c SL" by Sika Corp.; "Eucolastic 1 SL" by Euclid Chemical Co.; or accepted equivalent.
- E. Vertical Joint Sealants: "Eucolastic 1 NS" by Euclid Chemical Co.; "MasterSeal NP2" by Master Builders; "Sikaflex-2c NS" by Sika Corporation; or accepted equivalent.
- F. Joint Filler: ASTM D 1751, ½-inch-thick, premolded, expansion and isolation joint filler strips.
- G. Backer Rod: Polyethylene closed-cell foam. "MasterSeal 920 or 921" by Master Builders or accepted equivalent.
- H. Self-Expanding Butyl Strip Waterstops: "Waterstop-RX," 1 inch by ¾ inch, by CETCO or accepted equivalent at below-grade wall construction joint locations and at locations shown in drawings.
- I. Chamfer Strips: Provide wood, metal, PVC, or rubber chamfer strips fabricated to provide ¾-inch chamfer on exposed edges.
- 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 051200 and installed under this section.

- L. Non-shrink Grout: Corp of Engineers CRD-C 621. “Sure-Grip High Performance Grout” by Dayton Superior; “NS Grout” by Euclid Chemical Co.; “SikaGrout 212” by Sika Corp.; “Masterflow 928” by Master Builders, Inc.; or accepted equivalent.
- M. Bonding Agent: ASTM C 1059, Type II “Acrylic Bonding Agent J40” by Dayton Superior; “SBR Latex” by Euclid Chemical Co.; “Everbond” by L&M Construction Chemicals, Inc.; “SikaLatex” by Sika Corp.; or accepted equivalent.
- N. Chemical Adhesive for Drilled and 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 + Gold” by Powers Fasteners; “AT-XP” by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater; “HIT HY 200” by Hilti; “Epcon C6+” by ITW Ramset/Red Head; “PE 1000+” by Powers Fasteners; “ET-HP” by Simpson/Strong-Tie; or accepted equivalent.

2.6 PROPORTIONING AND MIX DESIGN

- A. Prepare design mixtures for type and strength of concrete in accordance with ACI 301, section 4.2.2 and these specifications. 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 301, Section 4.2.3.3(a).
- 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 301, Section 4.2.3.3(b).
- D. Documentation of average compressive strength shall comply with ACI 301, Section 4.2.3.4(a), 4.2.3.4(b), or 4.2.3.4(c). Submit sample standard deviation calculation and/or results of trial mixtures used as basis for determination of f'_{cr} . See Specification Section 1.6.B.

- E. Concrete Quality:

Location	Exposure Category†	Maximum Aggregate Size	Required 28-day Compressive Strength psi	Maximum Water/Cement Ratio	Percent Entrained Air
Footings, interior stair pans, misc. concrete.	F0, S0, W0, C1	1 ½"	3,000	0.55	N/A
Ext. foundation walls, frost walls, piers (subject to deicing chemicals).	F3, S0, W0, C2	1 ½"	5,000	0.40	6*
Lean concrete.	F0, S0, W0, C0	N/A	1,500	0.65	N/A

* Plus or minus 1.5 percent.

† ACI 318 Section 19.3.1

- F. Quantity of coarse aggregate in pounds must be in the range of 1.25 to 1.5 times quantity of fine aggregate in pounds.
- G. Admixtures: Structural concrete for columns, beams, and slabs shall contain the specified water-reducing admixture and/or high range water-reducing admixture (superplasticizer.) At the Contractor's option, both water-reducing admixtures may be included in the concrete mix. Concrete required to be air-entrained shall contain the accepted air entraining admixture. Pumped concrete, architectural concrete, and concrete with a water-cement ration less than 0.5 shall contain the specified high range water-reducing admixture (superplasticizer.)
- H. Slump:
1. Footings, frost/foundation walls, piers, misc. concrete: 3 inches to 5 inches.
 2. Concrete containing high-range, water-reducing admixture (superplasticizer) shall have a maximum slump of 9 inches unless otherwise accepted by Engineer.
 3. 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.
 4. Ready-Mix Concrete: ASTM C 94.
 5. 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.
- I. Pozzolans:
1. Pozzolans may be substituted for cement in normal-weight concrete, including fly ash, ground-granulated blast-furnace slag, and/or silica fume.
 - a. Substitution rate of Pozzolans for Portland Cement in concrete classified as Exposure Category F3 shall be limited to: fly ash, at a maximum rate of 25 percent by weight, ground-granulated blast-furnace slag at a maximum rate of 50 percent by weight, or silica fume at a maximum rate of 10 percent by weight.
 - b. Proposed concrete mix designs containing a combination of fly ash, ground-

granulated blast-furnace slag, or silica fume shall comply with the substitution limitations indicated in Table 26.4.2.2(b) of ACI 318.

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.
- J. Pumped concrete: Submit mix designs specifically prepared and used previously for pumping. Mix designs not previously used for anticipated pump line lengths shall be tested by Contractor to verify suitability for Project before use at site.

2.7 REINFORCING FABRICATION

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." 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, shore, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads, and construction 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 and ACI 117.
- 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, 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, 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. 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.
- G. Fit corners and joints with gaskets or tape to prevent leakage.
- H. 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.
- I. 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 and piers, unless shown in structural drawings.
- J. 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.
- K. 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-release agent. 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. Do not use patch forms for exposed concrete surfaces unless approved by Architect.
- L. Clean and coat forms before erection. Do not coat forms in place.
- M. Place concrete plugs in exposed holes left by form-tie cones.

3.3 STEEL REINFORCEMENT PLACEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust, mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. 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.

- D. Place reinforcement to obtain at least minimum concrete coverages for protection of bars. Minimum required concrete cover is noted in drawings.
- E. 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.
- F. Use of nails in forms and use of clay brick to support reinforcement is prohibited.
- G. Lap bar splices as indicated. Stagger splices in adjacent bars. Wire-tie splices.
- 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. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- 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 051200. 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 conduit, and piping and to coordinate requirements of this section. Cooperate with other trades in setting work as required.
- B. ACI 318, Section 20.7, 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. Conduits and pipes, with their fittings, embedded within a column shall not displace more than 4 percent of the cross section area of the column or that which is required for fire protection.
 - 4. Pipes and fittings embedded in concrete shall be designed to resist effects of the material, pressure, and temperature to which they will be subjected without transferring force to the surrounding concrete.
 - 5. No liquid, gas, or vapor, except water not exceeding 90° F nor 50 psi pressure, shall be placed in the pipes until the concrete has attained its design strength.
 - 6. 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.
 - g. Provide additional supplementary reinforcement with an area not less than 0.002 times the area of concrete section normal (perpendicular) to piping.

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. Construct joints true to line with faces perpendicular to surface plane of concrete. Locate and install construction joints so strength and appearance of concrete are not impaired, at locations indicated or 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 to a minimum 1/4-inch amplitude and remove dirt and concrete laitance prior to casting concrete walls.
 2. Space vertical joints in walls as indicated in drawings. If not indicated, space joints a maximum of 60 feet and locate beside piers integral with walls, near corners, and in concealed locations where possible.
 3. 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.
 4. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 5. 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. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and in compliance with construction documents and approved shop drawings, and required inspections have been performed.
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. Deposit concrete within 1-1/2 hour after water is added to dry batching, or use retarding admixture if accepted by the registered design professional responsible for structural engineering.
1. For footings, foundation walls, and miscellaneous concrete only: 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 in one layer or in layers of such thickness that no new concrete will 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.
- L. After placing concrete, screed to levels and slopes indicated. Do not use tamping tools to force aggregate away from surface. When the water sheen has disappeared, finish surface as indicated.

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. 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 CONCRETE PROTECTING AND CURING

- A. Protect freshly placed concrete from premature drying, excessive hot or cold temperature, and damage in accordance with provisions of ACI 306R for cold-weather protection and ACI 305, for hot-weather protection.
- B. Curing Methods: Perform concrete curing in accordance with ACI 308 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-retaining-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 12 inches and sealed by waterproof tape or adhesive. Cure for not less than seven days. 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 306R.
- B. For cold-weather concreting (defined as when air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C) during the protection period), maintain concrete temperature in accordance with Table 5.1, and maintain concrete protection in accordance with Table 7.1 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 5.1 of ACI 306R.
 - 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.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown in drawings. Coordinate sizes and locations with equipment supplied. Prior to placing concrete, set anchorage devices for machines and equipment using setting drawings, templates, diagrams, instructions and directions furnished with the equipment.
- D. Steel-Pan Stairs: Provide concrete fill for steel-pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown in drawings. Screed, tamp, and finish concrete surfaces as scheduled.

3.16 TOLERANCES

A. Concrete Section/Placement/Formwork

1. Dimensions of Walls, Footings
 - a. 12 inches or less: + 3/8 inch or - 1/4 inch
 - b. 12 inches to 36 inches: + 1/2 inch or - 3/8 inch
 - c. thicker than 36 inches: + 1 inch or - 3/4 inch
2. Dimension of Footing in plan: +2 inch or -1/2 inch.
3. Thickness of walls: + 1/2 inch or - 1/4 inch
4. Deviation from elevation of top surface from lines parallel to specified grade lines:
 - a. of bearing surface from specified elevation: +/- 1/2 inch.
 - b. Not to exceed 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.
5. Distance between adjacent elements sectioned by a vertical plane:
 - a. where specified 2 inches or less: +/- 1/8 inch
 - b. where specified 2 inches < x < 12 inches: +/- 1/4 inch
 - c. all other elements: +/- 1 inch
6. Horizontal deviation from location (center) specified in plan from straight lines parallel to specified linear building lines:
 - a. +/- 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.
 - b. other elements: +/- 1 inch
 - c. edge location of all openings: +/- 1 inch
7. Deviation from plumb: 1/4 inch for any 10 feet of height; 1 inch maximum for entire height.

B. Reinforcing

1. Vertical or horizontal variation from specified in plan
 - a. member depth 4 inch or less: +/- 1/4 inch
 - b. member depth (or thickness) over 4 inch but not over 12 inch: +/- 3/8 inch
 - c. member depth (or thickness) over 12 inches: +/- 1/2 inch
2. Spacing, measured long a line parallel to the specified spacing:
 - a. in slabs or walls: +/- 3 inch
 - b. ties: lesser of +/- 3 inches or +/-1 inch per foot of least column widthIn all cases the total number of bars shall not be less than that specified.
3. Longitudinal location of bends in bars and ends of bars:
 - a. at discontinuous ends of elements: +/- 1 inch
 - b. at other locations: +/- 2 inch
4. Length of bar lap for #3 to #11: -1 inch

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.

CONCRETE MIX DESIGN SUBMITTAL FORM

Submit separate form for each mix design

Project: _____ Location: _____

General Contractor: _____ Concrete Supplier: _____

Mix Design No: _____ Concrete Grade: _____

Use (Describe): _____

Methods of Placement (chute, pump, chute and buggy, etc.): _____

If placing by pumping, verify concrete mix can be pumped distances required in project: _____

A. DESIGN MIX INFORMATION:

Based on Standard Deviation Analysis: _____ or Trial Mix Design Data: _____

Design Characteristics - Density: _____ pcf; Strength: _____ psi (28-day);

Slump: _____ in. required BEFORE adding superplasticizer (if used)

Slump: _____ in. required AFTER adding superplasticizer (if used)

Entrained Air Content: _____ % specified

Materials:

Aggregates: (size; type; source; gradation; specification)

Coarse: _____

Fine: _____

<u>Other Materials:</u>	<u>Type</u>	<u>Product-Manufacturer (Source)</u>
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Cement: _____

Fly Ash: _____

Slag: _____

Admixtures:

Water Reducer: _____

Air-Entraining Agent: _____

High-Range, Water-Reducing Admixtures (superplasticizer): _____

Non-Corrosive Accelerator: _____

Other: _____

B. FINAL MIX DESIGN DATA:

RATIOS

Water _____ lb
Cementitious Materials lb = _____

Course Agg. _____ lb
Fine Agg. lb = _____

SPECIFIC GRAVITIES

Fine Agg. _____

Coarse Agg. _____

Other: _____

ADMIXTURES

W.R.: _____ oz. per 100 # Cement

HRWR: _____ oz. per 100 #Cement

Non-Corrosive Accelerator: _____ oz.
Per 100# Cement

A.E.A.: _____ oz. per 100 # Cement

Other: _____ oz. per 100# Cement

PLASTIC CONCRETE

Initial Slump = _____ in. Air Content = _____ %

Final Slump = _____ in. Unit Dry Wt. = _____ pcf

Unit Wet Wt. = _____ pcf

STANDARD DEVIATION ANALYSIS (from experience records):

Number of Test Cylinders Evaluated: _____ Standard Deviation: _____

$f_{cr} = f_c + 1.34s$ or $f_{cr} = f_c + 2.33s - 500$

(Refer to ACI for increased deviation factor when fewer than 30 tests are available.)

Mix # _____ Job Name _____

C. LABORATORY TEST DATA (HARDENED CONCRETE):

COMPRESSIVE STRENGTH

Age (days)	Mix #1	Mix #2	Mix #3
7	_____	_____	_____
14	_____	_____	_____
28	_____	_____	_____
Other	_____	_____	_____

28-day average compressive strength: _____ psi

Mix design proportioned to achieve $f_{cr} = f_c + 1200$ psi (1400 psi for strength higher than 5000 psi at 28 days)

CHLORIDE ION CONTENT: Total chloride ion content of concrete mixture. Percent by mass of cementitious materials. _____

Remarks: _____

NOTE: Fill in all blank spaces. Use 0- (Zero) or N.A. (Not Applicable) where appropriate. See "Design and Control of Concrete Mixtures," 13th Edition by Portland Cement Association, for assistance in completing this form.

D. REQUIRED ATTACHMENTS:

- _____ Coarse aggregate gradation report and DOT certification
- _____ Fine aggregate gradation report and DOT certification
- _____ Concrete compressive strength data used for standard deviation calculations
- _____ Chloride ion data and related calculations
- _____ Rapid chloride permeability test report
- _____ Admixture compatibility certification letter

Submitted by
Ready-Mix
Supplier: Name _____

Address _____

Phone Number _____ Date _____

Main Plant Location _____ Miles from Project _____

Secondary Plant Location _____ Miles from Project _____

END OF SECTION 033000 (1/2020)

SECTION 033020 - CONCRETE SLABS ON GRADE AND METAL DECK

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 supported on grade and metal deck. 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. Provide protection from precipitation for vapor retarder and slab subbase prior to slab-on-grade placement. Provide curing and protection of concrete slabs in accordance with Section 3.15.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 014533 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Contractor shall secure services of company field advisor from manufacturer of concrete surface treatment products, including sealers, hardeners, sealants, and finishes. Field advisor shall be certified in writing by manufacturer to be technically qualified in product installation. Personnel involved solely in sales do not qualify. Field advisor shall be present at beginning of installation of product and as required during duration of project for the purpose of:
 - 1. Render technical assistance to Contractor regarding installation procedures of product to satisfy warrantee or guarantee requirements.
 - 2. Provide specialized training in use of product to Contractor's personnel.
 - 3. Verify surface preparation procedures and suitable substrates for material application.
 - 4. Verify proper mixing proportions and procedures for product.
 - 5. Verify proper temperature and other environmental controls.
 - 6. Verify proper tools and application procedures.

7. Verify proper curing and protection of installed product.
 8. Familiarize Contractor/Owner/Architect/Engineer with entire system, including inspection techniques.
 9. Answer questions that arise.
- B. Field advisor shall prepare a written report summarizing information listed above. Submit report to Special Inspector, Contractor, Owner, Architect, and Engineer.
- C. Contractor shall be responsible for expenses of field advisor and verifying credentials of advisor.
- D. Contractor shall be responsible for the cost of any special procedures required by the manufacturer of WVRA to allow for the placement of slab finishes in advance of the specified minimum time period.

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, slab on grade, and slab on metal deck.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT AND ACCESSORIES

- A. Reinforcement: ASTM A 615, Grade 60 for uncoated deformed bars.
1. ASTM A 775 for epoxy-coated, deformed bars.
 2. Coatings (epoxy or zinc) applied after fabrication and bending.
- B. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
- C. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- D. Supports for Reinforcement: Use wire bar-type supports complying with CRSI specifications. For slabs on grade, 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 for slabs on grade.
 - a. Do not use clay bricks.
 - b. Do not use bricks to support epoxy-coated reinforcing.
 - c. Do not use bricks to support reinforcing for slabs on metal deck.
 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. Finish (epoxy-coated) for supports formed from reinforcing bars shall match finish of supported reinforcing.
- E. Minimum 16-gauge annealed tie wire, ASTM A 82.
- F. Deformed-Steel Wire: ASTM A 496/A 496M.
- G. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A, Type 1 coated, plain steel wire, with less than 2 percent damaged coating in each 12-inch wire length.
 - 1. Provide coated wire ties for use with epoxy-coated or galvanized bars. Acceptable coatings include epoxy, nylon, or vinyl. Do not use plain wire ties.
- H. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from galvanized-steel wire into flat sheets.

2.2 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150. Type II or Type I/II only.
- B. Fly Ash: ASTM C 618, Type F, with loss on ignition of less than 6 percent.
- C. Ground-Granulated, Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- D. Water: ASTM C 94, clean, fresh, drinkable.
- 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 for Slabs on Grade: 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

- 3. Lightweight Coarse Aggregate for Slabs on Metal Deck: ASTM C 330, Size 3/4-inch to No. 4. Dry unit weight of concrete shall be a maximum 120 pcf from a batch weight of 120 to 124 pcf, presoaked to achieve a damp condition according to ACI 211.2; limit shrinkage to 0.03 percent at 28 days.

2.3 ADMIXTURES

- A. Air Entraining: ASTM C 260.
- B. Set-Control Admixtures: Not permitted.
- C. Calcium Chloride: Not permitted.
- D. Water-Reducing Admixture: “Eucon WR-75” or “Eucon WR-91” by Euclid Chemical Co.; “MasterPozzolith 200” 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.
- E. Mid to High Range Water Reducer/Finish Enhancer: “MasterPolyheed 997” by Master Builders; “Sikament 686” by Sika Chemical Corp; or accepted equivalent. Admixture shall conform to ASTM C 494 Type A and F and not contain more chloride ions than in municipal drinking water.

2.4 RELATED MATERIALS

- A. Premolded Joint Filler for Slabs on Grade: Provide resilient and nonextruding, premolded, bituminous fiberboard units complying with ASTM D 1751; 1/2-inch-thick, full slab depth.
- B. Construction Joint Form: Square edge form only. Keyed joint not permitted.
- C. Semi-Rigid Epoxy Joint Filler for Interior Exposed Slabs: At exposed slabs, seal joints with “Sikadur 51SL” by Sika; “Sure Fil J52” by Dayton Superior; “MM-80P” by Metzger/McGuire; “Euco 700” by Euclid Chemical Co.
- D. Semi-Rigid Polyurea Joint Filler for Interior Slabs: At interior slabs to receive broadloom carpet, hardwood, or VCT, seal joints with “Euco QWIKjoint 200” by Euclid Chemical Co.; “Spal-Pro RS 65” by Metzger/McGuire; “Sika Loadflex” by Sika; or accepted equivalent.
- E. Cementitious Joint Filler for Interior Slabs (Self-Leveling Topping): At interior slabs to receive rubber-backed carpet, solid vinyl tile, and for all other floor coverings, seal joints with “Ardex K301” by Ardex; “Fast Setting Floor Resurfacer” by Quikrete; “Level-X52” by Edison Coatings; “SLT-HS” by Raeco; or accepted equivalent.
- F. Polyurethane Joint Sealant for Exterior Slabs: “Sikaflex-2c SL” by Sika; “MasterSeal SL2” by Master Builders; “Eucolastic 2 SL” by Euclid Chemical Co.; “Urexpan NR-200” by Pecora Corporation; or accepted equivalent.
- G. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 ounces a square yard and complying with AASHTO M 182, Class 2.
- H. 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.

- I. Penetrating Exterior Anti-Spalling Sealer: “Euco-Guard 100” by Euclid Chemical Co. (mixed to 17.5 percent concentration); “MasterProtect H400” by Master Builders; “Aquapel Plus” by L&M Construction Chemicals; or accepted equivalent.
- J. Evaporation Retarder: Monomolecular, film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss. “Aquafilm J74RTU” by Dayton Superior; “Euco-bar” by Euclid Chemical Co.; “MasterKure ER 50” by Master Builders, Inc.; or accepted equivalent.
- K. Crack Repair Material: For cracks smaller than 1/8 inch, use “Sika Pronto 19” methacrylate by Sika; “Rapid Refloor” polyurea by Metzger McGuire; or accepted equivalent. For cracks greater than 1/8 inch, use specified joint filler material.
- L. Hardener: “MasterKure HD 300WB” by Master Builders, Inc.; or accepted equivalent for exposed slabs.
- M. Vapor Retarder: Provide vapor retarder cover over prepared subbase 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.
- N. Geofoam Block Backfill: Molded expanded polystyrene conforming to ASTM C578, Type VIII or ASTM D6817 EPS 19 with a density of 1.15 pounds per cubic foot, minimum block size 2 feet by 2 feet by 4 feet as manufactured by Thermal Foams, Buffalo, NY 716-874-6474; Insulated Building Systems, Winchester, VA 540-662-0882; Insulfoam, Tacoma, WA 253-572-5111 or accepted equivalent.

2.5 PROPORTIONING AND MIX DESIGN

- A. Concrete Quality:

Location	Required 28-Day Compressive Strength (psi)	Approximate Cementitious Materials Content (pounds)	Maximum Water/Cement Ratio	Percent Entrained Air
Interior slabs on grade	3,500	530	0.50 (265 pounds maximum total water)	2*
Lightweight interior slabs on metal deck	3,500	611	0.50 (300 pounds maximum total water)	4***
Normal weight exterior slabs on grade (subject to deicing chemicals)	5,000	658****	0.40	6**

* Do not add air-entraining admixtures. Air entrapment occurs as result of mixing.

** Plus or minus 1.5 percent.

*** Include air-entrainment admixtures in lightweight concrete. Entrained air content shall be 4 percent minimum and 7 percent maximum.

**** Maximum cement content 563 pounds plus 20 percent pozzolans by weight. Minimum cement content 488 pounds plus 20 percent pozzolans by weight.

- 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.
- D. Use 564 pounds (6 sacks) maximum of cement for each cubic yard for interior slabs and minimum sand content.
- E. For normal-weight concrete, 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. For lightweight concrete, provide minimum 675 pounds of lightweight coarse aggregate (saturated, surface dry) for each cubic yard of concrete.
- G. Pozzolans:
- 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.
 - Pozzolans shall be used at a rate of 20 percent by weight of total cementitious materials 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.
- H. 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.
- B. Whenever possible, air temperature should be rising after concrete placement. Attempt to schedule slab placements according to favorable weather reports.

3.2 OPTION FOR SLAB PLACEMENT

- A. For placement of slabs that will be exposed in final structure, place construction and contraction joints as shown in drawings or as recommended by ACI 302 if not shown.
- B. For placement of slabs that will be subsequently concealed with an architectural finish material, Contractor has two options. Option 1 is to place slabs with few joints or construction joints only. Option 2 is to place slabs with construction and contraction joint spacings as recommended by ACI 302, "Guide for Concrete Floor and Slab Construction." Contractor shall submit option to be used and joint layout to Architect and Engineer for review.
- C. If Option 1 is selected, shrinkage cracking will likely occur but potential for curling will be reduced. Contractor shall be responsible for repairing cracks and curled areas. If Option 2 is selected, probability of shrinkage cracking will be less but probability of curling will increase. Contractor shall be responsible for repairing cracks and curled areas.

3.3 PRECONCRETE PLACEMENT

- A. Just before concrete placement on grade, 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 ON GRADE

- 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 VAPOR RETARDER INSTALLATION

- A. Following placement and compaction of subbase, place vapor retarder sheeting with longest dimension parallel with the direction of slab placement.
- B. Install vapor retarder in accordance with ASTM E 1643, manufacturer's instructions, and as follows:
 - 1. Lap joints 6 inches, and seal vapor retarder joints with manufacturer- recommended seam tape.
 - 2. Extend vapor retarder up walls and penetrations 4 inches minimum.
 - 3. Seal vapor retarder to walls and penetrations with manufacturer-recommended mastic to form continuous barrier.
 - 4. Repair damaged areas by cutting patches of vapor retarder material and placing to overlap damaged areas by 6 inches each side. Seal each side of patch with seam tape.
- C. Remove debris and standing water from vapor retarder prior to slab placement.

3.6 REINFORCEMENT PLACEMENT

- A. Place slab reinforcing one-third of slab thickness below top surface of slabs on grade and 1 inch below top surface of slabs on metal deck. Support reinforcement by metal chairs, runners, bolsters, or concrete brick (slabs on grade only) as required. Stagger brick locations.
- 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.

3.7 INSTALLATION OF NON-STRUCTURAL EMBEDDED ITEMS

- A. General: Notify other trades to permit installation of their work and coordinate with requirements of this section. Cooperate with other trades in setting work as required.
- B. Do not embed aluminum items unless coated to prevent galvanic reaction with concrete and steel.
- C. Do not embed conduit or other nonstructural items that are larger than the lesser of the following unless otherwise detailed:
 - 1. One-inch diameter.
 - 2. One-third the thickness of concrete slab above metal deck.

- D. Avoid embedding conduit or other nonstructural items wherever possible. If unavoidable, limit size as noted above and install embedded item following the guidelines below.
 - 1. Space at least 18 inches apart.
 - 2. Place so nonstructural items do not cross each other.
 - 3. Provide at least 1-inch concrete cover between items and slab surface. Provide minimum 3/4-inch concrete cover between items and deck, screed angles, edge forms, or reinforcing bars. Do not lay items on deck or reinforcing bars. In exterior slabs, provide at least 1½-inches concrete cover between items and exposed surfaces.
 - 4. Provide at least 1-inch concrete cover between embedded items and shear connectors in composite beam construction.
 - 5. Securely position items by wire tying to support chairs.
- E. Items such as trench ducts and electrical floor boxes require special consideration. Known conditions are detailed in drawings. Notify Architect and Engineer of discrepancies or locations not detailed.
- F. Install PVC sleeves at plumbing penetrations. Do not core-drill unless accepted by Engineer. Cut deck after slab has cured 28 days or after slab reaches its design strength.

3.8 ISOLATION JOINTS

- A. Construct isolation joints in slabs at points of contact with vertical surface and elsewhere as indicated.
- B. Use two layers of polyethylene film as bond breaker for slabs on metal deck.

3.9 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. Continue half of bar reinforcement through construction joints in concealed slabs and slabs on metal deck.
 - 1. If Contractor chooses to cut reinforcement for slabs on grade after placement, protect the vapor retarder and use cutting method which will not result in damage to the vapor retarder. Thermal cutting of reinforcement after placement is not permitted.
 - 2. Contractor shall repair damage to vapor retarder prior to slab on grade placement.

3.10 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.
 - 1. For slabs on grade, depth of cut shall be one-fifth of slab thickness with minimum of 1 inch.

2. For slabs on metal deck, depth of cut shall be one-fifth of slab cover over metal deck, with maximum depth of $\frac{3}{4}$ inch.
- C. Obtain permission from Engineer if diamond blade cutting is to be used.
- D. Continue half of bar reinforcement through contraction joints in concealed slabs and slabs on metal deck.
1. If Contractor chooses to cut reinforcement for slabs on grade after placement, protect the vapor retarder and use cutting method which will not result in damage to the vapor retarder. Thermal cutting of reinforcement after placement is not permitted.
 2. Contractor shall repair damage to vapor retarder prior to slab placement.

3.11 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. Slabs on Grade:
1. Use strip pour methods and mechanical vibratory screed whenever possible.
 2. Deposit and consolidate concrete in continuous operation within limits of construction joints until placing of panel or section is complete.
 3. Consolidate concrete during placing operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 4. Maximum placement width shall not exceed 20 feet for very-flat and super-flat slabs.
 5. 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.
 6. Maintain reinforcement in proper position during concrete placement operations. See requirements for reinforcement placement.
 7. Slab thicknesses shown in drawings are minimum allowable. Maximum allowable thickness shall be 1 inch greater than specified thickness.
 8. 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.
 9. Cost of corrections to provide for positive drainage shall be the responsibility of Contractor.
- C. Slabs on Metal Deck:
1. Place concrete in direction opposite to direction metal deck sheets were placed.
 2. Deposit and consolidate concrete in continuous operation within limits of construction joints until placing of panel or section is completed.
 3. During placement, avoid overloading metal deck or supporting structural members.
 4. Consolidate concrete during placing operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 5. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, leaving it free of humps or hollows. Do not sprinkle water on plastic surface. Do not disturb slab surfaces before beginning finishing operations.

6. Maintain reinforcement in proper position during concrete placement operations. See requirements for reinforcement placement.
7. 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.
8. Cost of corrections to provide for positive drainage shall be responsibility of Contractor.
9. Steel floor structure will deflect under weight of wet concrete. Placement of additional concrete may be required after initial wet screeding. Where indicated, camber will reduce but not eliminate need for placing additional concrete. Place varying-thickness concrete slab to maintain required finished-floor elevation. Placement sequence and joint locations are critical and shall be reviewed at slab preconstruction meeting.

3.12 SLAB FINISHES

- A. 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.
- B. 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.
- C. 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.
- D. Nonslip Broom Finish for Slabs on Grade: 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.
- E. Delay finishing as long as possible. Allow bleed water to evaporate before finishing.

- F. 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.

3.13 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.

3.14 HOT-WEATHER CONCRETING

- A. Comply with Section 033000.

3.15 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. Provide protection for concrete slabs from direct exposure to sun, wind, precipitation, and excessive cold or hot temperatures lasting from concrete placement until the building is enclosed and conditioned.
 - a. Protect the slab surface and slab openings from exposure to water; this includes water from construction activities and precipitation.
 - b. Contractor shall be responsible for cost of repairing slab defects and moisture issues resulting from deficient protection methods.
 - c. One method of protection is installing exterior walls, roof membrane and roof drains prior to installing vapor retarder, slab subbase, slab on grade, and slab on deck.
- G. 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.

H. 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.

I. Exterior Slabs:

1. Apply penetrating exterior anti-spalling sealer to exterior concrete slabs, walks, platforms, steps, ramps, and curbs according to manufacturer's directions.

3.16 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.

3.17 REPAIR OF SURFACES

- A. Contractor shall be responsible for cost of repairing slab defects.
- B. Test surfaces for flatness 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 033020 (02/21)

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Concrete building brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Masonry-cell insulation.
10. Cavity-wall insulation.

B. Related Sections:

1. Division 05 Section "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
2. Division 05 Section "Metal Fabrications" for furnishing steel lintels for unit masonry.
3. Division 07 Section "Water Repellents" for water repellents applied to unit masonry.
4. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
5. Division 08 Section "Louvers and Vents" for wall vents (brick vents).

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
 2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
 4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.
 5. Prism Test: For each type of construction required, according to ASTM C 1314.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
 3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
1. Face brick, in the form of straps of five or more bricks.
 2. Stone trim.
 3. Colored mortar.
 4. Weep holes/vents.
- D. Samples for Verification: For each type and color of the following:
1. Face brick, in the form of straps of five or more bricks.
 2. Special brick shapes.
 3. Stone trim.
 4. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 5. Weep holes and vents.
 6. Accessories embedded in masonry.

- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- F. Qualification Data: For testing agency.
- G. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. Include data on material properties.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
 - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - e. For decorative masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. Anchors, ties, and metal accessories.
- H. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- I. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- J. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- E. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
 - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness.
 - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
 - 3. Clean exposed faces of panels with masonry cleaner indicated.
 - 4. Protect approved sample panels from the elements with weather-resistant membrane.
 - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: Provide CMUs that have been manufactured within 500 miles of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners unless otherwise indicated.
- C. CMUs: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
 - 2. Density Classification: Normal weight unless otherwise indicated.
 - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 - 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.3 MASONRY LINTELS

- A. General: Provide one of the following:
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).
1. Products: Color to match existing
 2. Type: FBX or HBX.
 3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi.
 4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
 5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 6. Size (Actual Dimensions): 3-1/2 inches wide by 2-1/4 inches high by 7-1/2 inches long.

2.5 Decorative CMU

- A. Regional Materials: Provide CMUs that have been manufactured within 500 miles of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- C. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
 2. Density Classification: Normal weight unless otherwise indicated.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Exposed Faces: Provide color as selected by architect from full range of manufactures colors and texture (split face and ground face) matching the range represented by construction drawings.

2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Cemex S.A.B. de C.V.; Brikset Type N.
 - c. Essroc, Italcementi Group; Brixment or Velvet.
 - d. Holcim (US) Inc.; Mortamix Masonry Cement.
 - e. Lafarge North America Inc.; Magnolia Masonry Cement.
 - f. Lehigh Cement Company; Lehigh Masonry Cement.
 - g. National Cement Company, Inc.; Coosa Masonry Cement.
- E. Mortar Cement: ASTM C 1329.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.
- G. Colored Cement Product: Packaged blend made from portland cement and hydrated lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Colored Portland Cement-Lime Mix:

- 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
 - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
 - 3) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - 4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
- b. Colored Masonry Cement:
- 1) Capital Materials Corporation; Flamingo Color Masonry Cement.
 - 2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
 - 3) Essroc, Italcementi Group; Brixment-in-Color.
 - 4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
 - 5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
 - 6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
 - 7) National Cement Company, Inc.; Coosa Masonry Cement.
2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 3. Pigments shall not exceed 10 percent of portland cement by weight.
 4. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- H. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Aggregate for Grout: ASTM C 404.
- J. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.
- K. Refractory Mortar Mix: Ground fireclay or non-water-soluble, calcium aluminate, medium-duty refractory mortar that passes ASTM C 199 test; or an equivalent product acceptable to authorities having jurisdiction.
- L. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.

c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

M. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Wire Size for Veneer Ties: 0.148-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Masonry:

1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches wide, plus 2 side rods at each wythe of masonry 4 inches wide or less.

2.8 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Stainless-Steel Wire: ASTM A 580/A 580M, Type 316.
2. Stainless-Steel Sheet: ASTM A 666, Type 316.
3. Stainless-Steel Bars: ASTM A 276 or ASTM a 666, Type 304.

B. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213 or D/A 210 with D/A 700-708.
 - 2) Heckmann Building Products Inc.; 315-D with 316 or Pos-I-Tie.
 - 3) Hohmann & Barnard, Inc.; DW-10.
 - 4) Wire-Bond; 1004, Type III or SureTie.
4. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.
 - 2) ITW Buildex; Scots long life Tek.

2.9 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use one of the following unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 6) York Manufacturing, Inc.; Multi-Flash 500.
2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Advanced Building Products Inc.; Cop-R-Cote.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
 - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.

- 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
3. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Advanced Building Products Inc.; Peel-N-Seal.
 - 2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
 - 4) Fiberweb, Clark Hammerbeam Corp.; Aquaflash 500.
 - 5) Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 6) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
 - 7) Hohmann & Barnard, Inc.; Textroflash.
 - 8) W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
 - 9) Polyguard Products, Inc.; Polyguard 400.
 - 10) Sandell Manufacturing Co., Inc.; Sando-Seal.
 - 11) Williams Products, Inc.; Everlastic MF-40.
 - b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
 4. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) DuPont; Thru-Wall Flashing.
 - 2) Hohmann & Barnard, Inc.; Flex-Flash.
 - 3) Hyload, Inc.; Hyload Cloaked Flashing System.
 - b. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
 - c. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of adhesive.
 - d. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
 - 1) Color: Black.
 - e. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

5. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch thick.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Carlisle Coatings & Waterproofing; Pre-Kleened EPDM Thru-Wall Flashing.
 - 2) Firestone Specialty Products; FlashGuard.
 - 3) Heckmann Building Products Inc.; No. 81 EPDM Thru-Wall Flashing.
 - 4) Hohmann & Barnard, Inc.; Epra-Max EPDM Thru-Wall Flashing.
 - 5) Sandell Manufacturing Co., Inc.; EPDM Flashing.

B. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge or elastomeric thermoplastic flashing with drip edge or flexible flashing with a metal sealant stop.
4. Where flashing is fully concealed, use flexible flashing.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use one of the following unless otherwise indicated:
 1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.
 2. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
 3. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.

4. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Advanced Building Products Inc.; Mortar Maze weep vent.
 - 2) Blok-Lok Limited; Cell-Vent.
 - 3) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
 - 4) Heckmann Building Products Inc.; No. 85 Cell Vent.
 - 5) Hohmann & Barnard, Inc.; Quadro-Vent.
 - 6) Wire-Bond; Cell Vent.
 5. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.
 6. Aluminum Weep Hole/Vent: One-piece, L-shaped units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel with louvers stamped in web and with a top flap to keep mortar out of the head joint; painted before installation to comply with Division 09 painting Sections in color selected by Architect.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hohmann & Barnard, Inc.; #343W - Wilko Weep Hole.
 7. Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hohmann & Barnard, Inc.; #343 Louvered Weep Hole.
 - 2) Williams Products, Inc.; Williams-Goodco Brick Vent.
 - 3) Wire-Bond; Louvered Weepholes.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Advanced Building Products Inc.; Mortar Break Mortar Break II.
 - b. Archovations, Inc.; CavClear Masonry Mat.
 - c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
 - d. Mortar Net USA, Ltd.; Mortar Net.
2. Provide one of the following configurations:
- a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 1-1/2 inches thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
 - c. Sheets or strips full depth of cavity and installed to full height of cavity.
 - d. Sheets or strips not less than 3/4 inch thick and installed to full height of cavity with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime masonry cement or mortar cement mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime masonry cement or mortar cement mortar.
 4. For reinforced masonry, use portland cement-lime masonry cement or mortar cement mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type N.
 3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
 3. Mix to match Architect's sample.
 4. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Face brick.
 - c. Hollow brick.
 - d. Stone trim units.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Architect's sample.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Face brick.
 - c. Hollow brick.
 - d. Stone trim units.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
 - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Allow cleaned surfaces to dry before setting.
 3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 COMPOSITE MASONRY

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.
 3. Embed tie sections connector sections and continuous wire in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
 4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 5. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.
 6. Space anchors as indicated, but not more than 16 inches o.c. vertically and 32 inches o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 3. Build in compressible joint fillers where indicated.
 4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide steel lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
 - 3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.
 - 4. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
 - 5. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 6. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.

7. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
 8. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 9. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 10. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products to form weep holes.
 2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes 24 inches o.c. unless otherwise indicated.
 4. Space weep holes formed from plastic tubing or wicking material 16 inches o.c.
 5. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
 6. Trim wicking material flush with outside face of wall after mortar has set.
- F. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- G. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 2 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- J. Prism Test: For each type of construction provided, according to ASTM C 1314 at 28 days.
- 3.14 MASONRY WASTE DISPOSAL
- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04200

SECTION 04720 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Cast-stone trim[,] including the following:

- a. Window sills.
- b. Coping.
- c. Cornices
- d. Wall caps.
- e. Belt courses.

- B. Related Sections:

- 1. Section 042000 "Unit Masonry" for installing cast-stone units in unit masonry.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. For cast-stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Sustainable Design Submittals:

- C. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

- 1. Include building elevations showing layout of units and locations of joints and anchors.

- D. Samples for Initial Selection: For colored mortar.

- E. Samples for Verification:

- 1. For each color and texture of cast stone required, 10 inches square in size.
- 2. For each trim shape required, 10 inches in length.
- 3. For colored mortar, make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.
 - 1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.
 - 1. Provide test reports based on testing within previous two years.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute the Architectural Precast Association or the Precast/Prestressed Concrete Institute for Group A, Category AT.
- B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- C. Mockups: Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."
- D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical wall area as shown on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast-stone units in suitable packs or pallets.
 - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.
 - 2. Store cast-stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.7 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Cast Stone: Obtain cast-stone units from single source from single manufacturer.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

2.2 CAST-STONE MATERIALS

- A. General: Comply with ASTM C 1364.
- B. Portland Cement: ASTM C 150/C 150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast-stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33/C 33M; gradation and colors as needed to produce required cast-stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33/C 33M, gradation and colors as needed to produce required cast-stone textures and colors.
- E. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.

3. Air-Entraining Admixture: ASTM C 260/C 260M. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 4. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 5. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
 6. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.
- G. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast-stone material.
1. Epoxy Coating: ASTM A 775/A 775M.
 2. Galvanized Coating: ASTM A 767/A 767M.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.3 CAST-STONE UNITS

- A. Manufacturers
1. Sun Precast Co., Inc. or equal (Basis of Design)
- B. Cast-Stone Units: Comply with ASTM C 1364.
1. Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
- C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 3. Provide drips on projecting elements unless otherwise indicated.
- D. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- E. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:

- a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than six days at mean daily temperature of 60 deg F or above.
 - c. No fewer than seven days at mean daily temperature of 50 deg F or above.
 - d. No fewer than eight days at mean daily temperature of 45 deg F or above.
- F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- G. Colors and Textures: As selected by Architect from manufacturer's full range.
- H. Colors and Textures: Provide units with fine-grained texture and buff color resembling sand-rubbed Indiana limestone.
- I. Colors and Textures: Provide units with fine texture and red-brown color resembling brownstone on adjacent buildings.

2.4 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.
- B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.
- C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cast-stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
 - b. EaCo Chem, Inc.
 - c. PROSOCO, Inc.

2.5 MORTAR MIXES

- A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.
- B. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime masonry cement or mortar cement mortar unless otherwise indicated.
- C. Comply with ASTM C 270, Proportion Specification.
1. For setting mortar, use Type S.

2. For pointing mortar, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
 3. Mix to match Architect's sample.
 4. Application: Use pigmented mortar for exposed mortar joints.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Architect's sample.
 2. Application: Use colored-aggregate mortar for exposed mortar joints.

2.6 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to sample and test cast-stone units according to ASTM C 1364.
1. Include one test for resistance to freezing and thawing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

- A. Install cast-stone units to comply with requirements in Section 042000 "Unit Masonry."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
 2. Build anchors and ties into mortar joints as units are set.
 3. Fill dowel holes and anchor slots with mortar.
 4. Fill collar joints solid as units are set.
 5. Build concealed flashing into mortar joints as units are set.
 6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
 7. Keep joints at shelf angles open to receive sealant.
- E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- G. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- H. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.
- I. Point joints with sealant to comply with applicable requirements in Section 079200 "Joint Sealants."
1. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
- J. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
1. Keep joints free of mortar and other rigid materials.
 2. Build in compressible foam-plastic joint fillers where indicated.
 3. Form joint of width indicated, but not less than 3/8 inch.
 4. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
 - 1. Remove mortar fins and smears before tooling joints.
 - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
 - 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.
- B. Section 052100: Steel Joist Framing.
- C. Section 053000: Metal Deck, including field-installed shear connectors.

1.2 DESCRIPTION OF WORK

- A. This section includes structural steel.

1.3 QUALITY ASSURANCE

- A. Comply with latest editions of:
 - 1. American Institute of Steel Construction (AISC), "Manual of Steel Construction," including:
 - ANSI/AISC 360, "Specification for Structural Steel Buildings."
 - AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
 - Research Council on Structural Connections (RCSC), "Specification for Structural Joints Using High-Strength Bolts."
 - 2. American Welding Society, Inc. (AWS)
 - a. AWS D1.1 "Structural Welding Code - Steel."
 - b. AWS C5.4 "Recommended Practices for Stud Welding."
 - 3. Research Council on Structural Connections (RCSC), Educational Bulletin No. 4, "Recommended Erection and Field Inspection Procedures for High-Strength Bolts in Structural Steel Assemblies."
 - 4. American Hot-Dip Galvanizers Association, Inc.; Zinc Institute Inc.
 - a. "Inspection Manual for Hot-Dip Galvanized Products."
 - 5. Steel Structures Painting Council (SSPC)
 - a. "Surface Preparation Specifications."
- B. Qualifications for Welding Work:
 - 1. Qualify welding processes and welding operators in accordance with AWS standards.
 - 2. Provide one of the following certifications for welders to be employed in work.
 - a. Certification of satisfactorily passing AWS qualification tests within previous 12 months to perform type of welding in work.
 - b. Work record signed by supervisor showing regular employment within previous 12 months to perform type of welding in work.
- C. Qualifications for Fabricator, Detailer, and Erector:

1. Fabricator, Detailer, and Erector of structural steel shall have minimum 3 years experience in fabricating, detailing, and erecting structural steel.
 - a. Erector Qualifications: Erector shall be AISC Certified Erector, Category CSE.
 - b. Fabricator Qualifications: Fabricator shall be AISC Certified Fabricator, Category STD.
 - c. AISC Certification for Fabricators and Erectors may be waived at the discretion of Owner, Architect, and Engineer provided acceptable written quality assurance and quality control plan is submitted.
2. Submit written description of ability.
3. At completion of fabrication, Fabricator shall submit Certificate of Compliance to Special Inspector and Code Enforcement Official stating work was performed in accordance with approved Construction Documents in accordance with Chapter 17 of the 2020 *Building Code of New York State*.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 014533 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Contractor shall employ testing laboratory acceptable to Engineer and Architect to perform material evaluation tests.
- B. Submit testing service qualifications demonstrating experience with similar types of projects.
- C. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify RDPs 48 hours before anticipated time of completion for a given section of work so they may determine if site observations are required. If site observations are required, do not conceal framing until RDPs have had opportunity to make observations.

1.6 SUBMITTALS

- A. General: Review of submittals will be for general conformance only. Compliance with requirements for materials, fabrication, erection, and dimensioning of structural steel shall be Contractor's responsibility. Resubmitted shop drawings shall have revisions identified and dated.
- B. Connections: Submit as follows:
 1. Submit proposed connection types and calculations for review before preparing detailed shop drawings.
 2. Submit connection calculations in accordance with Option 3 of AISC *Code of Standard Practice for Steel Buildings and Bridges*. Calculations shall be stamped by a licensed Professional Engineer in New York State (Connection Design Engineer) retained by Fabricator.

3. Connections shown on shop drawings shall be coordinated with the submitted connection calculations. Submit written confirmation from Fabricator's Connection Design Engineer that the shop and erection drawings accurately incorporate the connection designs.
- C. Shop Drawings: Submit detailed drawings showing:
1. Submit Shop Drawings showing details of each individual steel shipping piece.
 2. Submit Erection Drawings showing location and attachment of individual steel shipping pieces. Including field installation details in Erection Drawings.
 3. Reference Contract Drawing number and addendum number in each shop and Erection drawing.
 4. Shop and Erection drawings shall show:
 - a. Details including cuts, copes, camber, connections, holes, bolts, and other pertinent information.
 - b. Connection design loads.
 - c. Material, including ASTM designations and grades or manufacturer's data as appropriate.
 - d. Welds with size, length, and type.
 - e. Anchor rod locations.
 5. Shop and Erection drawings shall be checked by detailer and noted as checked in drawings before submitting. Failure to submit checked Shop and Erection drawings will be cause for their return without review. If drawings are not prepared by detailer under direct control of Fabricator, Fabricator shall stamp each drawing and initial or sign stamp to certify review and approval of drawings and conformance with Fabricator's shop practice and capability.
- D. Material Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications. Submit producer's or manufacturer's specifications and installation instructions for the following products:
1. Structural steel, including certified copies of mill reports covering chemical and physical properties.
 2. High-strength bolts, including nuts and washers.
 3. Unfinished bolts and nuts.
 4. Structural steel primer paint if used.
 5. Welding electrodes.
 6. Post-installed anchors (expansion, sleeve, or chemical adhesive) if used.
- E. Bolt Certification: Submit to Special Inspector and Engineer certifications that bolts, nuts, and washers furnished comply with specifications. Submit manufacturer's inspection certificates for mill tests. For fasteners to be accepted, lot numbers on kegs, boxes, or bags must correlate with lot numbers shown in accepted test certificates and identification numbers in mill test reports. Manufacturer's symbol and grade markings must appear on bolts and nuts.
- F. Field Modifications: Submit drawings showing field modifications required to conform to actual field conditions or as required to correct errors in shop drawings, fabrication, or erection.
- G. Erector's Welding Procedure Specifications: Submit welding procedure specifications for joint types detailed for field welding.

1.7 PRODUCT HANDLING

- A. Store material in horizontal position on supports above ground.
- B. Protect from weather, and keep free of dirt and debris.
- C. Handle material carefully so it is not bent or marred.
- D. Store bolted fastener components in closed containers protected from moisture and contamination. Remove from protective storage containers only number of fasteners required for one shift. Return fasteners not installed at end of work day to protective storage.
- E. Repair or replace damaged materials. Do not incorporate in work fastener components that accumulate rust or dirt.

1.8 WORKMANSHIP

- A. Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Engineer.
- B. Remove work found to be defective. Replace with new acceptable work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials shall be new and free from rust.
- B. Rolled-Steel Plates and Bars: ASTM A 36 or ASTM A 572, Grade 50.
- C. Rolled-Steel Angles, C, and MC Shapes: ASTM A 36 or ASTM A 572, Grade 50.
- D. Rolled-Steel W and WT Shapes: ASTM A 992.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
- F. Hollow Structural Sections (HSS): ASTM A 500, Grade B or C.
- G. Unfinished Bolts, Nuts, and Washers: ASTM A 307, Grade A.
- H. High-Strength Bolts: ASTM F 3125, Grade A325 or Grade A490, Type 1, plain.
- I. Twist-Off-Type, Tension-Control Bolt Assemblies: ASTM F 3125, Grade F1852 or Grade F2280.
- J. High-Strength Bolts, Galvanized: ASTM F 3125, Grade A325, Type 1.
- K. Anchor Rods: ASTM F 1554, Grade 36 or Grade 55 with Supplement S1, unless otherwise indicated in Drawings.

- L. Threaded Rods: ASTM A 36 unless otherwise indicated in Drawings.
- M. Nuts: ASTM A 563. Grade and finish to match bolt or rod type.
- N. Washers: ASTM F 436 (ASTM F 844 for ASTM A 307 bolts, A 36 rods and F 1554 Grade 36 anchor rods). Finish to match bolt or rod type.
- O. Electrodes: E70 and in accordance with AWS.
- P. Headed Stud Anchors: ASTM A 108, AWS Type B, minimum tensile strength 65 ksi, solid-fluxed and in accordance with AWS. Use arc shield (ferrule) with each anchor. Size as indicated in drawings.
- Q. Steel Primer Paint: For steel scheduled to receive finish paint, use primer compatible with finish paint specified in Division 9.
- R. Hot-Dip Galvanizing: Hot-dip galvanize after fabricating in accordance with ASTM A 123. Restraighten members after galvanizing if necessary to be square and true. Items to be hot-dip galvanized are identified in drawings.
- S. Cold-Galvanizing Compound: Zinc-rich, anti-corrosion paint complying with ASTM A780. "ZRC Cold Galvanizing Compound" by ZRC Worldwide; "Roval Cold Galvanizing Compound" by Roval Corporation; or accepted equivalent. Items to be cold galvanized are identified on the drawings.
- T. Galvanizing Touch-up Compound: Zinc-rich, anti-corrosion paint complying with ASTM A780. "ZRC Galvilite" by ZRC Worldwide; "Roval ZC Galvanizing Repair" by Roval Corporation; or accepted equivalent. Use for field touch-up of hot-dip galvanized surfaces.
- U. Below-Grade Coating: Coal-Tar Epoxy, "TNEMEC 46H-413" or accepted equivalent.
- V. Expansion Anchors: "Kwik-Bolt 3" or "Kwik-Bolt-TZ" by Hilti; "Trubolt Wedge Anchors" by ITW Ramset/Red Head; "Power-Stud" by Powers Fasteners; "Wedge-All" by Simpson/Strong-Tie; or accepted equivalent.
- W. Sleeve Anchors: "HLC Sleeve Anchor" by Hilti; "Dynabolt Sleeve Anchor" by ITW Ramset/Red Head; "Power-Bolt" by Powers Fasteners; "Sleeve-All" by Simpson/Strong-Tie; or accepted equivalent.
- X. Screw Anchors: "Kwik HUS-EZ Screw Anchor" by Hilti; "Large Diameter Tapcon (LDT) Anchor" by ITW Ramset/Red Head; "Wedge-Bolt +" by Powers Fasteners; "Titen HD" by Simpson/Strong-Tie; or accepted equivalent.
- Y. Chemical Adhesive Anchors:
 - I. Anchors to solid concrete:
 - 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 Safe Set System with HIT-Z Rod or Hollow Drill Bit System" or "HIT-RE 500-

- SD” by Hilti; “Epcon C6” by ITW Ramset/Red Head; “T308 Plus” by Powers Fasteners; “ET Epoxy-Tie” by Simpson/Strong-Tie; or accepted equivalent.
2. Anchors to hollow masonry (brick or hollow CMU), grouted CMU, solid brick, or stone:
 - a. Anchors for use when base material temperature is 0°F or greater: “Epcon A7” by ITW Ramset/Red Head; “AC 100 Plus” by Powers Fasteners; “AT Acrylic-Tie” by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater: “HIT-HY 270” by Hilti; “Epcon C6” by ITW Ramset/Red Head; “T308 Plus” by Powers Fasteners; “ET Epoxy-Tie” by Simpson/Strong-Tie; or accepted equivalent.
 - c. Provide manufacturer’s standard screen tubes for use with anchors.
 - Z. Thermal Isolation Material (TIM) [Plates, bushings, and washers]: High-performance, fire-retardant, fiberglass-reinforced laminate composite for use between flanged connections of internal and external steelwork to limit thermal bridging, as manufactured by Fabreeka, Inc.; “Series 625 Extren” by Strongwell; or Type TBG300 by Farrat, Inc.; or accepted equivalent.
 - AA. High-Strength Bolts, Stainless Steel: ASTM F 593, Alloy Group 1 Condition CW.
 - AB. Stainless Steel Nuts: ASTM F 594, Alloy Group 1 Condition CW.

2.2 FABRICATION

- A. Fabricate structural steel in strict accordance with reviewed shop drawings and referenced standards.
- B. Fabricate and assemble structural material in shop to greatest extent possible.
- C. Fit stiffeners neatly between girder flanges. Where tight fits are required to transmit bearing, mill or grind ends of stiffeners for even bearing against flange.
- D. Where no camber is indicated, fabricate steel with mill camber up.
- E. Remove extension bars or runoff plates upon completing and cooling groove welds. Grind ends of welds smooth and flush with edges of abutting parts.
- F. Provide holes for securing other work to structural steel framing. Comply with AISC Specification 360, Section M2 for surface roughness for holes.
- G. For members to be hot-dip galvanized, comply with the American Galvanizer’s Association Design Guide: The Design of Products to be Hot-Dip Galvanized After Fabrication.
- H. Finish bottom of column and weld to base plate. Use flat base plates.
- I. For column base plates up to 24 inches, use 1/4-inch-thick, flat leveling plates unless noted otherwise in Drawings.
- J. Anchor Rods: Furnish anchor rods, leveling plate, or other devices necessary for setting anchoring rods required for securing structural steel to foundation, concrete, or masonry.

- K. Steel Wall Framing: Select members true and straight for fabrication of steel wall framing and lintels. Straighten as required to provide uniform, square, and true members in completed wall framing. Limit sweep to 1/8 inch for each 10 feet of length.
- L. Weld headed stud anchors with automatically timed, stud-welding equipment in accordance with ASW Specifications. Remove arc shields from studs after welding.
- M. Where headed stud anchors are to be welded to galvanized steel, Fabricator has the following options:
 - 1. Remove galvanized coating from surfaces to receive headed stud anchors prior to welding. Touch-up with cold-galvanizing paint after welding.
 - 2. Weld headed stud anchors to beams prior to galvanizing.

2.3 SHOP PAINTING

- A. Shop-paint structural steel work that will remain exposed to view in final work or where indicated in drawings. Do not paint members or portions of members to be concealed in final work embedded in concrete or mortar or to receive spray-on fireproofing unless noted otherwise in drawings.
- B. Do not paint the following surfaces:
 - 1. Surfaces within 2 inches of field welds.
 - 2. Surfaces within 1½ inches from center of high-strength, slip-critical (SC) bolts or areas within bolt pattern.
 - 3. Top flanges of beams to receive field-installed shear connectors or weldable reinforcement. Coordinate locations with installers.
 - 4. Top and bottom flanges of beams to receive field-installed brace angles, shear wall connectors, or hybrid connectors. Coordinate locations with installers.
- C. Apply two coats of paint to surfaces that will be inaccessible after assembly or erection. Apply two coats to surfaces indicated to be cold-galvanized.
- D. For steel to be spray-fireproofed, clean steel to remove dirt, grease, rust, and loose mill scale in accordance with SSPC-SP3 "Power Tool Cleaning."
- E. For steel to be cold-galvanized or primed and finish-painted, clean steel to remove dirt, grease, rust, and loose mill scale in accordance with SSPC-SP6 "Commercial Blast Cleaning" unless recommended otherwise by paint manufacturer.
- F. For steel to be hot-dip galvanized, prepare steel by successive immersion in chemical baths of caustic cleaning, pickling, and flux.
- G. After surface preparation, immediately apply structural steel primer paint in accordance with manufacturer's instructions at rate to provide uniform dry-film thickness of 2 mils. Use painting methods that will result in full coverage of joints, corners, edges, and exposed surfaces.
- H. Apply coal-tar epoxy coating to steel below slab on grade and in contact with soil or subbase materials or as indicated in drawings. Extend coating 1 inch into slab.

2.4 CONNECTIONS

- A. Comply with requirements of this section unless indicated otherwise in drawings.
- B. A licensed Professional Engineer (Connection Design Engineer) shall be retained by Fabricator to design connections in accordance with Option 3 in *AISC Code of Standard Practice for Steel Building and Bridges*.
- C. Use connection dimensions and sizes complying with AISC-published recommendations and limitations shown in drawings.
- D. For shear connections, use only connections published in the *AISC Steel Construction Manual* without modification unless otherwise indicated in Drawings.
- E. Connections shown in the Drawings are representative details. Design connections to comply with the requirements and limitations as shown in the Drawings.
- F. Weld or bolt shop connections.
- G. Bolt field connections wherever possible.
- H. Minimum Capacity of Beam Connections: For connections not detailed, provide connection capacity for shear, axial, and moment reactions shown in drawings. If reactions are not shown in drawings, base on either Allowable Stress Design or Load and Resistance Factor Design as follows:
 - 1. Shear Connections:
 - a. At least 50 percent of uniform load from Maximum-Uniform Load Tables in *AISC Steel Construction Manual*, Part 3, for given steel member (ASD or LRFD, as appropriate).
 - b. At least 70 percent of uniform load from Maximum Uniform Load Tables in *AISC Steel Construction Manual*, Part 3, for beams and girders with shear connectors (ASD or LRFD, as appropriate).
 - c. Concentrated loads near supports must be added.
 - 2. Moment Connections:
 - a. Design moment connections for full 75 percent of the bending capacity for given steel member.
- I. Beam connections to columns shall be in accordance with AISC and comply with the following.
 - 1. Use AISC Double-Angle Shear Connection for beam connections welded to faces of HSS columns having a workable flat of 6.75 inches or greater and to faces of W column flanges that have a width of 6.75 inches or greater.
 - 2. Use AISC Double-Angle Shear Connection for beam connections bolted to faces of W column flanges that have a width greater than 6 inches.
 - 3. Use AISC Single-Plate Shear Connection for beam connections to faces of columns smaller than required for double-angle shear connection.
 - 4. AISC Seated Connections are permitted as an alternative to double-angle and single-plate shear connections.
- J. Use AISC Single-Plate, Single-Angle, Double-Angle, or End-Plate Shear Connection for beam-to-beam connections.

- K. Provide high-strength or unfinished threaded fasteners installed snug-tight for bolted bearing connections of secondary framing members to primary members including girts, door framing systems, and roof openings.
- L. Provide high-strength fasteners for principal bolted connections unless otherwise indicated.
- M. Fabricator shall provide connections to properly transmit total reactions, moments, and axial forces either indicated in drawings or reasonably inferred from information provided.
- N. Provide snug-tightened joints using bearing bolts with thread condition N for bolted connections unless indicated otherwise. Provide pretensioned or slip-critical joints where shown or noted in drawings. For slip-critical joints, provide AISC Class A faying surface condition.
- O. Remove burrs that prevent solid seating of connected parts.
- P. ASTM F 3125 Grade F1852 or Grade F2280, twist-off-type, tension-control bolt assemblies may be used at snug-tightened. Compliance with RCSC Specifications for pre-installation testing and installation inspection is mandatory for the use of twist-off type, tension-controlled bolted connections, including pretensioned or slip-critical joints.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.

3.2 ERECTION

- A. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of a complete frame or structure before permanently fastening.
- B. Fit up connections to be field welded in compliance with AWS standard tolerances for review by the Special Inspector or Testing Agency prior to field welding.
- C. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact after assembly.
- D. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified tolerances.
- E. Contractor may field modify anchor rods and embedded structural supports incorrectly located or damaged after installation as indicated in Section 033000 and tested by Testing Agency. Submit documentation showing proposed field modification for review and acceptance by Engineer before beginning.
- F. Splice members only where shown or specified.
- G. Maintain work in stable condition during erection.

- H. Install snug-tightened bolted joints to comply with RCSC "Specification for Structural Joints Using High-Strength Bolts" and to comply with RCSC Educational Bulletin No. 4, "Recommended Erection and Field Inspection Procedures for High-Strength Bolts in Structural Steel Assemblies." Compliance with RCSC Specifications and Bulletins is mandatory for installation of all high-strength bolted connections.
- I. Install field connections and framing as detailed in Contract Documents and accepted shop drawings. If Contractor finds field modifications are necessary, submit documentation of proposed field modifications to Architect and Engineer for review and acceptance before beginning.
 - 1. Use of thermal cutting for field modifications is prohibited unless documented and accepted by Engineer before beginning.
 - 2. Use of thermal cutting for enlarging or cutting bolt holes in field is prohibited.

3.3 TOLERANCES

- A. Tolerances shall be within limits in AISC "Code of Standard Practice."
- B. Fabrication and mill tolerance shall be within limits in AISC "Standard Mill Practice."

3.4 TOUCH-UP PAINTING

- A. After erection is complete, touch up paint-damaged shop coats and welded areas with shop primer paint applied in accordance with manufacturer's instructions.
- B. Touch up paint damaged galvanized surfaces and welded areas with galvanizing touch-up compound or cold-galvanizing compound applied in accordance with manufacturer's instructions.
- C. Prepare surfaces of hot-dip galvanized members where the galvanization was omitted, or damaged in accordance with SSPC-SP3 "Power Tool Cleaning." Prepare field-welded galvanized members similarly.
- D. Remove weld slag before applying touch-up paint.

3.5 TEMPORARY SHORING AND BRACING

- A. Provide temporary shoring and bracing members as required with connections of sufficient strength to bear imposed loads.
- B. Remove temporary members and connections when permanent members are in place and final connections are made.
- C. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

3.6 PROTECTION

- A. Do not use members for storage or work platforms until permanently secured.

- B. Do not exceed load capacity of members with construction loads.

3.7 WELDING TO EXISTING STEEL

- A. Clean area to be welded using mechanical grinders and solvents to remove paint, rust, and other materials.
- B. Use E7018, low-hydrogen electrodes stored in ovens as prescribed by AWS. Preheat steel to be welded and maintain temperatures as prescribed by AWS.

END OF SECTION 051200 (03/20)

SECTION 052100 - STEEL JOIST FRAMING

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 work of this section.
- B. Section 051200: Structural Steel.
- C. Section 053000: Metal Deck.

1.2 DESCRIPTION OF WORK

- A. Extent of steel joists is shown in drawings, including basic layout and type of joists required.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with latest editions of:
 - 1. American Institute of Steel Construction (AISC) "Specification for Structural Steel Buildings." ("Allowable Stress Design or "Load and Resistance Factor Design".)
 - 2. Steel Joist Institute (SJI) "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders."
 - 3. Steel Structures Painting Council (SSPC) "Steel Joist Shop Primer Paint."
- B. Qualifications of Manufacturer: Qualify detailing and fabrication in accordance with SJI Standards:
 - 1. Detailer and Fabricator shall have not less than 3 years of experience in detailing and fabrication of steel joists and joist girders.
 - 2. Design special joists to comply with performance requirements. Provide calculations stamped by a New York State Professional Engineer.
 - 3. Submit written description of ability.
 - 4. At completion of fabrication, Manufacturer shall submit a Certificate of Compliance to the Special Inspector and to the Code Enforcement Official stating that the work was performed in accordance with the approved Construction Documents.
- C. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with SJI Standards.
- D. Qualifications for Erector of Steel Joists: Erector shall have not less than 3-years of experience in erection of steel joists and joist girders.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 014533 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ Testing Agency acceptable to Engineer and Architect to perform material evaluation tests.
- B. Submit testing service qualifications demonstrating experience with similar projects.
- C. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit the construction site at appropriate intervals to determine if work is in general conformance with the Contract Documents and specifications. Notify the RDPs 48 hours before the anticipated time of completion for a given section of work so that they may determine if site observations are required. If site observations are required, do not conceal the framing until the RDPs have had an opportunity to make observations.

1.6 SUBMITTALS

- A. General: Review of submittals will be for general conformance only. Compliance with requirements for materials, fabrication, erection, and dimensions shall be Contractor's responsibility.
- B. Shop Drawings:
 - 1. Reference Contract Drawing number including addendum number in each shop drawing.
 - 2. Include layout of members, connections, jointing, accessories, type, location, spacing, bridging, paint, installation instructions, and special details.
 - 3. Provide templates or location drawings for installation of anchor bolts and metal bearing plates.
- C. Manufacturer's Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications. Submit producer's or manufacturer's specifications and installation instructions.
- D. Comprehensive engineering analysis of special joists showing superimposed loading, web configuration, calculated member stresses, and allowable member stresses. Provide calculations signed and sealed by a New York State Professional Engineer.

1.7 PERFORMANCE REQUIREMENTS

- A. Deflection: Allowable deflections 1/240 of clear span for total load; 1/360 of clear span for live load.
- B. Uplift: Anchor joists to resist uplift loading based on wind component and cladding loads listed in the Drawings. Provide additional bottom chord bridging as required by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists in accordance with SJI's recommendations.
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

- C. Store members in vertical position above ground. Support from bearing points only. Do not support on bottom chord.
- D. Protect from elements, and keep free from dirt and other debris.
- E. Repair or replace damaged materials.
- F. Store packaged materials in their original unbroken container.
- G. Do not store materials on structure in manner that could cause distortion or damage to supporting structure.

1.9 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 STEEL JOISTS

- A. General: Materials shall be new and free from rust.
- B. K-Series Joists: Provide joists with steel angle top and bottom chords members.
 - 1. Size: As indicated in Drawings.
 - 2. Camber: In accordance with SJI unless noted otherwise.
 - 3. Steel Joist Substitutes: Manufacture in accordance SJI with steel angle or channel members.
- C. Long-Span Joists: Provide joists with steel angle top and bottom chords members.
 - 1. Type: LH & SLH.
 - 2. Size: As indicated in Drawings.
 - 3. Camber: In accordance with SJI unless noted otherwise.
 - 4. Profile: As indicated in Drawings.

2.2 JOIST ACCESSORIES

- A. Steel Shapes, Plates, and Bars: ASTM A 36.
- B. Unfinished Bolts, Nuts, and Washers: ASTM A 307, Grade A.
- C. High-Strength Threaded Fasteners: ASTM A 325 or A 490, heavy hexagon structural bolts with nuts and hardened washers.
- D. Electrodes: In accordance with AWS.

- E. Bridging:
 - 1. Provide number of rows of diagonal and horizontal bridging for joists and joist girders as required for type of joist, chord size, spacing, and span required by SJI and manufacturer unless otherwise shown in drawings. Furnish additional erection bridging if required for stability.
 - 2. Bridging for roof joists shall be horizontal type except for the bays adjacent to the exterior bays which shall have diagonal bridging unless otherwise shown.
 - 3. Provide bridging anchors for runs terminating at beams, columns, or walls.
- F. Steel Primer Paint: Fabricator's standard rust-inhibitive primer.

2.3 FABRICATION

- A. General: Fabricate steel joists in accordance with SJI. Properly mark materials for field assembly.
- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from area of chord when calculating strength of member.
- C. Extended Top Chord: Provide extended ends or top chords on joists as shown so as to have sufficient capacity to support loads.
- D. Extended Bottom Chord: Provide bottom chord extensions as shown for attachment to beams and columns. Extend ends to within 1/2 inch of member unless otherwise shown.
- E. Provide bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch in 12 inches.
- F. Anchorages: Furnish anchor bolts, weld plates, or other connectors required for securing members to other in-place work.

2.4 SHOP PAINTING

- A. After inspecting and before shipping, prepare surfaces by removing loose scale, rust, and other foreign materials. Preparation shall be equivalent to SSPC-SP3 "Power Tool Cleaning."
- B. Immediately after surface preparation, apply one shop coat of primer paint to steel joists and accessories by spraying, dipping, or other methods to provide continuous dry paint film thickness of not less than 1.0 mils.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.

3.2 ERECTION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction in accordance with SJI and joist manufacturer's written recommendations, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.
- C. Field weld joists to supporting steel. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using high-strength structural bolts unless noted otherwise in Drawings.
- E. Bridging: Install bridging simultaneously with joist erection before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at beams.
 - 1. If span of joist exceeds erection stability span indicated by SJI, install required rows of bolted diagonal bridging prior to releasing hoisting cables.
 - 2. Weld joist bridging except bridging for erection stability which shall be bolted.
- F. Bolt joists to supporting steel framework in accordance with SJI for type of joists used.
 - 1. Provide unfinished threaded fasteners for bolted connections except where high-strength bolts or welded connections are shown.
 - 2. Provide high-strength threaded fasteners for bolted connections of steel joists to steel columns.
- G. Maximum sweep tolerance in inches equals length of joist in feet divided by 40.

3.3 TOUCH-UP PAINTING

- A. After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories.
 - 1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
 - 2. Apply a compatible primer of same type as primer used on adjacent surfaces.
 - 3. Remove weld slag before applying touch-up paint.

3.4 TOLERANCES

- A. Tolerances shall be within limits of AISC "Code of Standard Practice."

3.5 PROTECTION

- A. Do not use members for storage or work platforms until permanently secured.
- B. Do not exceed load capacity of joists with construction loads.
- C. Repair or replace members damaged by shipping and handling. Fabricator's representative shall inspect damaged members and provide alternative methods of corrections.

END OF SECTION 052100 (08/14)

SECTION 053000 - METAL DECK

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 051200: Structural Steel.
- C. Section 052100: Steel Joist Framing.
- D. Section 033020: Concrete Slabs on Grade and Metal Deck.

1.2 DESCRIPTION OF WORK

- A. This section includes steel deck units for floor and roof applications.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with latest edition of:
 - 1. American Iron and Steel Institute (AISI) "Specification for the Design of Cold Formed Steel Structural Members."
 - 2. Steel Deck Institute (SDI).
 - a. "Design Manual for Composite Decks, Form Decks, and Roof Decks."
 - b. "Diaphragm Design Manual."
 - 3. American Welding Society Inc. (AWS).
 - a. AWS D1.1 "Structural Welding Code - Steel."
 - b. AWS D1.3 "Structural Welding Code - Sheet Steel."
 - c. AWS C5.4 "Recommended Practices for Stud Welding."
- B. Qualifications for Welding Work
 - 1. Use qualified welding processes and welding operators in accordance with AWS standards.
 - 2. Provide one of the following certifications for welders to be employed in work.
 - a. Certification of satisfactorily passing AWS qualification tests within previous 12 months to perform type of welding in work.
 - b. Work record signed by supervisor showing regular employment within previous 12 months to perform type of welding in work.
- C. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for Class 1, fire-rated construction.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 014533 and Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ testing laboratory acceptable to Engineer and Architect to perform material evaluation tests.
- B. Submit testing service qualifications demonstrating experience with similar types of projects.
- C. See Part 3 Section "Shear Connectors" for testing of shear connector installation at the start of each day's production welding period and after welding equipment has been moved or changed. This testing is to be by the shear connector installer.
- D. Contractor shall secure services of company field advisor from manufacturer of powder-actuated or pneumatically driven fasteners used to anchor metal deck. Field advisor shall be certified in writing by manufacturer to be technically qualified in product installation. Personnel involved solely in sales do not qualify. Field advisor shall be present at beginning of installation of product and as required during duration of project to:
 - 1. Render technical assistance to Contractor regarding installation procedures of product to satisfy warrantee or guarantee requirements.
 - 2. Provide specialized training in use of product to Contractor's personnel.
 - 3. Verify correct fastener is being used for each structural substrate type and thickness.
 - 4. Verify proper tools and application procedures.
 - 5. Familiarize Contractor/Owner/Architect/Engineer with entire system, including inspection techniques.
 - 6. Answer questions that arise.
- E. Field advisor shall prepare a written report summarizing information listed above. Submit report to Special Inspector, Contractor, Owner, Architect, and Engineer.
- F. Contractor shall be responsible for expenses of field advisor and verifying credentials of advisor.
- G. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify the RDPs 48 hours before anticipated time of completion for given section of work so that they may determine if site observations are required. If site observations are required, do not conceal metal deck or place concrete slabs until the RDPs have had opportunity to make observations.

1.6 SUBMITTALS

- A. General: Review of submittals is for general conformance only. Compliance with requirements for materials, fabricating, erection, and dimensions is Contractor's responsibility.
- B. Shop Drawings: Submit detailed drawings showing:
 - 1. Reference Contract Drawing number including addendum number in each shop drawing.

2. Panel layout.
 3. Anchorage details showing locations and size of welds or mechanical fasteners if used.
 4. Each condition requiring closure panels.
 5. Location and attachment of accessories.
 6. Supplementary framing furnished and required.
 7. Special conditions; opening locations.
 8. Side-lap fastening.
 9. Material thickness.
 10. Deck finish.
 11. Cross-section of panel with dimensions.
 12. Layout, size, material, and quantity of shear connectors.
 13. Powder-actuated corrosion resistant fasteners.
- C. Calculations: Submit calculations for powder-actuated fasteners indicating required diaphragm capacity has been provided in accordance with the Performance Requirements section of this Specification and the Drawings.
- D. Manufacturer's Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications. Submit producer's or manufacturer's specifications and installation instructions for the following products:
1. Sheet steel deck, including certified copies of mill reports covering chemical and physical properties.
 2. Shop primer paint if used.
 3. Welding electrodes.
 4. Mechanical and side-lap fasteners.
 5. Shear connectors.

1.7 PERFORMANCE REQUIREMENTS

- A. For composite deck, limit construction deflections from deck weight, wet concrete, and 20-psf construction live load to 1/180 of span or 3/4 inch, whichever is smaller.
1. Limit deflection from total uniform live and superimposed dead load to 1/360 of span when deck acts compositely with concrete slab.
- B. Limit construction deflection from concentrated live load of 300 pounds distributed over 1 foot to 1/240 of the span or 3/4 inch, whichever is smaller.
- C. Limit deflection of roof deck to 1/240 of span under total dead and live load.
- D. Anchor roof deck to resist uplift loading:
1. Eave Overhangs: 45 pounds per square foot.
 2. Other Roof Areas: 30 pounds per square foot.
- E. Install and anchor deck to develop 240 pounds per linear foot of diaphragm shear resistance unless noted otherwise.

1.8 PRODUCT HANDLING

- A. Store materials in approximately horizontal position on supports above ground with one end elevated for drainage.
- B. Protect from weather, and keep free of dirt and debris.
- C. Ventilate to avoid condensation.
- D. Handle material carefully so it is not bent or marred.
- E. Replace damaged materials at no cost to Owner.

1.9 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 DECK MATERIALS

- A. Materials shall be new and free from rust.
- B. Galvanized Steel Deck: ASTM A 653, with galvanized coating Designation G 60. Minimum 40,000 psi yield strength.
- C. Galvanized and Painted (Shop-primed) Steel Deck: ASTM A 653, with galvanized coating Designation G 60, extra smooth, with no oil preservatives. Cleaned and phosphatized, with one coat of shop primer. Areas of metal deck to be galvanized and shop primed are indicated in the drawings. Minimum 40,000 psi yield strength.
- D. Roof Deck Units:
 - 1. Type: "B or N" by Canam, Vulcraft, Consolidated System, Inc., New Millennium, or accepted equivalent.
 - 2. Size: As shown in drawings.
 - 3. Finish: Galvanized unless noted otherwise in drawings.
- E. Composite Floor Deck Units:
 - 1. Type: "B-Lok or Lok-Floor" by Canam; "VL" by Vulcraft; "Composite Floor-Dek" by Consolidated System, Inc.; "CD Deck" by New Millennium; or accepted equivalent.
 - 2. Size: As shown in drawings.
 - 3. Finish: Galvanized unless noted otherwise in drawings.
 - 4. Provide deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Open-beam deck units shall have fluted section with interlocking side laps.

- F. Acoustic Roof Deck Units:
 - 1. Type: “BA” or “NA” by Canam; “BA” or “NA” by Vulcraft; “B-Dek” or “N-Dek” Acoustical by Consolidated System, Inc.; or accepted equivalent.
 - 2. Size: As shown in drawings.
 - 3. Finish: Galvanized unless noted otherwise in drawings.

2.2 ACCESSORIES

- A. General: Provide manufacturer’s standard accessory materials for deck that comply with requirements indicated.
- B. Structural Shapes, Bars, and Plates: ASTM A 36. Refer to Section 051200.
- C. Shear Connectors: Headed stud-type, 3/4-inch-diameter, ASTM A 108 Grades 1010 through 1020, solid fluxed and in accordance with AWS. Provide Type B studs having a minimum yield strength of 50,000 psi, in accordance with AWS D1.1. An arc shield (ferrule) shall be used with each connector. Provide shear connections meeting the following size criteria unless noted otherwise in Drawings:
 - 1. Minimum of 3 inches long.
 - 2. Lengths to provide a minimum of 1 inch concrete cover over top of connectors.
 - 3. Connector to project a minimum of 1 1/2 inches above top of deck.
- D. Electrodes: In accordance with AWS.
- E. Welding Washers: As required by deck manufacturer.
- F. Mechanical Fasteners: Corrosion-resistant, low-velocity, powder-actuated, or pneumatically driven carbon steel fasteners or self-tapping screws.
 - 1. “X-ENP-19 L15” or “X-HSN-24” powder-actuated fasteners by Hilti, or accepted equivalent.
- G. Sidelap Fasteners: Corrosion-resistance, hexagonal washer head: self-tapping, carbon steel screws. No. 10 minimum diameter.
- H. Sheet Metal Accessories: ASTM A 653, SS Grade 33, commercial-quality steel sheets with G 60 galvanized coating.
 - 1. Pour stops and Girder Fillers: Provide 16-gauge-minimum thickness unless noted otherwise.
 - 2. Metal Cover Plates: Not less than thickness of deck.
 - 3. Metal Cell Closures: Provide 18-gauge-minimum (0.045-inch) thickness.
 - 4. Roof Sump Pans: Provide 14-gauge-minimum (0.0747) thickness.
 - 5. Provide 20-gauge-minimum thickness for other accessories unless noted otherwise.
- I. Flexible Cell Closures: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- J. Acoustic Sound Barrier Closures: Manufacturer's standard mineral-fiber closures.
- K. Shop Primer Paint: For application to metal surfaces chemically cleaned and phosphate chemical treated.
 - 1. “Valspar Low Cure Epoxy 88107-7197”, “Akzo Noble 9X4444”, or accepted equivalent.

2. Comply with the adhesion performance requirements of ASTM D 3359, Methods A and B with a 5A rating.

L. Touch-up Material:

1. Galvanizing Touch-up Compound: "ZRC Galvilite" by ZRC Worldwide; "Roval ZC Galvanizing Repair" by Roval Corporation; or accepted equivalent. Use for field touch-up of galvanized sheet metal.
2. Steel Primer Paint: Use primer compatible with finish paint specified in Division 9 for repair of painted surfaces.

2.3 FABRICATION

A. General: Form deck units in lengths to span three or more supports.

1. Provide flush or 2-inch nested end laps for roof deck, except at joists provide 4-inch nested end laps.
2. Provide flush end laps for floor deck.
3. Use nested side laps.
4. Prior to shipping decking to job site, manufacturer shall wire-brush, grind, clean, and paint scarred areas (weld marks on cellular deck, scratches, rust spots, etc.) on top and bottom surfaces of decking units.
 - a. Touch up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
 - b. Touch up painted surfaces with shop primer paint applied in accordance with manufacturer's instructions.
 - c. Galvanized and painted steel deck shall be first touched up with galvanizing repair paint. After paint has cured, touch up with shop primer paint.
 - d. Unrepaired scarred areas will be evaluated by Architect and may be cause for rejection of deck units.

B. Acoustic Deck Units:

1. Fabricate single-pan fluted units with vertical webs perforated with approximate 5/32-inch-diameter holes staggered 3/8 inch on center. Provide mineral-fiber acoustical insulation strips of profile to fit void space between vertical ribs.
2. Fabricate multiple-pan cellular units with upper fluted section combined with lower flat plate section having interlocking side laps and approximate 5/32-inch-perforations staggered on 3/8 inch centers under cells formed by upper unit. Provide manufacturer's mineral-fiber acoustical insulation strips of profile to fit void space of each cell.

C. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units. Form to match contour of deck units and approximately 6 inches wide.

D. Metal Cell Closures: Fabricate metal closure strips for cell raceways and openings between decking and other construction. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

E. Roof Sump Pans: Fabricate from single piece of sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide. Recess pans not less than 1½ inches below roof deck surface unless otherwise shown or required by deck configuration. Holes for drain will be field cut by others.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.

3.2 ERECTION

- A. General: Install deck and accessories in accordance with manufacturer's recommendations, and accepted shop drawings.
- B. Cut and fit units and accessories around projections through decking. Make cuts neat and square.
- C. Do not use cutting torches.
- D. Position deck on supporting steel framework and adjust to final position with ends bearing a minimum of 2 inches on supporting members and accurately aligned end to end before being permanently fastened.
- E. Do not install deck in a single span condition unless noted otherwise in Drawings. Lay out deck to provide a minimum two-span condition. Notify Engineer if single span deck is required.
- F. Do not stretch or contract side-lap interlocks.
- G. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.
- H. Place deck units flat and square, secured to adjacent framing without warp or deflection.
- I. At beams to receive shear connectors and pour stops, lap pour stop 2 inches onto beam flange and butt deck to pour stop. Do not lap deck onto pour stop. Locate shear connectors on the opposite side of the beam flange from pour stop.
- J. Coordinate and cooperate with structural steel erector in locating deck bundles to prevent overloading of structural members.
- K. Fastening Deck Units:
 - 1. Fasten floor deck units to steel supporting members to resist forces listed under Performance Requirements. Minimum fastening shall be by nominal 5/8-inch-diameter puddle welds or elongated welds of equal strength, spaced not more than 12 inches on center with minimum of three welds a unit at each support.
 - 2. Fasten roof deck units to steel supporting members to resist forces listed in drawings or under performance requirements. Minimum fastening shall be by nominal 5/8-inch-diameter puddle welds or elongated welds of equal strength, spaced not more than 12 inches at every support and closer where indicated. In addition, secure deck to each supporting member in ribs where side laps occur.
 - 3. Comply with AWS requirements and procedures for manual shielded metal arc- welding, appearance and quality of welds, and methods used in correcting welding work.

- a. Use welding washers where recommended by deck manufacturer.
 4. Mechanical fasteners may be used in lieu of welding. Locate fasteners and install in accordance with the manufacturer's accepted submittal.
 5. Mechanically fasten side laps of adjacent deck units between supports at intervals not exceeding 36 inches on center using No. 10 or larger self-tapping screws unless otherwise specified by manufacturer. Button punching not permitted.
 6. Keep the interiors of cells that will be used as raceways free of welds having sharp points or edges.
- L. Pour Stops and Girder Fillers: Install pour stops and girder fillers at edges of slabs and in voids between decking and other construction.
1. Weld pour stops and girder fillers at 6 inches on center. Butt joints tight and weld top and bottom.
- M. Cell closures: Install metal cell closures at open uncovered ends and edges of decking to provide complete decking installation.
1. Fasten using tack weld or install No. 10 or larger self-tapping screws at 4 feet on center.
 2. At Contractor's option, provide flexible cell closures instead of metal cell closures wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.
- N. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches on center with at least one weld at each corner.

3.3 DECK REINFORCEMENT

- A. Unless noted otherwise, reinforce roof deck as follows:
1. For deck openings less than 15 inches wide and not supported by structural members, fabricate from minimum 18-gauge, galvanized sheet metal. Fusion-weld to bottom surface of deck and extend at least 12 inches wider and longer than opening. Weld at each corner, and provide two welds to each rib crossed. Weld edges parallel with deck at 12 inches on center.
 2. For deck openings from 15 inches to 30 inches wide and not supported by structural members, weld 2-inch x 2-inch x 1/4-inch steel angle to underside of deck at right angles to deck ribs. Extend angles three ribs beyond each side of opening and puddle weld. Reinforce side of opening parallel to ribs with 18-gauge sheet metal 12 inches wide placed on bottom surface of decking. Weld plate at each corner and at 12 inches on center along edges.
 3. For deck openings greater than 30 inches wide, provide structural steel for edge support around entire opening. Frame into adjacent structural members.
 4. For sleeved penetrations smaller than rib width, no reinforcing is required.
- B. Unless noted otherwise, reinforce composite floor deck as follows:
1. For deck openings up to 24 inches wide and not supported by structural members, provide additional two, No. 5 bar slab reinforcing each side of openings as shown in drawings.
 2. For deck openings greater than 24 inches wide, provide structural steel for edge support around entire opening, except where a side is within 12 inches of another framing member. Frame into adjacent structural members.
 3. For sleeved penetrations smaller than rib width, no reinforcing is required.

4. At openings in composite decks not supported by structural members, form openings in slab, but do not cut deck until slab strength reaches 75 percent of its design strength or until needed by trade requiring the opening.

3.4 SHEAR CONNECTORS

- A. General: Installation shall be in accordance with AWS Code, using automatically timed connector welding equipment.
- B. Clean welding surface before installing connectors.
- C. Lay out shear connectors prior to welding.
- D. For beams perpendicular to deck span, distribute shear connectors as follows unless noted otherwise:
 1. Equally space (approximately) connectors in one row along beam at a maximum spacing of 2 feet on center. Notify Engineer if there are insufficient connectors to space at 2 feet on center throughout the length of the beam.
 2. If there are connectors remaining, assign one connector to every other rib without a connector starting at each end of beam.
 3. If there are still connectors remaining, assign one connector to each rib without a connector, again starting at each end of beam.
 4. If number of connectors exceeds number of ribs, assign one connector to each rib. Assign a second connector to each rib starting at each end of beam until all connectors are used. Weld connectors only after assigning is completed.
 5. Do not center connectors in ribs with rib stiffeners. Offset connectors to the side of each rib closest to the nearest beam end.
- E. For beams parallel to deck span, distribute shear connectors as follows unless noted otherwise:
 1. Equally space total number of connectors in one row along beam.
 2. Connector spacing along beam shall not be closer than 4 1/2 inches on center.
 3. For one row of connectors, locate connectors over beam web. For two rows of connectors, locate each row 1½ inches from center of beam web (3-inch gauge).
- F. At start of each day's production welding period and after welding equipment has been moved or changed, weld and test two test connectors. These connectors shall be bent to an angle of 30 degrees from vertical by striking with a hammer. If failure occurs in weld zone of either connector, correct or adjust welding operation. Two consecutive connectors shall be welded and found satisfactory before production welding can begin.
 1. Where connectors are welded through metal deck, ten connectors shall be tested as described above. Connectors shall be on the same beam and through the same deck type and thickness. Ten consecutive connectors shall be welded and found satisfactory before production welding can begin.
 2. Connector tests shall be performed each time conditions change (i.e., no deck to through deck, through one thickness or layer of deck to another thickness or multiple layers of deck, change of deck types).
- G. Replace connectors that fail inspection by Testing/Inspecting Agency at no expense to Owner.
- H. Break ferrules away from connectors. Remove ferrules from deck prior to placing concrete.

- I. Do not weld when air temperature is below 0 degrees F or when welding surface is wet.
- J. Beam top flange shall not be painted or galvanized in area of connector welding. Remove paint, galvanized coating, rust, and debris prior to welding connectors.
- K. Number of shear connectors shown in drawings is based on deck type and size specified. Should deck be installed with characteristics different than specified deck, number of shear connectors shall be increased to provide equivalent capacity at no additional expense to Owner.

3.5 TOUCH-UP PAINTING

- A. After installing decking, wire-brush, clean, and paint scarred areas (scratches, weld burn marks, etc.), welds (shop and field), and rust spots on top and bottom surfaces of decking units and supporting steel members.
 - 1. Touch-up paint damaged galvanized surfaces and welded areas with galvanizing touch-up compound applied in accordance with manufacturer's instructions.
 - 2. Galvanized and painted steel deck shall be first touched up with galvanizing touch-up compound. After paint has cured, touch up with shop primer paint.
- B. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

3.6 CLEANING

- A. Clean debris from metal deck prior to placing concrete slabs and installing roofing materials. Remove dirt, debris, shear connector ferrules, weld flux and other items not meant to remain as part of the final Work. Coordinate cleaning method with site conditions.

3.7 PROTECTION AND LOADING

- A. Do not use units for storage or for work platforms until deck is permanently secured to the supporting structure.
- B. Do not exceed load capacity of deck with construction loads. Limit temporary construction loads to 20 psf.
- C. Before concrete placement, check welds. Reweld broken or damaged welds.
- D. Do not suspend mechanical, electrical, or plumbing items from roof deck. Suspend loads directly from main framing or from supplemental framing installed between main framing.
 - 1. Refer to mechanical, electrical, and plumbing specifications for hangers and supplemental framing required to attach these items to main framing.

3.8 TOLERANCES

- A. Maximum variation in deck unit alignment shall be 1/4 inch in 40 feet.

END OF SECTION 053000 (06/20)

SECTION 054000 - COLD-FORMED METAL FRAMING

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 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
- C. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.2 DESCRIPTION OF WORK

- A. This section includes the following types of cold-formed metal framing:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Soffit framing.
 - 3. Manufacturer's accessories.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with latest editions of:
 - 1. AISI S100 "North American Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. AISI S200 "North American Standard for Cold-Formed Steel Framing – General Provisions".
 - 3. AISI S201 "North American Standard for Cold-Formed Steel Framing – Product Standard".
 - 4. AISI S210 "North American Standard for Cold-Formed Steel Framing – Floor and Roof System Design".
 - 5. AISI S211 "North American Standard for Cold-Formed Steel Framing – Wall Stud Design".
 - 6. AISI S212 "North American Standard for Cold-Formed Steel Framing – Header Design".
 - 7. AISI S213 "North American Standard for Cold-Formed Steel Framing – Lateral Design".
 - 8. AISI "Code of Standard Practice for Cold-Formed Steel Structural Framing".
 - 9. American Welding Society, Inc. (AWS): AWS D1.1 "Structural Welding Code - Steel" and AWS D1.3 "Structural Welding Code - Sheet Steel."
 - 10. American Society for Testing and Materials (ASTM):
 - a. ASTM C 1007 "Standard Specification for Installation of Load-Bearing (Transverse and Axial) Steel Studs and Related Accessories."
 - b. ASTM A653 / A653M – 09a "Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process."

- c. ASTM A780 / A780M - 09 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
- B. Qualifications for Welding Work:
- 1. Qualify welding processes and welding operators in accordance with AWS standards.
 - a. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - b. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
 - 2. Provide one of the following certifications for welders to be employed in the work:
 - a. Certification of satisfactorily passing AWS qualification tests within previous 12 months to perform type of welding in work.
 - b. Work record signed by supervisor showing regular employment within previous 12 months to perform type of welding in work.
- C. Qualifications for Fabricator and Installer:
- 1. Installer of cold-formed metal framing shall have minimum 3-years experience in installation of cold-formed metal framing on projects similar in material, design, and size to this project.
 - 2. Submit written description of ability.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 for testing indicated.
- E. Delegated Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- F. Professional Engineer Qualifications: A professional engineer who is legally qualified 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.
- G. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- H. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating including those required for compliance with governing regulations, provide units that have been approved by governing authorities having jurisdiction.
- I. Preinstallation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work, including structural steel, door and window frames, mechanical, and electrical work. Review areas of potential interference and conflicts. Coordinate layout and support provisions for interfacing work.
- 1.4 SPECIAL INSPECTIONS
- A. Refer to Specification Section 014533 and the Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ a testing laboratory acceptable to Engineer and Architect to perform material evaluation tests.
- B. Submit testing service qualifications demonstrating experience with similar types of projects.
- C. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit the construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify RDPs 48 hours before anticipated time of completion for a given section of work so they may determine if site observations are required. If site observations are required, do not conceal framing until RDPs have had an opportunity to make observations.

1.6 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings showing:
 - 1. Reference Contract Drawing number and addendum number in each shop drawing.
 - 2. Cold Formed Metal Wall Framing:
 - a. Include complete layout of framing, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Provide building elevations showing framing layout including shop-fabricated panels.
 - b. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - c. For cold-formed metal framing design delegated to specialty Engineer and indicated to comply with design loads, include structural analysis and detailed shop drawings signed and sealed by a qualified Professional Engineer, who shall be licensed in the State in which the Project is located and responsible for their preparation.
- B. Delegated-Design Submittal: For cold-formed steel framing:
 - 1. Indicated in architectural drawings and not designated in structural drawings.
 - 2. Indicated as “design by specialty Engineer” or “design by delegated Engineer” in structural drawings.
- C. Material Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications based on evaluation of comprehensive tests for current products. Submit producer’s or manufacturer’s specifications and installation instructions for the following:
 - 1. Product data and installation instructions for each item of cold-formed metal framing and accessories, including manufacturer’s suggested capacities and certified test data.
 - 2. Mill certificates signed by steel sheet producer or test reports from qualified independent Testing Agency indicating steel sheet complies with specified requirements.
 - 3. Certification that framing members have equivalent or greater capacities and properties than specified performance requirements.
 - 4. Welding certificates and electrodes.
 - 5. Product data for screws, bolts, and other fasteners used.
 - 6. Post installed anchors (expansion, sleeve, or chemical adhesive) if used.

7. Mechanical fasteners.
 8. Vertical deflection clips.
 9. Horizontal drift deflection clips.
 10. Miscellaneous structural clips and accessories.
 11. Research reports: For non-standard cold-formed steel framing, from ICC-ES.
- D. Qualification Data: Submit to Special Inspector and Engineer data for firms and persons specified in “Quality Assurance” paragraph to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.
- E. Coordination Drawings: Submit plans, elevations, sections, and details illustrating interface and anchorage of manufactured wall panels to cold-formed metal framing system.

1.7 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified Professional Engineer, as defined in Section 1.3F to perform delegated cold-formed steel framing design as indicated. Load-bearing stud design shall be All-Steel Design per Section D4.1 of AISI S100. Structural contribution of attached sheathing shall not be considered.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated in Drawings.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing with metal panel Veneer: Horizontal deflection of $1/360$ of the wall height.
 - b. Exterior Non-Load-Bearing Framing with Masonry veneer: Horizontal deflection of $1/600$ of the wall height.
 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 degrees F (67 deg C).
 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 inch (25 mm).
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Maintain spacing and configuration as indicated in drawings. Details showing specific framing sizes, gauges, and connection information in the Drawings are required as part of the installed framing system.
- D. Cold-Formed Steel Framing Design Standards: Design according to AISI's S100 “North American Specification for the Design of Cold-Formed Steel Structural Members.” See Section 1.3A for applicable AISI standards.

- 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.

1.8 PRODUCT HANDLING

- A. Store materials in approximately horizontal position on supports above ground with one end elevated for drainage.
- B. Protect from weather, and keep free of dirt and debris.
- C. Ventilate to avoid condensation.
- D. Handle material carefully so it is not bent or marred.
- E. Replace damaged materials at no cost to Owner.

1.9 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. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: Provide galvanized finish to metal framing components complying with ASTM A 653 for minimum G60 coating. Provide minimum G90 coating for exposed exterior environments.
- B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: 50.
 - 2. Coating: G90 (Z275).
- C. Non-Load Bearing Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch - 54 mil (16 Ga).
 - 2. Flange Width: 1-5/8 inch minimum.
 - 3. Section Properties: As indicated on drawings. Where not indicated on drawings, as required by structural performance.

- D. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs, unless thicker material is required by structural performance.
 2. Flange Width: 1-1/4 inch minimum.
- E. Load Bearing 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, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch - 54 mil (16 Ga).
 2. Flange Width: 1-5/8 inches (41 mm).
 3. Section Properties: As indicated on drawings. Where not indicated on drawings, as required by structural performance.
- F. Wall Bridging:
1. Channel Bridging Inside Wall: 1-1/2 inch web, 1/2 inch flanges, 0.0342 inch uncoated thickness and G-90 hot-dipped galvanized coating according to ASTM A 123/A 123M. Attach to studs as required by structural design calculations.
 2. Flat Strap: Width and thickness as required by structural design calculations.
 3. Solid Bridging: Channel-shaped bridging with lipped flanges and integral formed clips. Size and gauge as required by structural design calculations.
- G. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating required out-of-plan loading and upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- H. 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, and as follows:
1. Minimum Base-Metal Thickness: 68 mil (14 Ga) for exterior conditions and 43 mil (18 Ga) for interior conditions, unless noted otherwise.
 2. Flange Width: 1 inch plus twice the design gap – with minimum 1-1/2" overlap on stud.
- I. 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.
- J. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch - 54 mil (16 Ga).
 2. Flange Width: 1-5/8 inches (41 mm) minimum.
 3. Section Properties: As indicated on drawings. Where not indicated on drawings, as required by structural performance.
- K. System Components: AISI standard load-bearing steel studs and joists of type, size, shape, and gauge as indicated. With each type of metal framing required, provide manufacturer's standard steel runners (tracks), bridging, blocking, lintels, clip angles, vertical deflection (slide) clips, shoes, reinforcements, fasteners, and accessories for application indicated as needed to provide complete metal framing system and comply with structural drawings and structural performance criteria.

2.2 ACCESSORIES

A. Fasteners:

1. Screws: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws in accordance with manufacturer's recommendations for size and spacing unless detailed otherwise in drawings.
 - a. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
2. Bolts and Nuts: ASTM A 307.
3. Finish: Corrosion-resistant, plated finish.

B. Provide accessories of manufacturer's standard thickness and configuration unless required for structural performance, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Stud kickers and knee braces.
8. Joist hangers and end closures.
9. Hole reinforcing plates.
10. Backer plates.

C. 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.

D. Welding Electrodes: As permitted by AWS.

E. Power-Actuated Fasteners: 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 the design load as determined by testing in accordance with ASTM E 1190, performed by a qualified independent Testing Agency.

F. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

1. "Kwik-Bolt 3" by Hilti; "Trubolt Wedge Anchors" by ITW Ramset/Red Head; "Power-Stud" by Powers Fasteners; "Wedge-All" by Simpson/Strong-Tie; or accepted equivalent.

G. Sleeve Anchors: "HLC Sleeve Anchor" by Hilti; "Dynabolt Sleeve Anchor" by ITW Ramset/Red Head; "Power-Bolt" by Powers Fasteners; "Sleeve-All" by Simpson/Strong-Tie; or accepted equivalent.

H. Chemical Adhesive Anchors:

1. Anchors to solid concrete, grouted CMU, solid brick, or stone:
 - a. Anchors for use when base material temperature is 0°F or greater: "HIT-Ice" by Hilti; "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater: "HIT-HY 200

Safe Set” by Hilti; “Epcon C6” by ITW Ramset/Red Head; “T308 Plus” by Powers Fasteners; “ET Epoxy-Tie” by Simpson/Strong-Tie; or accepted equivalent.

- I. Steel Shapes and Clips: Provided under Section 051200; installed under this section.
- J. Anchor Rods: ASTM F 1554, Grade 36, threaded carbon steel hooked rods, galvanized.
- K. Nuts: ASTM A 563. Grade and finish to match rod type.
- L. Washers: ASTM F 844. Finish to match rod type.

2.3 MISCELLANEOUS MATERIALS

- A. Galvanizing Touch-up Compound: “ZRC Galvilite” by ZRC Worldwide; “Roval ZC Galvanizing Repair” by Roval Corporation; or accepted equivalent. Use for field touch-up of galvanized sheet metal.
- 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, nonmetallic, 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 (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.4 FABRICATION

- A. General: Prefabricate framing components into assemblies before erection wherever possible. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.
- B. Fabricate units in jig templates to hold members in proper alignment and position and to ensure consistent component placement.
- C. Fastenings: Attach components by welding, bolting, or screw fasteners as standard with manufacturer unless noted otherwise in drawings.
- D. Wire-tying of framing components shall not be permitted.
- E. Welds shall be fillet, plug, butt, or seam unless noted otherwise. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

- F. Cut framing components squarely or on an angle required to fit tightly with proper bearing against abutting members. Maintain members firmly in position until permanently fastened.
- G. Wire-brush shop welds clean, and apply galvanizing repair paint in accordance with ASTM A 780 and manufacturer's written instructions.
- H. 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. Space individual framing members within plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finish materials.
 - 2. Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.
 - 3. Length of end bearing members shall be within plus or minus 1/16 inch of length shown.

PART 3 - EXECUTION

3.1 INSTALLATION / ERECTION

- A. General: Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.
- B. Install cold-formed framing in accordance with ASTM C1007, AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions", and the manufacturer's written instructions, whichever is more stringent.
- C. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- D. Handling and lifting of members or prefabricated panels shall be done in a manner to not cause distortion in members. Lift only at points indicated in Shop Drawings.
- E. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as shown in drawings, except do not exceed 24 inches on center spacing for nail or power-driven fasteners or 16 inches on center for other types of attachment. Provide fasteners at corners and ends of tracks.
 - 1. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab to ensure a uniform bearing surface on supporting concrete or masonry construction.
- F. At track butt joints, abutting pieces of track shall be securely anchored to a common structural element or they shall be butt-welded or spliced together.
- G. Installation of Wall Studs: Secure studs to top and bottom runner tracks by either welding or screw-fastening at both inside and outside flanges as shown in drawings. Do not screw or weld non-load bearing studs to vertical deflection clips or deflection slip tracks.
 - 1. Set studs plumb except as needed for diagonal bracing or as required for nonplumb walls or warped surfaces and similar requirements.

2. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) 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 follows:
 - a. Stud Spacing: As indicated in structural drawings and approved shop drawings.
 3. Where stud system abuts structural columns or walls, anchor ends of bridging to supporting structure.
 4. 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.
 5. 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.
 6. 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.
 7. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm). Fasten at each stud intersection and anchor bridging lines to bottom and/or top tracks as indicated.
 - a. 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 8 inches (150 mm) deep.
 - b. 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.
 - c. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
 8. 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 wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards, considering weight or loading resulting from item supported.
 9. 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.
 10. Frame both sides of expansion and control joints with separate studs. Do not bridge the joint with components of stud system.
 11. Framing system shall be constructed to maintain clearances to allow for construction tolerances and to accommodate live load deflection of primary building structure as indicated in drawings.
- H. Bridging, blocking, and sheathing shall be in place prior to loading roof framing.
- I. Cutting of flanges in joist, stud, and header framing members shall not be permitted.
- J. Splicing of stud and header framing members shall not be permitted.
- K. Welding of wall and soffit stud framing and connection clips is required where shown in the Drawings.

3.2 ERECTION TOLERANCES

- A. Framing and prefabricated assemblies:
 - 1. Length of end bearing members: $\pm 1/16$ inch.
 - 2. Vertical alignment of studs: $\pm 1/8$ inch in 10 feet.
 - 3. Horizontal alignment of walls: $\pm 1/8$ inch in 10 feet; 1/4-inch maximum deviation from theoretical line.
 - 4. Framing spacing: $\pm 1/8$ inch from design spacing; 1/2-inch maximum cumulative error.
 - 5. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/4 inch.
- B. Bolt or weld wall panels at both horizontal and vertical junctures to produce flush, even, true-to-line joints.

3.3 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.

3.4 TOUCH-UP PAINTING

- A. After installing framing, wire-brush, clean, and paint scarred areas (scratches, weld burn marks, etc.), welds (shop and field), and rust spots on both surfaces of framing units and supporting steel members.
 - 1. Touch up paint-damaged galvanized surfaces and welded areas with galvanizing touch-up compound in accordance with manufacturer's instructions.

END OF SECTION 054000 (03/20)

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for operable partitions.
2. Steel framing and supports for overhead doors and grilles.
3. Steel framing and supports for countertops.
4. Steel framing and supports for mechanical and electrical equipment.
5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
6. Elevator machine beams, hoist beams,.
7. Steel shapes for supporting elevator door sills.
8. Metal ladders.
9. Ladder safety cages.
10. Miscellaneous steel trim including steel angle corner guards steel edgings and loading-dock edge angles.
11. Metal bollards.

B. Products furnished, but not installed, under this Section:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 Section "Structural Steel Framing."
4. Division 05 Section "Metal Stairs."
5. Division 05 Section "Pipe and Tube Railings."
6. Division 05 Section "Metal Gratings."
7. Division 05 Section "Decorative Metal."
8. Division 05 Section "Decorative Metal Railings."
9. Division 06 Sections for metal framing anchors and timber connectors.

10. Division 10 Section "Wire Mesh Partitions."
11. Division 12 Section "Site Furnishings" for bicycle racks.
12. Division 32 Section "Plants" for tree grates.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design ladders and alternating tread devices, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Structural Performance of Alternating Tread Devices: Alternating tread devices shall withstand the effects of loads and stresses within limits and under conditions specified in ICC's International Building Code.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

- A. Product Data: For the following:
 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 2. Prefabricated building columns.
 3. Metal nosings and treads.
 4. Paint products.
 5. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Samples for Verification: For each type and finish of extruded nosing and tread.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For qualified professional engineer.
- F. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.

- G. Welding certificates.
- H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- G. Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallurgically bonded to steel.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. IKG Industries, a division of Harsco Corporation; Mebac.
 - b. SlipNOT Metal Safety Flooring, a W. S. Molnar company; SlipNOT.
- H. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- I. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- J. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- E. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).
- F. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
- G. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- H. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.
- I. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
 - 3. Provide stainless-steel fasteners for fastening nickel silver.
 - 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Eyebolts: ASTM A 489.
- G. Machine Screws: ASME B18.6.3.
- H. Lag Screws: ASME B18.2.1.
- I. Wood Screws: Flat head, ASME B18.6.1.
- J. Plain Washers: Round, ASME B18.22.1.
- K. Lock Washers: Helical, spring type, ASME B18.21.1.
- L. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- M. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- N. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

- O. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 09 painting Sections.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as indicated recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.

1. Provide bearing plates welded to beams where indicated.
 2. Drill or punch girders and plates for field-bolted connections where indicated.
 3. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.
- E. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
 2. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.
- F. Galvanize miscellaneous framing and supports where indicated.

2.8 METAL LADDERS

A. General:

1. Comply with ANSI A14.3 unless otherwise indicated.
2. For elevator pit ladders, comply with ASME A17.1.

B. Steel Ladders:

1. Space siderails 18 inches apart unless otherwise indicated.
2. Space siderails of elevator pit ladders 12 inches apart.
3. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
4. Rungs: 1-inch- diameter steel bars.
5. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
6. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
7. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) IKG Industries, a division of Harsco Corporation; Mebac.
 - 2) SlipNOT Metal Safety Flooring, a W. S. Molnar company; SlipNOT.
8. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 3/4 inch in least dimension.
9. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
10. Galvanize exterior ladders, including brackets and fasteners.
11. Prime exterior ladders, including brackets and fasteners, with

2.9 LADDER SAFETY CAGES

A. General:

1. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.
2. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet o.c. Provide secondary intermediate hoops spaced not more than 48 inches o.c. between primary hoops.
3. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless-steel fasteners unless otherwise indicated.

B. Steel Ladder Safety Cages:

1. Primary Hoops: 1/4-by-4-inch flat bar hoops.
2. Secondary Intermediate Hoops: 1/4-by-2-inch flat bar hoops.
3. Vertical Bars: 3/16-by-1-1/2-inch flat bars secured to each hoop.
4. Galvanize ladder safety cages, including brackets and fasteners.
5. Prime ladder safety cages, including brackets and fasteners, with primer specified in Division 09 Section "High-Performance Coatings."

C. Aluminum Ladder Safety Cages:

1. Primary Hoops: 1/4-by-4-inch flat bar hoops.
2. Secondary Intermediate Hoops: 1/4-by-2-inch flat bar hoops.
3. Vertical Bars: 1/4-by-2-inch flat bars secured to each hoop.

2.10 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe.

1. Cap bollards with 1/4-inch- thick steel plate.
2. Where bollards are indicated to receive controls for door operators, provide necessary cutouts for controls and holes for wire.
3. Where bollards are indicated to receive light fixtures, provide necessary cutouts for fixtures and holes for wire.

B. Fabricate bollards with 3/8-inch- thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.

D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4 inch steel machine bolt.

- E. Prime bollards with primer specified in Division 09 Section "High-Performance Coatings."

2.11 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.
- C. Prime plates with primer specified in Division 09 Section "High-Performance Coatings."

2.12 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with primer specified in Division 09 Section "High-Performance Coatings."

2.13 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.14 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 1. Shop prime with universal shop primer unless primers specified in Division 09 Section "High-Performance Coatings" are indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning." SSPC-SP 3, "Power Tool Cleaning." requirements indicated below:
 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 3. Items Indicated to Receive Primers Specified in Division 09 Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.16 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. Do not fill removable bollards with concrete.

- B. Anchor bollards to existing construction with expansion anchors anchor bolts through bolts. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.
 - 1. Embed anchor bolts at least 4 inches in concrete.
- C. Anchor bollards in concrete in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
- D. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- E. Anchor internal sleeves for removable bollards in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of sleeve. Fill annular space around internal sleeves solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.
- F. Anchor internal sleeves for removable bollards in place with concrete footings. Center and align sleeves in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace sleeves in position until concrete has cured.
- G. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish padlocks.
- H. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.4 INSTALLING PIPE GUARDS

- A. Provide pipe guards at exposed vertical pipes in parking garage where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four 3/4-inch bolts at each pipe guard. Mount pipe guards with top edge 26 inches above driving surface.

3.5 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 07 Section "Joint Sealants" to provide a watertight installation.

3.6 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.7 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 05510 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preassembled steel stairs with concrete-filled epoxy-resin-filled treads.
2. Industrial-type stairs with steel floor plate treads.
3. Ornamental steel-framed stairs.
4. Steel tube railings attached to metal stairs.
5. Steel tube handrails attached to walls adjacent to metal stairs.
6. Railing gates at the level of exit discharge.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for concrete fill for stair treads and platforms.
2. Division 05 Section "Metal Fabrications" for.
3. Division 05 Section "Pipe and Tube Railings" for pipe and tube railings.
4. Division 05 Section "Fabricated Metal Spiral Stairs."
5. Division 05 Section "Decorative Metal Railings" for ornamental metal railings.
6. Division 06 Section "" for wood blocking for anchoring railings.
7. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.
8. Division 09 Section " Resinous Matrix Terrazzo Flooring" for terrazzo treads and landings.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 1. Uniform Load: 100 lbf/sq. ft..
 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.

5. Limit deflection of treads, platforms, and framing members to $L/360$ or $1/4$ inch, whichever is less.
- C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Component Importance Factor is 1.5.

1.4 SUBMITTALS

- A. Product Data: For metal stairs and the following:
1. Prefilled metal-pan stair treads.
 2. Abrasive nosings.
 3. Metal floor plate treads.
 4. Paint products.
 5. Grout.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes:
1. Precast concrete treads.
 2. Stair treads with nonslip-aggregate surface finish.
 3. Metal floor plate treads.
 4. Grating treads.
 5. Abrasive nosings.
- E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Qualification Data: For qualified professional engineer testing agency.
- G. Welding certificates.

- H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for stairs and railings.
 - 1. Test railings according ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Preassembled Stairs: Commercial class.
 - 2. Industrial-Type Stairs: Industrial class.
 - 3. Ornamental Stairs: Architectural class.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for exterior stairs indicated to be shop primed with zinc-rich primer.
- D. Machine Screws: ASME B18.6.3.
- E. Lag Screws: ASME B18.2.1.
- F. Plain Washers: Round, ASME B18.22.1.
- G. Lock Washers: Helical, spring type, ASME B18.21.1.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit

masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
- F. Nonslip-Aggregate Concrete Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rustproof and nonglazing; unaffected by freezing, moisture, or cleaning materials.
- G. Welded Wire Fabric: ASTM A 185/A 185M, 6 by 6 inches, W1.4 by W1.4, unless otherwise indicated.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 1. Join components by welding unless otherwise indicated.
 2. Use connections that maintain structural value of joined pieces.
 3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alfab, Inc.
 - 2. American Stair, Inc.
 - 3. Sharon Companies Ltd. (The).
- B. Stair Framing:
 - 1. Fabricate stringers of steel channels.
 - a. Provide closures for exposed ends of channel stringers.
 - 2. Construct platforms of steel plate headers and miscellaneous framing members as needed to comply with performance requirements.
 - 3. Weld stringers to headers; weld framing members to stringers and headers.
 - 4. Where stairs are enclosed by gypsum board shaft-wall assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.
 - 5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

- C. Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.067 inch.
1. Steel Sheet: Uncoated cold-rolled steel sheet.
 2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
 3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 4. Shape metal pans to include nosing integral with riser.
 5. Attach abrasive nosings to risers.
 6. At Contractor's option, provide stair assemblies with metal-pan subtreads filled with reinforced concrete during fabrication.
 7. Provide epoxy-resin-filled treads, reinforced with glass fibers, with slip-resistant, abrasive surface.
 8. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.
 - a. Smooth Soffit Construction: Construct subplatforms with flat metal under surfaces to produce smooth soffits.

2.7 STAIR RAILINGS

- A. Comply with applicable requirements in Division 05 Section "Pipe and Tube Railings."
1. Fabricate newels of square steel tubing and provide newel caps of pressed steel, as shown.
 2. Rails may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
 3. Connect posts to stair framing by direct welding unless otherwise indicated.
- B. Steel Tube Railings: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
1. Rails and Posts: See drawings.
 2. Picket Infill: See drawings.
 3. Gates: Form gates from steel tube of same size and shape as top rails, with infill to match guards. Provide with cam-type, self-closing hinges for fastening to wall and overlapping stop with rubber bumper to prevent gate from opening in direction opposite egress.
- C. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
1. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint
- D. Form changes in direction of railings as follows:

1. As detailed.
 2. By bending.
 3. By flush bends.
- E. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- F. Close exposed ends of railing members with prefabricated end fittings.
- G. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
1. Connect posts to stair framing by direct welding unless otherwise indicated.
 2. For galvanized railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.
 3. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.
- 2.8 FINISHES (See Specification pipe and tube railings for railing finish)
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. All metal stair parts shall be powder coated
- C. Finish metal stairs after assembly.
- D. Preparation for Finish: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
1. Exterior Stairs: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Interior Stairs: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 3. Interior Stairs: SSPC-SP 3, "Power Tool Cleaning."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
- G. Place and finish concrete fill for treads and platforms to comply with Division 03 Section "Cast-in-Place Concrete."
 - 1. Install abrasive nosings with anchors fully embedded in concrete. Center nosings on tread width.
- H. Install precast concrete treads with adhesive supplied by manufacturer.

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.
- B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonmetallic, nonshrink grout unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING RAILINGS

- A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
1. Anchor posts to steel by welding directly to steel supporting members.
 2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with post installed anchors and bolts.
- B. Attach handrails to wall with wall brackets. Use type of bracket with predrilled hole for exposed bolt anchorage. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as required to comply with performance requirements. as follows:
1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 2. For hollow masonry anchorage, use toggle bolts.
 3. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
 4. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
 5. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING AFTER FITTING ALL STAIR AND RAILING PARTS

All stair parts and railings shall be pre fitted before powder coating no cutting or welding shall be done after powder coating.

END OF SECTION 055100

SECTION 055210 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Steel pipe and tube railings.
- B. Related Sections include the following:
 - 1. Division 5 Section "Metal Stairs" for steel tube railings associated with metal stairs.
 - 2. Division 5 Section "Ornamental Railings" for ornamental railings fabricated from pipes and tubes.
 - 3. Division 6 Section "Miscellaneous Carpentry" for wood blocking for anchoring railings.
 - 4. Division 9 Section "Gypsum Board Assemblies Gypsum Board Shaft-Wall Assemblies" for metal backing for anchoring railings.

1.3 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Aluminum: 72 percent of minimum yield strength.
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied horizontally and concurrently with 100 lbf/ ft. applied vertically downward.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 3. Infill of Guards:

- a. Concentrated load of 200 lbf applied horizontally on an area of 1 sq. ft..
 - b. Uniform load of 25 lbf/sq. ft. applied horizontally.
 - c. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. 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. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Manufacturer's product lines of mechanically connected railings.
 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.
1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of connecting members at intersections.
- E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- F. Welding certificates.
- G. Qualification Data: For testing agency.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Steel Pipe and Tube Railings:
 - a. Pisor Industries, Inc.
 - b. Sharpe Products.
 - c. Wagner, R & B, Inc.; a division of the Wagner Companies.
 - 2. Aluminum Pipe and Tube Railings:

- a. ATR Technologies, Inc.
- b. Blum, Julius & Co., Inc.
- c. Braun, J. G., Company; a division of the Wagner Companies.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Castings: Either gray or malleable iron, unless otherwise indicated.
 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
 2. Malleable Iron: ASTM A 47/A 47M.
- E. Expanded Metal: ASTM F 1267, Type I (expanded), Class 1 (uncoated).
 1. Style Designation: 3/4 number 13.

2.4 ALUMINUM

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- B. Extruded Bars and Tubing: ASTM B 221 (ASTM B 221M), Alloy 6063-T5/T52.
- C. Extruded Structural Pipe and Round Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
- D. Drawn Seamless Tubing: ASTM B 210 (ASTM B 210M), Alloy 6063-T832.
- E. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- F. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6061-T6.

- G. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.5 FASTENERS

- A. General: Provide the following:
1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 3. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Anchors: Provide cast-in-place anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.6 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Division 9 painting Sections.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
 - b. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.

- c. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
 - d. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
- 1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded either welded or nonwelded connections, unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
- 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

- I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- J. Form changes in direction as follows:
 - 1. As detailed.
- K. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of railing members with prefabricated end fittings.
- M. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.
- Q. For removable railing posts, fabricate slip-fit sockets from steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

2.8 FINISHES, GENERAL

- A. All railings interior and exterior shall have a powder coated finish. This shall include but not limited to; guard rails, handrails, railings, etc. All railings shall be field fitted before power coating.

- B. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
- E. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.9 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
2. Hot-dip galvanize indicated steel and iron railings, including hardware, after fabrication.
3. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
4. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.

- B. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

C. Nongalvanized steel railings:

Provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry. Prep as required and finish all railings and fittings with powder coating, the railing shall be pre-fitted in the field disassembled and the powder coated. **No powder coating shall be done before members are pre-fitted.**

2.10 ALUMINUM FINISHES

- A. Mechanical Finish: AA-M12 (Mechanical Finish: nonspecular as fabricated).
- B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

- A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, attached to post with set screws.
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ANCHORING RAILING ENDS

- A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends].

3.6 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.
 - 4. For steel-framed gypsum board partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.

3.7 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.

3.8 PROTECTION

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

END OF SECTION 05521

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for bituminous vapor retarders under slabs-on-grade.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. [List of Manufactures](#)

1. Henry Company
2. MasterSeal
3. Rust-oleum
4. Or approved equal

- B. Trowel Coats: ASTM D1227, Type II, Class 1.

- C. Fibered Brush and Spray Coats: ASTM D1227, Type II, Class 1.

- D. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
- C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
 2. Lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.

3.4 INSTALLATION OF COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations Walls: Apply one fibered brush or spray coat at not less than 3 gal./100 sq. ft. or one trowel coat at not less than 4 gal./100 sq. ft..
- B. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft..

3.5 PROTECTION

- A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where panels are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- B. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

END OF SECTION 071113

SECTION 072100 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Foundation wall insulation (supporting backfill).
 - 2. Cavity wall insulation.
 - 3. Concealed building insulation.
 - 4. Vapor retarders.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete."
 - 2. Division 4 Section "Unit Masonry Assemblies" for insulation installed in cavity walls and masonry cells.
 - 3. Division 7 Section "Self-Adhering Sheet Waterproofing" for insulation installed with waterproofing.
 - 4. Division 7 Section "EPDM-Single-Ply Membrane Roofing" for insulation specified as part of roofing construction.
 - 5. Division 9 Sections "Gypsum Board Assemblies" and "Gypsum Board Shaft-Wall Assemblies" for installation in metal-framed assemblies of insulation specified by reference to this Section.
 - 6. Division 15 Sections "Duct Insulation," "Equipment Insulation," and "Pipe Insulation."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.
- D. Research/Evaluation Reports: For foam-plastic insulation.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.

- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Extruded-Polystyrene Board Insulation:
 - a. Dow Chemical Company.
 - b. Owens Corning.
 - c. Tenneco Building Products.
 - 2. Polyisocyanurate Board Insulation:
 - a. Apache Products Company.
 - b. Celotex Corporation.
 - c. Johns Manville Corporation.
 - 3. Glass-Fiber Insulation:
 - a. CertainTeed Corporation.
 - b. Johns Manville Corporation.

- c. Owens Corning.

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively.
- C. Molded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:
 - 1. Type I, 0.90 lb/cu. ft..
- D. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face.

2.3 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- B. Protection Board: Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, of standard sizes.

2.4 INSULATION FASTENERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Adhesively Attached, Spindle-Type Anchors:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada Limited; Stic-Klip Type N Fasteners.
 - c. Gemco; Spindle Type.
 - 2. Adhesively Attached, Angle-Shaped, Spindle-Type Anchor:
 - a. Gemco; 90-Degree Insulation Hangers.
 - 3. Insulation-Retaining Washers:

- a. AGM Industries, Inc.; RC150.
 - b. AGM Industries, Inc.; SC150.
 - c. Gemco; Dome-Cap.
 - d. Gemco; R-150.
 - e. Gemco; S-150.
4. Insulation Standoff:
- a. Gemco; Clutch Clip.
5. Anchor Adhesives:
- a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Eckel Industries of Canada Limited; Stic-Klip Type S Adhesive.
 - c. Gemco; Tuff Bond Hanger Adhesive.
- C. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 2. Spindle: Copper-coated, low carbon steel, fully annealed, 0.105 inch in diameter, length to suit depth of insulation indicated.
- D. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Angle: Formed from 0.030-inch- thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
 2. Spindle: Copper-coated, low carbon steel, fully annealed, 0.105 inch in diameter, length to suit depth of insulation indicated.
- E. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawlspace.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- F. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of dimension indicated between face of insulation and substrate to which anchor is attached.
1. Air Space: 2 inches.

- G. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.
- B. Close off openings in cavities receiving poured-in-place insulation to prevent escape of insulation. Provide bronze or stainless-steel screens (inside) where openings must be maintained for drainage or ventilation.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

3.5 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- C. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor-retarder manufacturer.
- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.6 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.

END OF SECTION 07210

SECTION 072190 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Closed-cell spray polyurethane foam.

B. Related Requirements:

- 1. Section 072100 "Thermal Insulation" for foam-plastic board insulation.
- 2. Section 072713 "Modified Bituminous Sheet Air Barriers" for spray polyurethane foam insulation installed as part of an air barrier system.
- 3. Section 079200 "Joint Sealants" for spray polyurethane foam insulation installed as part of a barrier system.
- 4. Section 099646 "Intumescent Painting" for ignition barrier protection of spray urethane foam insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For spray-applied polyurethane foam-plastic insulation, from ICC-ES .

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer. Any repairs by an Icynene licensed contractor.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- C. Fire Resistance Characteristics: As determined by testing identical products (based on a 4 inch minimum thickness) according to ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- D. Fire Resistance Characteristics: As determined by testing identical products according to NFPA 285 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect spray polyurethane foam components as follows:
 - 1. Component A and B: store between 60 degrees F) and 90 degrees F
 - 2. Component B can be frozen but must be protected from overheating over 120 degree F and prolonged storage over 100 degree F).
 - 3. Component B: mix thoroughly prior to use.
 - 4. Components should be a matched set (system) as supplied by the manufacturer.
 - 5. Use components within their labeled shelf-life.
 - 6. Use components as supplied with no site alterations or additions.

1.7 WARRANTY

- A. Refer to manufacturer's standard warranty terms (as applicable).

PART 2 - PRODUCTS

2.1 PERFORMANCE CHARACTERISTICS

- A. Air Material Air Leakage Rate: Maximum material air leakage rate of less than 0.004 cfm/ft² under a pressure differential of 0.3 in w.g. (1.6 psf per ASTM E 2178 or E 282).
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Development Index: 450 or less.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Compressive strength: Minimum 40 psi ASTM C1029 Type II.
- E. Sustainability Requirements: Provide spray polyurethane foam insulation as follows:
 - 1. Low Emitting: Insulation tested according to CA/DPH/EHLB/v1.1-2010.
 - 2. Resistant to fungal growth as per ASTM C1338.
 - 3. Containing no PBDE.

2.2 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 2.5 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 7.0 deg F x h x sq. ft./Btu at 75 deg F.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Icynene Inc.; Icynene ProSeal or comparable product by one of the following:
 - a. BASF Corporation.
 - b. Dow Chemical Company (The).

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.
- B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
- D. Do not apply insulation within 3-inches), as per ASTM C411 or in accordance with applicable codes.
- E. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.
- F. Cavity Walls: Install into cavities to 3”.
- G. Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.3 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Thermal Protection: Protect installed spray polyurethane foam insulation with qualified thermal or ignition barrier per applicable building codes.

3.4 INSTALLATION OF AIR BARRIER COMPONENTS

- A. Install air barrier components – membranes and sealants – as indicated on drawings for spray polyurethane foam as part of an air barrier system.

END OF SECTION 072119

SECTION 074110 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes standing-seam metal roof panels.
- B. Related Sections:
 - 1. Section 074213.53 "Metal Soffit Panels" for metal panels used in horizontal soffit applications.
 - 2. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review structural loading limitations of deck purlins and rafters during and after roofing.
 - 6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
 - 7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 8. Review temporary protection requirements for metal panel systems during and after installation.
 - 9. Review procedures for repair of metal panels damaged after installation.
 - 10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockups for typical roof area only, including accessories.
 - a. Size: 12 feet long by 6 feet.
 - b. Each type of exposed seam and seam termination.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.
- E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
1. Wind Loads: 90
 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 at the following test-pressure difference:
1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
1. Test-Pressure Difference: 2.86 lbf/sq. ft..

- D. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.
- F. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
 - 1. Fire/Windstorm Classification: Class 1A- 90.
 - 2. Hail Resistance: MH.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 STANDING-SEAM METAL ROOF PANELS

- A. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [ATAS International, Inc.](#)
 - b. [Firestone Metal Products, LLC.](#)
 - c. [MBCI; a division of NCI Group, Inc.](#)
 - d. [McElroy Metal, Inc.](#)
 - e. [Merchant & Evans Inc.](#)
 - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 0.034 inch.
 - b. Exterior Finish: Kynar.
 - c. Color: As selected by Architect from manufacturer's full range.
 - 3. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

- a. Thickness: 0.032 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Kynar.
 - d. Color: As selected by Architect from manufacturer's full range.
4. Clips: Two-piece floating to accommodate thermal movement.
 - a. Material: 0.062-inch- thick, stainless-steel sheet.
 5. Joint Type: Double folded.
 6. Panel Coverage: 16 inches.
 7. Panel Height: 2.0 inches.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Residential; a division of Carlisle Construction Materials.
 - b. Henry Company.
 - c. Owens Corning.
 - d. GAF.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- E. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.
- F. Roof Curbs: Fabricated from same material as roof panels, 0.048-inch nominal thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length cricket. Fabricate curb subframing of 0.060-inch-nominal thickness, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match metal roof panels.
 - 1. Insulate roof curb with 1-inch-thick, rigid insulation.
- G. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- H. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the entire roof surface.
- B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 - 1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
 - 2. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

- H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 - 1. Connect downspouts to underground drainage system indicated.
- J. Roof Curbs: Install flashing around bases where they meet metal roof panels.
- K. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: MCA's "Guide Specification for Residential Metal Roofing."

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

SECTION 074240 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This Section covers the pre-finished, pre-fabricated Factory Manufactured Architectural Concealed attachment Metal Wall system. All metal trim, accessories, fasteners, insulation, and sealants indicated on the drawings as part of this section.
- B. Drawings and general provisions of the Contract, including general and Supplementary Conditions and Division 01 Specifications, apply to this section
- C. Related Work Specified Elsewhere
 - 1. Roof Deck structural steel, flat roof systems, preformed metal standing seam roofing, perimeter edge systems, roof hatches, firestopping not included in this section

1.3 SUMMARY

- A. Section Includes
 - 1. Factory formed metal wall panels
- B. Related work specified elsewhere (Note: select from the below or add appropriate sections)
 - 1. Metal Roof Deck: Division 5 – Metal Deck Sections
 - 2. Wood Framing and Decking: Division 6 Roof Carpentry Section
 - 3. Flashing and Trim: Division 7- Flashing and Sheet Metal
 - 4. Coping and Gravel Stops: Division 7 Roof Specialties and Accessories
 - 5. Sealants: Division 7 Joint Sealers Sections

1.4 DEFINITION

- A. Metal-Faced Composite Wall Panel Assembly: Metal-faced composite wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weathertight wall system.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

- B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- C. Water Penetration Under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- D. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
 - 1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure of 30 lbf/sq. ft., acting inward or outward.
 - b. Uniform pressure as indicated on Drawings.
 - 2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.
 - 1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
 - a. Flashing and trim.
 - b. Anchorage systems.
- C. Samples for Initial Selection: For each type of metal-faced composite wall panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.

2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Metal-Faced Composite Wall Panels: Minimum 12 x 12 inches. Include fasteners, closures, and other metal-faced composite wall panel accessories.
 - a. Composite Panels: Include four-way joint.
 2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
 3. Accessories: 12-inch- long Samples for each type of accessory.
 4. Exposed Gaskets: 12 inches long.
 5. Exposed Sealants: For each type and color of joint sealant required. Install joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of metal-faced composite wall panels adjacent to joint sealants.
- E. Coordination Drawings: Exterior elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Wall panels and attachments.
 2. Stud framing.
 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 4. Penetrations of wall by pipes and utilities.
- F. Qualification Data: For professional engineer and testing agency.
- G. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- I. Field quality-control reports.
- J. Maintenance Data: For metal wall panels to include in maintenance manuals.
- K. Warranties: Samples of special warranties.
- 1.7 QUALITY ASSURANCE
- A. Petersen Aluminum Corp products establish a minimum of quality required.
 1. Annapolis Junction, MD, 800-344-1400
 - B. Manufacturer and erector shall demonstrate experience of a minimum of five (5) years in this type of project.

- C. Sheet Metal Industry Standard: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual and National Roofing Contractors Association (NRCA) details applicable to wall panels and wall flashings.
- D. Panels shall be factory-produced only. No portable, installer-owned or installer-rented machines will be permitted
- E. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- F. Source Limitations: Obtain each type of metal-faced composite wall panel from single source from single manufacturer.
- G. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact joint sealants to joint-sealant manufacturers for testing indicated in subparagraphs below:
 - 1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.
 - 2. Submit no fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
- H. Fire-Resistance Ratings: Where indicated, provide metal-faced composite wall panels identical to those of assemblies tested for fire resistance per ASTM E 119 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.
- I. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall corner panel, including soffit, as shown on Drawings; approximately one bay wide by one story high by full thickness, including supports, attachments, and accessories.
 - a. Include four-way joint for metal-faced composite wall panels.
 - 2. Conduct water-spray test of mockup of metal-faced composite wall panel assembly, testing for water penetration according to AAMA 501.2.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal-faced composite wall panel Installer, metal-faced composite wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal-faced composite wall panels including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal-faced composite wall panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal-faced composite wall panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal-faced composite wall panel assembly during and after installation.
8. Review wall panel observation and repair procedures after metal-faced composite wall panel installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal-faced composite wall panels, and other manufactured items so as not to be damaged or deformed. Package metal-faced composite wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal-faced composite wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Store metal-faced composite wall panels vertically, covered with suitable weathertight and ventilated covering. Store metal-faced composite wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F.
- D. Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal-faced composite wall panels to be performed according to manufacturer's written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal-faced composite wall panel fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

- A. Coordinate metal-faced composite wall panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- 1. The bases of design is around Pac Clad: PAC Precision Series Highline M1, 12.004" width, 1 3/8" High, Three-rib profile with clip attachment.

2.2 MISCELLANEOUS METAL FRAMING

- A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G60 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal-faced composite wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.4 METAL PANELS

- A. Panel Design
 1. Provide factory-formed wall panels that shall be concealed attachment in nominal 12" width with 1 3/8" high panel corrugations that are mechanically attached to wall supports and do not have any exposed fasteners on the panel face for attachment to the wall supports. Panels can be specified for clip attachment.
 2. Architect to select from the following:
 3. PAC Precision Series Highline M1, 12.004" width, 1 3/8" High, Three-rib profile with clip attachment

2.5 MATERIAL AND FINISH

- A. Preformed metal panels shall be fabricated of 24 GA G-90 Galvanized steel.
- B. Color shall be PAC-CLAD *Pac-Clad Metallic Finish
- C. Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over 0.25 to 0.31 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
- D. Field protection must be provided by the Contractor at the job site so material is not exposed to weather and moisture.
- E. Forming: use continuous and rolling method. No "portable rollforming" machines will be permitted on this project; no installer-owned or installer-rented machines shall be permitted. It is the intent of the Architect to provide Factory-Manufactured wall panel systems only for this project.

- F. Trim: Trim shall be fabricated of the same material and finish to match the profiled sheeting and press broken in lengths of 10 – 12 feet. Trim shall be formed only by the manufacturer or their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on drawings. Miter conditions shall be factory welded material to match the sheeting.
 - G. Accessories/Fasteners: Fasteners shall be of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous framing members to substrates. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the wall panel system.
 - H. Exposed fasteners shall not restrict free movement of the wall panel system resulting from thermal forces, except at designed points of wall panel fixity. May require the use of PAC factory clips to alleviate thermal movement for panels over 20' in length. Consult PAC factory on use of wall panel clips.
 - I. Closures: Use composition or metal profiled closures at top of each elevation to close ends of the panels. Metal closures to be made in the same material and finish as face sheet.
 - J. Fasteners: Fasteners shall be galvanized steel, dished washers, galvanized steel with bonded neoprene.
 - K. Zees: Where required by design of primary structural framing system shall be used to span between beams and/or joists.
 - L. Insulation: See Section 07 210: Building Insulation.
 - M. Sealants
 - 1. Provide two part polysulfide class "B" non-sag type for vertical and horizontal joints, brand name: NP-1. Geocell 2300, Weathermaster "Titebond" or similar performing caulking.
 - 2. One part polysulfide not containing pitch or phenolic extenders, or;
 - 3. Exterior grade silicone sealant recommended by roofing manufacturer, or;
One part non-sag, gun grade, exterior type polyurethane recommended by roofing manufacturer.
- 2.6 ACCEPTABLE MANUFACTURERS This project is detailed around the wall panel product of Petersen Aluminum Corporation, Elk Grove Village, IL: PAC Precision Series HWP and Highline panels
- a. Alcan Composites USA Inc.; Alucobond.(design based on system type: Rear Ventilated Rain Screen: system must provide a reveal joint as detailed on drawings. Provide moisture barrier and sheathing as shown on drawings.)
 - b. Alcoa Inc.; Reynobond .
 - c. ALPOLIC, Division of Mitsubishi Chemical America, Inc.,.
 - d. CENTRIA Architectural Systems; Formabond Wall System.
 - e. Citadel Architectural Products, Inc., Envelope 2000.
 - f. Copper Sales, Inc.; UNA-FAB.
 - g. Protean Construction Products, Inc.; ACM 100.

2. Panel Thickness: As indicated.
 3. Core: Standard.
 4. Exterior Finish: Coil coated Kynar-based 70% PVDF coatings resin in conformance with the following general requirements of AAMA 2605.
 - a. Color: As selected by Architect from manufacturer's full range in stocking colors, classic.
- B. Attachment System Components: Formed from extruded aluminum material compatible with panel facing.
1. Include manufacturer's standard perimeter extrusions with integral weather stripping panel stiffeners panel clips and anchor channels.

2.7 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite wall panels unless otherwise indicated.
- B. Flashing and Trim: Formed from 0.018-inch- minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, end walls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels.

2.8 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Comply with dimensions, profile limitations, gauges and fabrication details shown and if not shown and, if not shown, provide manufacturer's standard product fabrication.
- C. Fabricate components of the system in factory, ready for field assembly.
- D. Fabricate components and assemble units to comply with fire and performance requirements specified.
- E. Apply specified finishes in conformance with manufacturer's standards, and according to manufacturer's instructions.

- F. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal-faced composite wall panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal-faced composite wall panel manufacturer for application, but not less than thickness of metal being secured.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the Work.
1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite wall panel manufacturer.
 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal-faced composite wall panel manufacturer.

3. Verify that weather-resistant sheathing paper has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal-faced composite wall panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install sub girts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal-faced composite wall panel manufacturer's written instructions.

3.3 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and sub girts unless otherwise indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Commence metal wall panel installation and install minimum of 300 sq. ft. in presence of factory-authorized representative.
 2. Shim or otherwise plumb substrates receiving metal wall panels.
 3. Flash and seal metal wall panels at perimeter of all openings. Do not begin installation until weather barrier and flashings that will be concealed by panels are installed.
 4. Install flashing and trim as metal wall panel work proceeds.
 5. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
 6. Provide weather tight escutcheons for pipe and conduit penetrating exterior walls.
- B. Fasteners:
 1. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weather tight performance of metal-faced composite wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- C. Attachment System Installation, General: Install attachment system required to support metal wall panels and to provide a complete weather tight wall system, including sub girts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
 2. Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.
- D. Clip Installation: Attach panel clips to supports at each metal wall panel joint at locations, spacing's, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.
1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Division 07 Section "Joint Sealants."

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 feet, noncumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

- B. Water Penetration: Test areas of installed system indicated on Drawings for compliance with system performance requirements according to ASTM E 1105 at minimum differential pressure of 20 percent of inward-acting, wind-load design pressure as defined by SEI/ASCE 7, but not less than 6.24 lbf/sq. ft..
- C. Water-Spray Test: After completing the installation of 75-foot- by-2-story minimum area of metal-faced composite wall panel assembly, test assembly for water penetration according to AAMA 501.2 in a 2-bay area directed by Architect.
- D. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust completed metal-faced composite wall panel installation, including accessories.
- E. Metal wall panels will be considered defective if they do not pass tests and inspections.
- F. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- G. Prepare test and inspection reports.

3.7 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
- B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074243

SECTION 075310 - EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Adhered membrane roofing system.
 - 2. Mechanically fastened membrane roofing system.
 - 3. Vapor retarder.
 - 4. Roof insulation.
- B. This Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 5 Section "Steel Deck."
- C. Related Sections include the following:
 - 1. Division 5 Section "Steel Deck" for furnishing acoustical deck rib insulation.
 - 2. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
 - 3. Division 7 Section "Building Insulation" for insulation beneath the roof deck.
 - 4. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
 - 5. Division 7 Section "Joint Sealants."
 - 6. Division 15 Section "Plumbing Specialties" for roof drains.
- D. Unit Prices: Refer to Division 1 Section "Unit Prices" for description of Work in this Section affected by unit prices.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
 - 1. Corner Uplift Pressure: 90 lbf/sq. ft..
 - 2. Perimeter Uplift Pressure: 60 lbf/sq. ft..
 - 3. Field-of-Roof Uplift Pressure: 30 lbf/sq. ft..
- D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
 - 1. Fire/Windstorm Classification: Class 1A- 105.
 - 2. Hail Resistance: MH.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Insulation fastening patterns.
- C. Samples for Verification: For the following products:
 - 1. 12-by-12-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. 12-by-12-inch square of roof insulation.
 - 3. 12-by-12-inch square of walkway pads or rolls.
 - 4. 12-inch length of metal termination bars.
 - 5. 12-inch length of battens.
 - 6. Six insulation fasteners of each type, length, and finish.
 - 7. Six roof cover fasteners of each type, length, and finish.

- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements.
- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Research/Evaluation Reports: For components of membrane roofing system.
- I. Maintenance Data: For roofing system to include in maintenance manuals.
- J. Warranties: Special warranties specified in this Section.
- K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing system identical to that used for this Project.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.
- E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
 - 2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

- F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- G. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturers written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing accessories roof insulation fasteners cover boards substrate board vapor retarder roof pavers walkway products and other components of membrane roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 4. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 EPDM (fully adhered) ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type I, nonreinforced uniform, flexible sheet made from EPDM and as follows:
1. Manufacturers:
 - a. Carlisle SynTec Incorporated. (Basis of Design: 90-mil Sure-Seal EPDM)
 - b. Celotex Corporation.
 - c. GenFlex Roofing Systems.
 - d. Johns Manville International, Inc.
 2. Thickness: 90 mils, nominal.
 3. Exposed Face Color: Black.

2.3 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 90-mil- thick EPDM, partially cured or cured, according to application.
- C. Epichlorohydrin Sheet: 90-mil- thick, unreinforced flexible sheet with the following typical properties as determined per ASTM test method indicated:
1. Tensile Strength: 1500 psi; ASTM D 412.
 2. Ultimate Elongation: 200 percent; ASTM D 412.
 3. Tear Resistance: 150 lbf/in.; ASTM D 412.
 4. Brittleness Temperature: Minus 20 deg F; ASTM D 746.
 5. Resistance to Ozone Aging: No cracks after 168 hours' exposure of 50 percent elongated sample at 104 deg F and 100-pphm ozone; ASTM D 1149.
 6. Resistance to Oil Aging: 15 percent maximum mass change after 168 hours' immersion in diesel fuel No. 2 at 158 deg F; ASTM D 471.

- D. Bonding Adhesive: Manufacturer's standard bonding adhesive.
- E. Cold Fluid-Applied Membrane Adhesive: Manufacturer's standard cold fluid-applied bonding adhesive formulated to adhere fleece-backed roofing membrane to substrate.
- F. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film.
- G. Lap Sealant: Manufacturer's standard single-component sealant.
- H. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- I. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- J. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- K. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- L. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.4 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick.
 - 1. Product: Subject to compliance with requirements, provide "Dens-Deck" manufactured by Georgia-Pacific Corporation.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

2.5 VAPOR RETARDER

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, FMG approved for vapor-retarder application.

2.6 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Celotex Corporation.
 - c. Firestone Building Products Company.
 - d. GAF Materials Corp.
 - e. GenFlex Roofing Systems.
 - f. Johns Manville International, Inc.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.
- D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick.
 - 1. Product: Subject to compliance with requirements, provided "Dens-Deck" manufactured by Georgia-Pacific Corporation.
- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric mat, water permeable and resistant to ultraviolet degradation, type and weight as recommended by roofing system manufacturer for application.
- F. Metal Securement System: Perimeter securement flashing and strapping fabricated from stainless steel, a minimum of 0.031 inch thick. Provide fasteners as recommended by mortar-faced insulation manufacturer.

2.8 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 1/4 inch thick, and acceptable to membrane roofing system manufacturer.
 - 1. Size: 24 by 24 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 5 Section "Steel Deck."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 - 7. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Install acoustical roof deck rib insulation strips, specified in Division 5 Section "Steel Deck," according to acoustical roof deck manufacturer's written instructions.

3.3 SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.4 VAPOR-RETARDER INSTALLATION

- A. Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively.
 1. Seal side and end laps with tape.
- B. Install laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively. Bond vapor retarder to deck as follows:
 1. Apply adhesive at rate recommended by vapor-retarder manufacturer. Seal laps with adhesive.
 2. Apply ribbons of hot roofing asphalt at spacing, temperature, and rate recommended by vapor-retarder manufacturer. Seal laps with hot roofing asphalt.
- C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, 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.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

- G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck.
 - 1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Roofing system shall be a fully adhered system
- C. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
- D. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- F. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- G. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
 - 1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.
- I. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

- J. Repair tears, voids, and lapped seams in roofing that does not meet requirements.
- K. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- L. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.7 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- B. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- C. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 100 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 - 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 - 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

- 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
- 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
- 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
- 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

D. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

- 1. Authorized Signature: _____
- 2. Name: _____
- 3. Title: _____

END OF SECTION 07531

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Manufactured through-wall flashing.
 - 2. Manufactured reglets.
 - 3. Formed roof drainage system.
 - 4. Formed wall flashing and trim.
 - 5. Formed equipment support flashing.
 - 6. Formed overhead-piping safety pans.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for installing reglets.
 - 2. Division 4 Section "Unit Masonry Assemblies" for installing through-wall flashing, reglets, and other sheet metal flashing and trim.
 - 3. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
 - 4. Division 7 Section "EDPM membrane roofing" for installing sheet metal flashing and trim integral with roofing membrane.
 - 5. Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
 - 6. Division 7 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 - 1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft.: 60-lbf/sq. ft. perimeter uplift force, 90-lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of

joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. 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. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
4. Details of expansion-joint covers, including showing direction of expansion and contraction.

C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long. Include fasteners, clips, closures, and other attachments.
2. Trim: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METALS

- A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:

1. Mill Finish: Standard two-sides bright.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 1. Manufacturers:
 - a. Fry Reglet Corporation.
 - b. Heckmann Building Products Inc.
 - c. Hickman, W. P. Company.
 - d. Keystone Flashing Company, Inc.
 2. Material: Aluminum, 0.024 inch thick Galvanized steel, 0.0217 inch thick.
 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
7. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
8. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.7 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch- wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
 - 1. Fabricate parapet scuppers from the following material:
 - a. Aluminum: 0.0320 inch thick.
 - b. Galvanized Steel: 0.0276 inch thick.
 - B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.
 - 1. Joint Style: Butt, with 12-inch- wide concealed backup plate.
 - 2. Fabricate copings from the following material:
 - a. Aluminum: 0.050 inch thick.
 - b. Galvanized Steel: 0.0396 inch thick.
 - C. Roof and Roof to Wall Transition Expansion-Joint Cover: Fabricate from the following material:
 - 1. Aluminum: 0.050 inch thick.
 - 2. Galvanized Steel: 0.0336 inch thick.
 - D. Base Flashing: Fabricate from the following material:
 - 1. Aluminum: 0.040 inch thick.
 - 2. Galvanized Steel: 0.0276 inch thick.
 - E. Counterflashing: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch thick.
 - 2. Galvanized Steel: 0.0217 inch thick.
 - F. Flashing Receivers: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch thick.
 - 2. Galvanized Steel: 0.0217 inch thick.
 - G. Roof-Penetration Flashing: Fabricate from the following material:
 - 1. Galvanized Steel: 0.0276 inch thick.
 - H. Splash Pans: Fabricate from the following material:
 - 1. Aluminum: 0.040 inch thick.
- 2.8 MISCELLANEOUS SHEET METAL FABRICATIONS
- A. Equipment Support Flashing: Fabricate from the following material:
 - 1. Galvanized Steel: 0.0276 inch thick.
 - 2. Prepainted, Metallic-Coated Steel: 0.0276 inch thick.
 - B. Overhead-Piping Safety Pans: Fabricate from the following material:
 - 1. Galvanized Steel: 0.0396 inch thick.
 - 2. Prepainted, Metallic-Coated Steel: 0.0276 inch thick.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 - 2. Aluminum: Use aluminum or stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
 - 1. Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.
 - 2. Loosely lock front edge of scupper with conductor head.
 - 3. Seal or solder exterior wall scupper flanges into back of conductor head.
- C. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers.
 - 2. Anchor interior leg of coping with screw fasteners and washers at 18-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
 - 1. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 - 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of manufactured through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies."

- C. Reglets: Installation of reglets is specified in Division 3 Section "Cast-in-Place Concrete 4 Section "Unit Masonry Assemblies."
- D. Openings Flashing in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

- A. Overhead-Piping Safety Pans: Suspend pans from pipe and install drain line to plumbing waste or drain line.
- B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07620

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Roof curbs.
- 2. Equipment supports.
- 3. Roof walkways.

- B. Related Sections include the following:

- 1. Division 5 Section "Metal Fabrications" for ladders and miscellaneous metal framing and supports.
- 2. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fasciae, roof expansion-joint covers, valleys, and miscellaneous sheet metal trim and accessories.
- 3. Division 7 Sections for roofing accessories included as part of roofing Work.
- 4. Division 9 Section "Painting" for shop primers and field painting.
- 5. Division 15 Section "Power Ventilators" for power roof-mounted ventilators.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other Work.
- C. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for roof accessories with factory-applied color finishes.

- E. Samples for Verification: For each type of exposed finish required, prepared on Samples in manufacturer's standard sizes, and of same thickness and material indicated for the Work. If finishes involve normal color or shade variations, include sample sets showing the full range of variations expected.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
 - 2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Roof Curbs and Equipment Supports:
 - a. Custom Curb, Inc.
 - b. Gieske Custom Metal Fabricators.
 - c. Goeller Enterprises.
 - d. LMCurbs.
 - e. Loren Cook Company.
 - f. Metallic Products Corporation.
 - g. Roof Products & Systems Corp.
 - h. Vent Products Co., Inc.

2.2 MATERIALS, GENERAL

- A. Aluminum Sheet: ASTM B 209 for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
- B. Extruded Aluminum: ASTM B 221 alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 coating designation; commercial quality, unless otherwise indicated.
 - 1. Structural Quality: Grade 40, where indicated or as required for strength.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 coating, structural quality, Grade 40, or as required for strength.

- E. Plastic Sheet: Unless additional thickness is required for light transmittances, provide glazing plastic sheet thickness required for 40-lbf/sq. ft. external and 20-lbf/sq. ft. internal loading pressures as recommended by the manufacturer for the size and shape indicated.
 - 1. Acrylic: ASTM D 4802, thermoformable, cell-cast or continuous-cast acrylic (methacrylate), Category A-1 or A-2, Type UVA containing ultraviolet absorber, with smooth or polished Finish 1, unless otherwise indicated.
 - 2. Polycarbonate: Thermoformable, monolithic polycarbonate sheets manufactured by the extrusion process, burglar-resistance rated per UL 972 with average impact strength of 16 ft-lbf/in. of width when tested according to ASTM D 256, Method A (Izod).
- F. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- G. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWWA C2; not less than 1-1/2 inches thick.
- H. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removing exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
- I. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- J. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.
- K. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- L. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.
- M. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 ROOF CURBS

- A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
- B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
- C. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.063-inch- thick, sheet aluminum with welded corner joints.

1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
2. Provide manufacturer's standard rigid or semirigid insulation where indicated.
3. Provide formed cants and base profile coordinated with roof insulation thickness.
4. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
5. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.4 EQUIPMENT SUPPORTS

- A. General: Provide equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
- B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
- C. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.063-inch- thick, sheet aluminum with welded corner joints.
 1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
 2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
 3. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
 4. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot, fabricate support units with height tapered to match slope to level tops of units.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

2.7 GALVANIZED STEEL SHEET FINISHES

- A. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with paint manufacturers written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 07720

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Concealed SFRM.
- 2. Exposed SFRM.
- 3. Exposed intumescent mastic fire-resistive coatings.

- B. Related Sections include the following:

- 1. Division 05 Section "Structural Steel Framing" for surface conditions required for structural steel receiving SFRM.
- 2. Division 07 Section "Thermal Insulation" for fire-safing insulation.
- 3. Division 07 Section "Board Fireproofing" for mineral-fiber-board fire protection.
- 4. Division 07 Section "Penetration Firestopping" for fire-resistance-rated firestopping systems.
- 5. Division 07 Section "Fire-Resistive Joint Systems" for fire-resistance-rated joint systems.
- 6. Division 09 Section "Intumescent Painting" for intumescent paints that are not fire resistive.

- C.

1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive material.
- B. Concealed: Fire-resistive materials applied to surfaces that are concealed from view behind other construction when the Work is completed and have not been defined as exposed.
- C. Exposed: Fire-resistive materials applied to surfaces that are exposed to view when the Work is completed, that are accessible through suspended ceilings, that are in elevator shafts and machine rooms, that are in mechanical rooms, that are in air-handling plenums, and that are identified as exposed on Drawings.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Structural framing plans indicating the following:
1. Locations and types of surface preparations required before applying SFRM.
 2. Extent of SFRM for each construction and fire-resistance rating, including the following:
 - a. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1) For steel joist assemblies, include applicable fire-resistance design designations, with each steel joist tested with the same maximum tensile stress as each steel joist indicated on Drawings. Design designations with steel joists tested at lower maximum tensile stress than those indicated are not permitted.
 - b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.
 3. Treatment of SFRM after application.
- C. Samples for Initial Selection: For each type of colored, exposed SFRM indicated.
- D. Samples for Verification: For each type of colored, exposed SFRM, two Samples, each 4 inches square, of each color, texture, and material formulation to be applied. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Product Certificates: For each type of SFRM, signed by product manufacturer.
- F. Qualification Data: For Installer, manufacturer, professional engineer, and testing agency.
- G. Compatibility and Adhesion Test Reports: From SFRM manufacturer indicating the following:
1. Materials have been tested for bond with substrates.
 2. Materials have been verified by SFRM manufacturer to be compatible with substrate primers and coatings.
 3. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed SFRM.
- I. Research/Evaluation Reports: For SFRM.
- J. Field quality-control test and special inspection reports.
- K. Warranties: Special warranties specified in this Section.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by SFRM manufacturer as experienced and with sufficient trained staff to install manufacturer's

products according to specified requirements. A manufacturer's willingness to sell its SFRM to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

- B. Source Limitations: Obtain SFRM through one source from a single manufacturer.
- C. SFRM Testing: By a qualified testing and inspecting agency engaged by Contractor or manufacturer to test for compliance with specified requirements for performance and test methods.
 - 1. SFRMs are randomly selected for testing from bags bearing the applicable classification marking of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Testing is performed on specimens of SFRMs that comply with laboratory testing requirements specified in Part 2 and are otherwise identical to installed fire-resistive materials, including application of accelerant, sealers, topcoats, tamping, troweling, rolling, and water overspray, if any of these are used in final application.
 - 3. Testing is performed on specimens whose application the independent testing and inspecting agency witnessed during preparation and conditioning. Include in test reports a full description of preparation and conditioning of laboratory test specimens.
- D. Compatibility and Adhesion Testing: Engage a qualified testing and inspecting agency to test for compliance with requirements for specified performance and test methods.
 - 1. Test for bond per ASTM E 736 and requirements in UL's "Fire Resistance Directory" for coating materials. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 2. Verify that manufacturer, through its own laboratory testing or field experience, has not found primers or coatings to be incompatible with SFRM.
- E. Fire-Test-Response Characteristics: Provide SFRM with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify bags containing SFRM with appropriate markings of applicable testing and inspecting agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" acceptable to authorities having jurisdiction, for SFRM serving as direct-applied protection tested per ASTM E 119.
 - 2. Surface-Burning Characteristics: ASTM E 84.
- F. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- G. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Extent of Mockups: Approximately 100 sq. ft. of surface for each product indicated.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to SFRM including, but not limited to, the following:
1. Review products, exposure conditions, design ratings, restrained and unrestrained conditions, calculations, densities, thicknesses, bond strengths, and other performance requirements.
 2. Review and finalize construction schedule and verify sequencing and coordination requirements.
 3. Review weather predictions, ambient conditions, and proposed temporary protections for SFRM during and after installation.
 4. Review surface conditions and preparations.
 5. Review field quality-control testing procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply SFRM when ambient or substrate temperature is 40 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of SFRM. Use natural means or, if they are inadequate, forced-air circulation until fire-resistive material dries thoroughly.

1.8 COORDINATION

- A. Sequence and coordinate application of SFRM with other related work specified in other Sections to comply with the following requirements:
1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 3. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.

4. Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been completed. For metal roof decks without concrete topping, do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material.
5. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
6. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
7. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
8. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace SFRMs that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of SFRM from substrates.
 - b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCEALED SFRM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Concealed Cementitious SFRM:
 - a. Carbolite Co., Fireproofing Products Div.; Pyrolite 15 High Yield.
 - b. Grace, W. R. & Co. - Conn., Construction Products Div.; Monokote Type MK-6 MK-6/HY and MK-6s.
 - c. Isolatek International Corp.; Cafco 300.
 - d. Southwest Vermiculite Co., Inc.; Type 5.
 - e. Carbolite Co., Fireproofing Products Div.; Pyrolite 15 Blue.

- f. Grace, W. R. & Co. - Conn., Construction Products Div.; Retro-Gard.
 - g. Isolatek International Corp.; Cafco 300 SB.
 2. Concealed Sprayed-Fiber Fire-Resistive Material:
 - a. Isolatek International Corp.; Cafco Blaze-Shield II.
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
- D. Material Composition: Manufacturer's standard product, as follows or either of the following:
 1. Concealed Cementitious SFRM: Factory-mixed, dry formulation of gypsum or portland cement binders, additives, and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
 2. Concealed Sprayed-Fiber Fire-Resistive Material: Factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at spray nozzle to form a damp, as-applied product.
- E. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:
 1. Dry Density: 15 lb/cu. ft. for average and individual densities, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method."
 2. Thickness: Minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch, per ASTM E 605:
 - a. Where the referenced fire-resistance design lists a thickness of 1 inch or more, the minimum allowable individual thickness of SFRM is the design thickness minus 0.25 inch.
 - b. Where the referenced fire-resistance design lists a thickness of less than 1 inch but more than 0.375 inch, the minimum allowable individual thickness of SFRM is the greater of 0.375 inch or 75 percent of the design thickness.
 - c. No reduction in average thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cu. ft..
 3. Bond Strength: 150 lbf/sq. ft. minimum per ASTM E 736 based on laboratory testing of 0.75-inch minimum thickness of SFRM.
 4. Compressive Strength: 5.21 lbf/sq. in. minimum per ASTM E 761. Minimum thickness of SFRM tested shall be 0.75 inch and minimum dry density shall be as specified but not less than 15 lb/cu. ft..
 5. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
 6. Deflection: No cracking, spalling, or delamination per ASTM E 759.
 7. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
 8. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours per ASTM E 859. For laboratory tests, minimum thickness of SFRM is 0.75 inch, maximum dry density is 15 lb/cu. ft., test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.

9. Fire-Test-Response Characteristics: Provide SFRM with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 0.
10. Fungal Resistance: No observed growth on specimens per ASTM G 21.

2.2 EXPOSED SFRM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Exposed Cementitious SFRM:
 - a. Carbolite Co., Fireproofing Products Div.; Pyrolite 22.
 - b. Carbolite Co., Fireproofing Products Div.; Pyrocrete 239.
 - c. Carbolite Co., Fireproofing Products Div.; Pyrocrete 40.
 - d. Carbolite Co., Fireproofing Products Div.; Pyrocrete 240 High Yield.
 - e. Carbolite Co., Fireproofing Products Div.; Pyrocrete 241.
 - f. Grace, W.R. & Co. - Conn., Construction Products Div.; Monokote Type Z106G.
 - g. Grace, W.R. & Co. - Conn., Construction Products Div.; Monokote Type Z106.
 - h. Grace, W.R. & Co. - Conn., Construction Products Div.; Monokote Type Z106/HY.
 - i. Grace, W.R. & Co. - Conn., Construction Products Div.; Monokote Type Z146.
 - j. Isolatek International Corp.; Cafco 400.
 - k. Isolatek International Corp.; Fendolite M-II.
 - l. Pyrok, Inc.; Pyrok-HD.
 - m. Pyrok, Inc.; Pyrok-MD.
 - n. Southwest Vermiculite Co., Inc.; 5MD.
 - o. Southwest Vermiculite Co., Inc.; 7GP.
 - p. Southwest Vermiculite Co., Inc.; 1XR.
 2. Exposed Sprayed-Fiber Fire-Resistive Material:
 - a. Isolatek International Corp.; Cafco Blaze-Shield HP.
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 1. Insert, in separate subparagraphs, manufacturer's name.
- D. Material Composition: Manufacturer's standard product, as follows:
 1. Exposed Cementitious SFRM: Factory-mixed, dry, cement aggregate formulation; or chloride-free formulation of gypsum or portland cement binders, additives, and inorganic

- aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
2. Exposed Sprayed-Fiber Fire-Resistive Material: Factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at spray nozzle to form a damp, as-applied product.
- E. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:
1. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method," but with an average density of not less than 22 lb/cu. ft..
 2. Bond Strength: 434 lbf/sq. ft. minimum per ASTM E 736.
 3. Compressive Strength: 51 lbf/sq. in. minimum per ASTM E 761.
 4. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method," but with an average density of not less than 39 lb/cu. ft..
 5. Bond Strength: 1000 lbf/sq. ft. minimum per ASTM E 736.
 6. Compressive Strength: 300 lbf/sq. in. minimum per ASTM E 761.
 7. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
 8. Deflection: No cracking, spalling, or delamination per ASTM E 759.
 9. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
 10. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. per ASTM E 859.
 11. Combustion Characteristics: Passes ASTM E 136.
 12. Fire-Test-Response Characteristics: Provide SFRM with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 0.
 13. Fungal Resistance: No observed growth on specimens per ASTM G 21.
 14. For exterior applications of SFRM, provide formulation listed and labeled by testing and inspecting agency acceptable to authorities having jurisdiction for surfaces exposed to exterior.

2.3 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with SFRM and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: For use on each substrate and with each sprayed fire-resistive product, provide primer that complies with one or more of the following requirements:
 1. Primer's bond strength complies with requirements specified in UL's "Fire Resistance Directory" for coating materials based on a series of bond tests per ASTM E 736.

2. Primer is identical to those used in assemblies tested for fire-test-response characteristics of SFRM per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Adhesive for Bonding Fire-Resistive Material: Product approved by manufacturer of SFRM.
 - D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistance designs indicated and fire-resistive material manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive SFRM.
 - E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by manufacturer of SFRM.
 - F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by manufacturer of intumescent mastic coating fire-resistive material. Include pins and attachment.
 - G. Sealer for Sprayed-Fiber Fire-Resistive Material: Transparent-drying, water-dispersible, tinted protective coating recommended in writing by manufacturer of sprayed-fiber fire-resistive material.
 1. Product: Subject to compliance with requirements, provide "Cafco Bond-Seal" by Isolatek International Corp.
 - H. Topcoat: Type recommended in writing by manufacturer of each SFRM for application over concealed and exposed SFRM.
 - I. Cement-Based Topcoat: Factory-mixed, cementitious hardcoat formulation recommended in writing by manufacturer of SFRM for trowel or spray application over concealed and exposed SFRM.
 1. Product: Subject to compliance with requirements, provide "Hardcoat 4500" by Carboline Co.; Fireproofing Products Div. "Cafco 800" by Isolatek International Corp.
 - J. Veneer-Plaster Topcoat: Factory-mixed formulation of a latex-modified, portland cement-based veneer plaster recommended in writing by manufacturer of SFRM for trowel or spray application over concealed and exposed SFRM.
 1. Product: Subject to compliance with requirements, provide "Topkrete Type TK-610L" by Grace, W. R. & Co.--Conn.; Construction Products Div.
 - K. Water-Based Permeable Topcoat: Factory-mixed formulation recommended in writing by manufacturer of SFRM for brush, roller, or spray application over concealed and exposed SFRM. Provide application at a rate of 120 sq. ft./gal..
 1. Product: Subject to compliance with requirements, provide "Cafco Topcoat" by Isolatek International Corp.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of work. A substrate is in satisfactory condition if it complies with the following:
 - 1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
 - 2. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, incompatible paints, incompatible encapsulants, or other foreign substances capable of impairing bond of fire-resistive materials with substrates under conditions of normal use or fire exposure.
 - 3. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 4. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.
- B. Verify that concrete work on steel deck has been completed.
- C. Verify that roof construction, installation of roof-top HVAC equipment, and other related work are completed.
- D. Conduct tests according to fire-resistive material manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application.
- B. Clean substrates of substances that could impair bond of fire-resistive material, including dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, and incompatible primers, paints, and encapsulants.
- C. Prime substrates where recommended in writing by SFRM manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive SFRM.
- D. For exposed applications, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of SFRM. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION, GENERAL

- A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on fire-resistive

material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

- B. Apply SFRM that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports, with respect to rate of application, accelerator use, sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.
- C. Install metal lath and reinforcing fabric, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath and fabric to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by SFRM manufacturer. Attach accessories where indicated or required for secure attachment of lath and fabric to substrate.
- D. Coat substrates with bonding adhesive before applying fire-resistive material where required to achieve fire-resistance rating or as recommended in writing by SFRM manufacturer for material and application indicated.
- E. Extend fire-resistive material in full thickness over entire area of each substrate to be protected. Unless otherwise recommended in writing by SFRM manufacturer, install body of fire-resistive covering in a single course.
- F. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by SFRM manufacturer.
- G. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply SFRM that differs in color from that of encapsulant over which it is applied.
- H. Where sealers are used, apply products that are tinted to differentiate them from SFRM over which they are applied.

3.4 APPLICATION, CONCEALED SFRM

- A. Apply concealed SFRM in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if specified in Part 2 "Concealed SFRM" Article.
- B. Apply water overspray to concealed sprayed-fiber fire-resistive material as required to obtain designated fire-resistance rating and where indicated.
- C. Cure concealed SFRM according to product manufacturer's written recommendations.
- D. Apply sealer to concealed SFRM.
- E. Apply topcoat to concealed SFRM.

3.5 APPLICATION, EXPOSED SFRM

- A. Apply exposed SFRM in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if indicated.
 - 1. For steel beams and bracing, provide a thickness of not less than 1 inch.
 - 2. For metal floor or roof decks, provide a thickness of not less than 1/2 inch.
- B. Provide a uniform finish complying with description indicated for each type of material and matching Architect's sample or, if none, finish approved for field-erected mockup.
- C. Apply exposed cementitious SFRM to produce the following finish:
 - 1. Spray-textured finish with no further treatment.
 - 2. Even, spray-textured finish, produced by rolling flat surfaces of fire-protected members with a damp paint roller to remove drippings and excessive roughness.
 - 3. Skip-troweled finish with leveled surface, smoothed-out texture, and neat edges.
 - 4. Smooth, troweled finish with surface markings eliminated and edges squared.
- D. Apply exposed sprayed-fiber fire-resistive material to produce the following finish:
 - 1. Spray-textured finish.
 - 2. Sealer.
 - 3. Topcoat.
- E. Cure exposed SFRM according to product manufacturer's written recommendations.
 - 1.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspection and prepare reports:
 - 1. SFRM.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- C. Tests and Inspections: Testing and inspecting of completed applications of SFRM shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of SFRM for the next area until test results for previously completed applications of SFRM show compliance with requirements. Tested values must equal or exceed values indicated and required for approved fire-resistance design.
 - 1. Thickness for Floor, Roof, and Wall Assemblies: For each 1000-sq. ft. area, or partial area, on each floor, from the average of 4 measurements from a 144-sq. in. sample area, with sample width of not less than 6 inches per ASTM E 605.

2. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
 3. Density for Floors, Roofs, Walls, and Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method."
 4. Bond Strength for Floors, Roofs, Walls, and Structural Framing Members: For each 10,000-sq. ft. area, or partial area, on each floor, cohesion and adhesion from one sample of size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 736.
 - a. Field test SFRM that is applied to flanges of wide-flange, structural-steel members on surfaces matching those that will exist for remainder of steel receiving fire-resistive material.
 - b. If surfaces of structural steel receiving SFRM are primed or otherwise painted for coating materials, perform series of bond tests specified in UL's "Fire Resistance Directory." Provide bond strength indicated in referenced UL fire-resistance criteria, but not less than 150 lbf/sq. ft. minimum per ASTM E 736.
 5. If testing finds applications of SFRM are not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.
- D. Remove and replace applications of SFRM that do not pass tests and inspections for cohesion and adhesion, for density, or for both and retest as specified above.
- E. Apply additional SFRM, per manufacturer's written instructions, where test results indicate that thickness does not comply with specified requirements, and retest as specified above.
- 3.7 CLEANING, PROTECTING, AND REPAIR
- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
 - B. Protect SFRM, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at time of Substantial Completion.
 - C. Coordinate application of SFRM with other construction to minimize need to cut or remove fire protection. As installation of other construction proceeds, inspect SFRM and patch any damaged or removed areas.
 - D. Repair or replace work that has not successfully protected steel.

END OF SECTION 078100

SECTION 078410 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1. Floors.
2. Roofs.
3. Walls and partitions.
4. Smoke barriers.
5. Construction enclosing compartmentalized areas.

- B. Related Sections include the following:

1. Division 5 Section "Steel Deck" for steel roof deck supporting metal roof panels.
2. Division 5 Section "Cold-Formed Metal Framing" for secondary support framing supporting metal roof panels.
3. Division 7 Section "Sheet Metal Flashing and Trim" for fasciae, flashings and other sheet metal work not part of metal roof panel assemblies.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
3. Fire-resistance-rated floor assemblies.
4. Fire-resistance-rated roof assemblies.

- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
1. Penetrations located outside wall cavities.
 2. Penetrations located outside fire-resistive shaft enclosures.
 3. Penetrations located in construction containing fire-protection-rated openings.
 4. Penetrating items larger than 4-inch- diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems 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.
- B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturers written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. DAP Inc.
 2. Hilti Construction Chemicals, Inc.
 3. Isolatek International.
 4. Nelson Firestop Products.
 5. 3M Fire Protection Products.
 6. Tremco.
 7. United States Gypsum Company.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.

- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

- 1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

- a. Construction joints in cast-in-place concrete.
- b. Control and expansion joints in unit masonry.
- c. Joints between metal panels.
- d. Joints between different materials listed above.
- e. Perimeter joints between materials listed above and frames of doors windows and louvers.
- f. Control and expansion joints in ceilings and other overhead surfaces.
- g. Other joints as indicated.

- 2. Exterior joints in the following horizontal traffic surfaces:

- a. Isolation and contraction joints in cast-in-place concrete slabs.
- b. Tile control and expansion joints.
- c. Joints between different materials listed above.
- d. Other joints as indicated.

- 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

- a. Control and expansion joints on exposed interior surfaces of exterior walls.
- b. Perimeter joints of exterior openings where indicated.
- c. Tile control and expansion joints.
- d. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
- e. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
- f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
- g. Other joints as indicated.

- 4. Interior joints in the following horizontal traffic surfaces:

- a. Isolation joints in cast-in-place concrete slabs.
- b. Control and expansion joints in tile flooring.
- c. Other joints as indicated.

- B. Related Sections include the following:
1. Division 4 Section "Unit Masonry Assemblies" for masonry control and expansion joint fillers and gaskets.
 2. Division 7 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
 3. Division 8 Section "Glazing" for glazing sealants.
 4. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
 5. Division 9 Section "Ceramic Tile" for sealing tile joints.
 6. Division 9 Section "Acoustical Panel Ceilings" and "Acoustical Tile Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

- I. Field Test Report Log: For each elastomeric sealant application.
- J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than six pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturers written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the Notice to Proceed with the Work.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
 - 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
 - 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- E. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:

- a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of nonelastomeric sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: two years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Single-Component Nonsag Polysulfide Sealant:
1. Products:
 - a. Pacific Polymers, Inc.; Elastoseal 230 Type I (Gun Grade).
 - b. Polymeric Systems Inc.; PSI-7000.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass ceramic tile.
- F. Multicomponent Nonsag Neutral-Curing Silicone Sealant:
1. Products:
 - a. Dow Corning Corporation; 756 H.P.
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 50.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass.
- G. Multicomponent Pourable Neutral-Curing Silicone Sealant:
1. Products:
 - a. Dow Corning Corporation; FC Parking Structure Sealant.
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: ceramic tile.
- H. Single-Component Pourable Neutral-Curing Silicone Sealant:
1. Products:
 - a. Dow Corning Corporation; 890-SL.
 - b. Pecora Corporation; 300 Pavement Sealant (Self Leveling).

- c. Dow Corning Corporation; SL Parking Structure Sealant.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 100/50.
 4. Use Related to Exposure: NT.
 5. Uses Related to Joint Substrates: O, as applicable to joint substrates indicated.
 - a. Use O Joint Substrates: ceramic tile.
- I. Single-Component Neutral- and Basic-Curing Silicone Sealant:
 1. Products:
 - a. Dow Corning Corporation; 790.
 - b. GE Silicones; SilPruf LM SCS2700.
 - c. GE Silicones; SilPruf SCS2000.
 - d. Sonneborn, Division of ChemRex Inc.; Omniseal.
 - e. Dow Corning Corporation; 791.
 - f. Dow Corning Corporation; 795
 - g. GE Silicones; SilPruf NB SCS9000.
 - h. GE Silicones; UltraPruf II SCS2900.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 100/50.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass, brick, ceramic tile.
 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- J. Single-Component Neutral-Curing Silicone Sealant:
 1. Products:
 - a. Dow Corning Corporation; 799.
 - b. GE Silicones; UltraGlaze SSG4000.
 - c. GE Silicones; UltraGlaze SSG4000AC.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass ceramic tile.
- K. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:
 1. Products:

- a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Coated glass, ceramic tile.
- L. Single-Component Nonsag Urethane Sealant:
 1. Products:
 - a. Sika Corporation, Inc.; Sikaflex - 1a.
 - b. Sonneborn, Division of ChemRex Inc.; Ultra.
 - c. Sonneborn, Division of ChemRex Inc.; NP 1.
 - d. Tremco; Vulkem 116.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: brick, ceramic tile.
- M. Single-Component Pourable Urethane Sealant:
 1. Products:
 - a. Sika Corporation, Inc.; Sikaflex - 1CSL.
 - b. Sonneborn, Division of ChemRex Inc.; SL 1.
 - c. Tremco; Vulkem Nova 300 SSL.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 50.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: brick, ceramic tile.
- N. Single-Component Pourable Urethane Sealant:
 1. Products:
 - a. Tremco; Tremflex S/L.
 - b. Tremco; Vulkem 45.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 25.

4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: brick, ceramic tile.

2.4 LATEX JOINT SEALANTS

- A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.
- B. Products:
 1. Sonneborn, Division of ChemRex Inc.; Sonolac.
 2. Tremco; Tremflex 834.

2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Apply sealant / caulk between any dissimilar material with material appropriate for application.
- B. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- C. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- D. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- E. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- F. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- G. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- H. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- I. Installation of Preformed Tapes: Install according to manufacturer's written instructions.

- J. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- K. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.

5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07920

SECTION 079500 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Architectural joint systems for building interiors. (See Structural drawings for locations)
2. Architectural joint systems for building exteriors. (See Structural drawings for locations)
3. Architectural joint systems for open-air structures. (See Structural drawings for locations)

- B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for cast-in architectural-joint-system frames furnished, but not installed, in this Section.
2. Division 04 Section "Unit Masonry" for masonry wall joint systems.
3. Division 07 Section "Sheet Metal Roofing" for sheet metal roof joint systems.
4. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal wall joint systems.
5. Division 07 Section "Manufactured Roof Expansion Joints" for factory-fabricated roof joint systems.
6. Division 07 Section "Fire-Resistive Joint Systems" for liquid-applied joint sealants in fire-resistive building joints.
7. Division 07 Section "Joint Sealants" for liquid-applied joint sealants.

1.3 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width.
- D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.4 SUBMITTALS

- A. Shop Drawings: Provide the following for each joint system specified:
1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
 2. Architectural/ Structural Joint System: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - a. Manufacturer and model number for each joint system.
 - b. Joint system location cross-referenced to Drawings.
 - c. Nominal joint width.
 - d. Movement capability.
 - e. Classification as thermal or seismic.
 - f. Materials, colors, and finishes.
 - g. Product options.
 - h. Fire-resistance ratings.
- B. Samples for Initial Selection: For each type of joint system indicated.
1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.
- C. Samples for Verification: For each type of architectural joint system indicated.
1. Full width by 6 inches long, for each system required.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain interior architectural joint systems through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product 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.
- D. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)" and ICC A117.1.

- E. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

1.6 COORDINATION

- A. Coordinate installation of exterior wall and soffit joint systems with roof expansion assemblies to ensure that wall transitions are watertight. Roof expansion assemblies are specified in Division 07.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
 - 2. Mill Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
 - 3. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
 - 4. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
 - 5. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.
 - 6. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
 - 7. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.
- B. Stainless Steel: ASTM A 666, Type 304 for plates, sheet, and strips.
 - 1. Remove tool and die marks and stretch lines or blend into finish.

2. Finish: No. 4, directional satin.
 - a. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

C. Brass: ASTM B 36/B 36M, UNS Alloy C26000 for half hard sheet and coil.

D. Bronze: ASTM B 455, Alloy C38500 for extrusions; Alloy C23000 red brass for plates.

E. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.

F. Compression Seals: ASTM E 1612; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.

G. Strip Seals: ASTM E 1783; preformed elastomeric membrane or tubular extrusions having an internal baffle system and secured in or over a joint by a metal locking rail.

H. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

I. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.

J. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.

K. Moisture Barrier: Flexible elastomeric material, EPDM, minimum 45 mils thick.

L. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated see structural drawings. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Design architectural joint systems for the following size and movement characteristics:

1. Nominal Joint Width: As required by manufacturer.

2. Movement Capability: Plus or minus 50 percent.
3. Type of Movement: Thermal Seismic Wind sway.

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:
 1. Architectural Art Mfg., Inc.
 2. Balco, Inc.
 3. Construction Specialties, Inc.
 4. JointMaster/InPro Corporation.
 5. Michael Rizza Company, LLC.
 6. MM Systems Corporation.
 7. Nystrom, Inc.
 8. Watson Bowman Acme Corp.
- D. Floor-to-Floor Joint Systems:
 1. Type: Hidden sightline.
 - a. Exposed Metal: Stainless steel.
 - 1) Finish: Manufacturer's standard finish.
 - b. Seal Material: Santoprene.
 - 1) Color: As selected by Architect from manufacturer's full range.
 2. Cover-Plate Design: Plain.
 3. Cover-Plate Design: Recessed to accept field-applied finish materials.
 - a. Recess Depth: As required to accommodate adjacent flooring.
 - b. Recess Depth: 3/8 inch.
 4. Attachment Method: Mechanical anchors.
 5. Load Capacity: Heavy duty.
 6. Load Capacity:
 - a. Uniform Load: 150 lb/sq. ft..
 - b. Concentrated Load: 2000 lb.
 - c. Maximum Deflection: 0.5 inch.
 7. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

8. Moisture Barrier: Manufacturer's standard.
- E. Floor-to-Wall Joint Systems:
1. Type: Hidden sightline.
 - a. Exposed Metal: Stainless steel.
 - 1) Finish: Manufacturer's standard finish.
 - b. Seal Material: Santoprene.
 - 1) Color: As selected by Architect from manufacturer's full range.
 2. Cover-Plate Design: Plain.
 3. Cover-Plate Design: Recessed to accept field-applied finish materials.
 - a. Recess Depth: As required to accommodate adjacent flooring.
 - b. Recess Depth: 3/8 inch.
 4. Attachment Method: Mechanical anchors.
 5. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 6. Moisture Barrier: Manufacturer's standard.
- F. Wall-to-Ceiling Joint Systems:
1. Type: Cover plate.
 - a. Exposed Metal: Stainless steel.
 - 1) Finish: Manufacturer's standard finish.
 - b. Seal Material: Santoprene.
 - 1) Color: As selected by Architect from manufacturer's full range.
 2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 3. Moisture Barrier: Manufacturer's standard.
- G. Ceiling-to-Ceiling Joint Systems:
1. Type: Cover plate.
 - a. Exposed Metal: Stainless steel.
 - 1) Finish: Manufacturer's standard finish.
 - b. Seal Material: Santoprene.
 - 1) Color: As selected by Architect from manufacturer's full range.
 2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than.

3. Moisture Barrier: Manufacturer's standard.

2.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:
 1. Architectural Art Mfg., Inc.
 2. Balco, Inc.
 3. Capital Services.
 4. Construction Specialties, Inc.
 5. EMSEAL Joint Systems, Ltd.
 6. E-Poxy Engineered Materials, LLC.
 7. Erie Metal Specialties.
 8. JointMaster/InPro Corporation.
 9. LymTal International, Inc.
 10. Michael Rizza Company, LLC.
 11. MM Systems Corporation.
 12. Nystrom, Inc.
 13. R. J. Watson, Inc.
 14. Schul International, Inc.
 15. Stellar-Mark, Inc.
 16. Thermal-Chem.
 17. Tremco Sealant/Weatherproofing Division.
 18. Watson Bowman Acme Corp.
 19. Williams Products, Inc.
- D. Architectural Joint Systems for Exterior Walls and Soffits:
 1. Type: Vertical cover-plate.
 - a. Exposed Metal: Stainless steel.
 - 1) Finish: Manufacturer's standard finish.
 - b. Secondary Seal: Manufacturer's standard extruded-elastomeric seal designed to prevent water and moisture infiltration.
 2. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.

3. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work. (See structural drawings)
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.
- C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.
- D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.
 1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper joint installation and performance.

3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 4. Locate in continuous contact with adjacent surfaces.
 5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.
 6. Heavy-Duty Systems: Repair or grout blockout as required for continuous frame support and to bring frame to proper level. Shimming is not allowed.
 7. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
1. Provide in continuous lengths for straight sections.
 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Compression Seals: Apply adhesive or lubricant adhesive as recommended by manufacturer to both sides of slabs before installing compression seals.
- E. Foam Seals: Install with adhesive recommended by manufacturer.
- F. Epoxy-Bonded Seals: Pressurize seal for time period and to pressure recommended by manufacturer. Do not overpressurize.
- G. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- H. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- I. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings. Provide drainage fittings where indicated.
- 3.4 PROTECTION
- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
 - B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

SECTION 081110 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Standard hollow-metal steel doors.
 - 2. Standard hollow-metal steel frames.
- B. Related Sections include the following:
 - 1. Division 4 Section "Unit Masonry Assemblies" for building anchors into and grouting standard steel frames in masonry construction.
 - 2. Division 8 Section "Glazing" for glazed lites in standard steel doors and frames.
 - 3. Division 8 Sections for door hardware for standard steel doors.
 - 4. Division 9 painting Sections for field painting standard steel doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, and finishes for each type of steel door and frame specified.
- B. Shop Drawings: In addition to requirements below, provide a schedule of standard steel doors and frames using same reference numbers for details and openings as those on Drawings:
 - 1. Elevations of each door design.
 - 2. Details of doors, including vertical and horizontal edge details.
 - 3. Frame details for each frame type, including dimensioned profiles.
 - 4. Details and locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, accessories, joints, and connections.
 - 7. Details of glazing frames and stops showing glazing.
 - 8. Details of conduit and preparations for electrified door hardware and controls.

- C. Coordination Drawings: Drawings of each opening, including door and frame, drawn to scale and coordinating door hardware. Show elevations of each door design type, showing dimensions, locations of door hardware, and preparations for power, signal, and electrified and pneumatic control systems.
- D. Samples for Initial Selection: For units with factory-applied color finishes.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
- F. Oversize Construction Certification: For standard steel door assemblies required to be fire rated and exceeding limitations of labeled assemblies; include statement that doors comply with requirements of design, materials, and construction but have not been subjected to fire test.
- G. Qualification Data: For Installer.
- H. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of standard steel door and frame.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door 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.
 - 1. Test Pressure: Test at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.
 - 2. Test Pressure: Test according to UBC Standard 7-2. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.
 - 3. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.
 - 4. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.
 1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Amweld Building Products, LLC.
 2. Benchmark Doors; a division of General Products Co., Inc.
 3. Ceco Door Products; an ASSA ABLOY Group Company.
 4. CURRIES Company; an ASSA ABLOY Group Company.
 5. Deansteel Manufacturing, Inc.
 6. Fleming Door Products Ltd.; an ASSA ABLOY Group Company.
 7. Kewanee Corporation (The).
 8. Mesker Door Inc.

9. Pioneer Industries, Inc.
10. Republic Builders Products Company.
11. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.
- D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized.
- E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.
- F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.
- G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching standard steel door frames of type indicated.
- H. Grout: Comply with ASTM C 476, with a slump of 4 inches for standard steel door frames built into concrete or masonry, as measured according to ASTM C 143/C 143M.
- I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.
- J. Glazing: Comply with requirements in Division 8 Section "Glazing."

2.3 STANDARD STEEL DOORS

- A. General: Provide 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 A250.8.
 1. Design: Flush panel As indicated on Drawings.
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.

- a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 1) Locations: Exterior doors.
3. Vertical Edges for Single-Acting Doors: Square edge unless beveled edge is indicated.
 - a. Beveled Edge: 1/8 inch in 2 inches.
 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
 5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick end closures or channels of same material as face sheets.
 6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush) 2 (Seamless).
 2. Level 4 and Physical Performance Level A (Maximum Duty), Model 1 (Full Flush) 2 (Seamless).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush) 2 (Seamless).
- D. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
 2. Pivots: Minimum 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
 3. Lock Face Closers, and Concealed Holders: Minimum 0.067 inch thick.
 4. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- 2.4 STANDARD STEEL FRAMES
- A. General: Comply with ANSI A250.8 and with details indicated for type and profile.

- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
 - 1. Fabricate frames with mitered or coped and welded face corners.
 - 2. Frames for Steel Doors: 0.053-inch- thick steel sheet, unless otherwise indicated.
- C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
 - 1. Fabricate knocked-down frames with mitered or coped corners, for field assembly.
 - 2. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
 - 3. Frames for Steel Doors: 0.053-inch- thick steel sheet, unless otherwise indicated.
- D. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:
 - 1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
 - 2. Pivots: Minimum 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
 - 3. Lock Face Closers, and Concealed Holders: Minimum 0.067 inch thick.
 - 4. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.
- E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
- F. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, 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, welded to back of frames; not less than 0.042 inch thick.
 - 3. Compression Type for Slip-on Frames: Adjustable compression anchors.
- G. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.
- H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- I. Ceiling Struts: Minimum 3/8-inch-thick by 2-inch- wide steel.
- J. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

2.5 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.6 FABRICATION

- A. General: Fabricate standard steel doors and frames 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
 - 1. All doors shall have raceway prepped for card access. Raceway shall go from door hinge to lockset
- B. Standard Steel Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in doors.
- C. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Sidelight, interior windows, 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.
 - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners, unless otherwise indicated.
 - 4. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry.
 - 5. Where installed in masonry, leave vertical mullions in frames open at top for grouting.
 - 6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 7. 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 in height.
 - 2) Three anchors per jamb from 60 to 90 inches in height.
 - 3) Four anchors per jamb from 90 to 120 inches in height.

- 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.
 - 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:
 - 1) Three anchors per jamb up to 60 inches in height.
 - 2) Four anchors per jamb from 60 to 90 inches in height.
 - 3) Five anchors per jamb from 90 to 96 inches in height.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
 - 5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - c. Compression Type: Not less than two anchors in each jamb.
 8. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 - D. Hardware Preparation: Factory prepare standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
 1. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
 - E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
 2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 3. Provide loose stops and moldings on inside of doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
- 2.7 STEEL FINISHES
- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Finish standard steel door and frames after assembly.
 - B. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale

and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

- C. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of standard steel doors and frames.
 - 1. Examine roughing-in for embedded and built-in anchors to verify actual locations of standard steel frame connections before frame installation.
 - 2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturers written instructions. **All doors shall have conduit installed down to latch to above ceiling and down to center hinge to above ceiling, prepped for card reader.**
- B. Standard Steel Frames: Install standard steel frames for doors sidelights transoms borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Apply bituminous coating to backs of frames that are filled with mortar, grout, and plaster containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."
 5. Concrete Walls: Solidly fill space between frames and concrete with grout. Install grout in lifts and take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.

9. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Standard Steel 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 with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

ADJUSTING AND CLEANING

- E. 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 standard steel doors or frames that are warped, bowed, or otherwise unacceptable.
- F. Clean grout and other bonding material off standard steel doors and frames immediately after installation.
- G. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

END OF SECTION 08111

SECTION 082120 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid-core doors with wood-veneer, faces.
- B. Related Sections include the following:
 - 1. Division 6 Section "Finish Carpentry" for wood door frames.
 - 2. Division 8 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire ratings for fire doors.
- C. Samples for Initial Selection: Color charts consisting of actual materials in small sections.
- D. Samples for Verification:
 - 1. Corner sections of doors, approximately 8 by 10 inches, with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required..
 - 2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

- B. Quality Standard: Comply with WIC's "Manual of Millwork."
 - 1. Provide WIC-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
 - 2. Provide WIC-Certified Compliance Certificate for installation.
- C. Forest Certification: Provide doors made from wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."
 - 1. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flush Wood Doors:
 - a. Masonite Wood Door
 - b. Ampco Products, Inc.
 - c. Buell Door Company.
 - d. Chappell Door Co.
 - e. Eagle Plywood & Door Manufacturing, Inc.
 - f. Eggers Industries; Architectural Door Division.
 - g. GRAHAM Manufacturing Corp.
 - h. Haley Brothers, Inc.
 - i. Ideal Wood Products, Inc.
 - j. IPIK Door Company.
 - k. Lambton Doors.
 - l. Marlite.
 - m. Mohawk Flush Doors, Inc.
 - n. Oshkosh Architectural Door Co.
 - o. Poncraft Door Co.
 - p. Southwood Door Co.
 - q. Vancouver Door Company, Inc.
 - r. VT Industries Inc.
 - s. Weyerhaeuser Company.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Adhesives: Do not use adhesives containing urea formaldehyde.
- B. Doors for Transparent Finish:
1. Grade: Premium, with Grade A faces.
 2. Species and Cut: White oak, Rift sawn
 3. Match between Veneer Leaves: Book match.
 4. Assembly of Veneer Leaves on Door Faces: Balance match.
 5. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 20 feet or more.
 6. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 7. Stiles: Same species as faces.
- C. Doors for Opaque Finish:
1. Grade: Premium.
 2. Faces for Interior Doors: Medium-density overlay.
 3. Apply medium-density overlay to standard thickness, closed-grain, hardwood face veneers.

- 2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH
1. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.
 2. Architectural Woodwork Standards Grade: Premium.
 3. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: White oak.
 - b. Cut: Rift cut.
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Center-balance match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
 - f. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.
 - g. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 - h. Transom Match: Continuous match.
 - i. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Section 064216 "Flush Wood Paneling."
 4. Exposed Vertical and Top Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - c. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
 - 1) Finish steel edges and astragals with baked enamel same color as doors.
 - 2) Finish steel edges and astragals to match door hardware (locksets or exit devices).
 - d. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.
 5. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-1 particleboard.

- 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - a) 5-inch top-rail blocking, in doors indicated to have closers.
 - b) 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c) 5-inch midrail blocking, in doors indicated to have exit devices.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Spec section "Door Hardware." And door schedule in drawings
 - b. Glued wood stave.
6. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware. Retain "Blocking for Mineral-Core Doors" Subparagraph above and first four subparagraphs below only after verifying availability for fire-protection rating required. Delete four subparagraphs below if retaining first option above.
 - 1) 5-inch top-rail blocking.
 - 2) 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - 3) 5-inch midrail blocking, in doors indicated to have armor plates.
 - 4) 4-1/2-by-10-inch lock blocks, in doors indicated to have exit devices.
7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LOUVERS AND LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. Fire rated doors metal beads primed ready to paint to match door

2.5 FABRICATION

A. Fabricate doors in sizes indicated for Project-site fitting.

B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
- E. All doors shall be prepped with raceway ready for card access in lock set. Raceway shall go from second hinge from bottom to lockset

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
 - a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- F. Field-Finished Doors: Refer to the following for finishing requirements:
 - 1. Division 9 Section "Painting."

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08211

SECTION 083320 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulated Overhead doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Include description of automatic-closing device and testing and resetting instructions.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 - 5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 6. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
 - 1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Special warranty.
- B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.
- C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
 - 1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 2. Testing: According to ASTM E330/E330M or DASMA 108 for garage doors and complying with acceptance criteria of DASMA 108.
 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
 4. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20-lbf/sq. ft. wind load, acting inward and outward.
- B. Windborne-Debris Impact Resistance: Provide impact-protective overhead coiling doors that pass ASTM E1886 missile-impact and cyclic-pressure tests according to ASTM E1996 for Wind Zone 3 for protection.
1. Large-Missile Test: For overhead coiling doors located within 30 feet (9.1 m) of grade.
 2. Small-Missile Test: For overhead coiling doors located between 30 feet (9.1 m) and 60 feet (18.3 m) above grade.
- C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Component Importance Factor: **[1.5]** **[1.0]**.

2.3 DOOR ASSEMBLY

Copy this article and re-edit for each non-fire-rated coiling-door unit. This article is intended as a guide if Project requires several units of varying sizes, characteristics, and capacities. For each door assembly, retain required options in this article and their related requirements in other Part 2 articles. Consult manufacturers for recommendations and availability.

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Alpine Overhead Doors, Inc.](#)
 - b. [C.H.I. Overhead Doors, Inc.](#)
 - c. [Overhead Door Corporation.](#)
 - d. [Raynor.](#)
 - e. [Wayne-Dalton Corp.](#)
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000 **<Insert number>**. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E283 or DASMA 105.

- D. STC Rating: 26.
- E. Curtain R-Value: 6.0 deg F x h x sq. ft./Btu.
- F. Door Curtain Material: Galvanized steel.
- G. Door Curtain Slats: Flat profile slats of 3-1/4-inch center-to-center height.
 - 1. Insulated-Slat Interior Facing: Metal.
 - 2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.
- H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- I. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- J. Hood: Match curtain material and finish.
 - 1. Shape: Square.
 - 2. Mounting: Face of wall.
- K. Locking Devices: Equip door with slide bolt for padlock.
 - 1. Locking Device Assembly: Cremone-type, both jamb sides locking bars, operable from inside with thumbturn.
- L. Electric Door Operator:
 - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 - 2. Operator Location: Wall.
 - 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
 - 4. Motor Exposure: Interior.
 - 5. Motor Electrical Characteristics:
 - a. Horsepower: 2 hp.
 - b. Voltage: 208-V ac, single phase, 60 Hz.
 - 6. Emergency Manual Operation: Chain type.
 - 7. Obstruction-Detection Device: Automatic photoelectric sensor.
 - a. Sensor Edge Bulb Color: As selected by Architect from manufacturer's full range.
 - 8. Control Station(s): Interior mounted.
- M. Curtain Accessories: Equip door with weatherseals push/pull handles automatic-closing device.
- N. Door Finish:
 - 1. Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
 - 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 - 1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 - 2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.
 - 3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.6 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized-steel sheet with G90 zinc coating, complying with ASTM A653/A653M.
- B. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling unless otherwise indicated.

2.7 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
 - 1. At door head, use 1/8-inch-thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene.
- B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.9 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
 - 1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.

2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
1. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
 - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency

manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.
- D. Power-Operated Doors: Install according to UL 325.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and to furnish reports to Architect.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.
 - 2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.
 - 3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 084130 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes conventionally glazed aluminum curtain walls installed as stick unitized unit-and-mullion assemblies.
- B. Related Sections:
 - 1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with glazed aluminum curtain walls and for sealants to the extent not specified in this Section.
 - 2. Division 08 Section "Structural-Sealant-Glazed Curtain Walls" for structural-sealant-glazed curtain walls.
 - 3. Division 08 Section "Sloped Glazing Assemblies" for sloped glazing installed with glazed aluminum curtain walls.
 - 4. Division 08 Section "Louvers and Vents" for units installed with glazed aluminum curtain walls.

1.3 ALLOWANCES

- A. Provide preconstruction field quality-control testing as part of testing and inspecting allowance.

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by preconstruction testing of manufacturer's standard glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.

- e. Failure of operating units.
- B. Delegated Design: Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Loads:
- 1. Wind Loads: As indicated on Drawings.
 - a. Basic Wind Speed: 90 mph.
 - b. Importance Factor: low.
 - c. Exposure Category: B.
 - 2. Blast Loads: As indicated on Drawings.
 - 3. Periodic Maintenance-Equipment Loads: As indicated on Drawings.
- D. Structural-Test Performance: Test according to ASTM E 330 as follows:
- 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Deflection of Framing Members: At design wind pressure, as follows:
- 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or $1/8$ inch, whichever is smaller.
 - a. Operable Units: Provide a minimum $1/16$ -inch clearance between framing members and operable units.
 - 3. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to two times the length of cantilevered member, divided by 175.
- F. Windborne-Debris-Impact-Resistance Performance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 2.
- 1. Large-Missile Test: For glazed openings located within 30 feet of grade.
 - 2. Small-Missile Test: For glazed openings located more than 30 feet above grade.
- G. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. Component Importance Factor is 1.5.
- H. Story Drift: Accommodate design displacement of adjacent stories indicated.
1. Design Displacement: As indicated on Drawings.
 2. Test Performance: Meeting criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.
- I. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
- J. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
1. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.
- K. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
 2. Test Interior Ambient-Air Temperature: 75 deg F.
 3. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
- L. Energy Performance: Glazed aluminum curtain walls shall have certified and labeled energy performance ratings in accordance with NFRC.
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.69 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.45 as determined according to NFRC 200.
 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
 4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC- certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- M. Sound Transmission: Provide glazed aluminum curtain walls with fixed glazing and framing areas having the following sound-transmission characteristics:
1. Outdoor-Indoor Transmission Class: Minimum 34 when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Provide glazed aluminum curtain walls that comply with test-performance requirements indicated, as evidenced by reports based on Project-specific preconstruction testing of tests performed on manufacturer's standard assemblies by a qualified testing agency.
1. Engage a qualified testing agency to perform preconstruction testing on laboratory mockups.
 2. Build laboratory mockups at testing agency facility using personnel, materials, and methods of construction that will be used at Project site.
 3. Notify Architect seven days in advance of the dates and times when laboratory mockups will be constructed.
 4. Preconstruction Testing Program: Perform tests specified in "Performance Requirements" Article on laboratory mockups in the following order:
 - a. Structural-performance preloading at 50 percent of the specified wind-load design pressure when tested according to ASTM E 330.
 - b. Air infiltration when tested according to ASTM E 283.
 - c. Water penetration under static pressure when tested according to ASTM E 331.
 - d. Water penetration under dynamic pressure when tested according to AAMA 501.1.
 - e. Structural performance at design load when tested according to ASTM E 330.
 - f. Repeat air filtration when tested according to ASTM E 283.
 - g. Repeat water penetration under static pressure when tested according to ASTM E 331.
 - h. Structural performance at maximum 150 percent of positive and negative wind-load design pressures when tested according to ASTM E 330.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. LEED Submittal:
1. Product Data for Credit EQ 4.1: For glazing sealants used inside of the weatherproofing system, including printed statement of VOC content.
- C. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.

- e. Flashing and drainage.
- 3. Include laboratory mockup Shop Drawings, prepared by a qualified preconstruction testing agency, showing details of laboratory mockup.
 - a. Resubmit Shop Drawings with changes made to glazed aluminum curtain walls to successfully complete preconstruction testing.
- D. Samples for Initial Selection: For units with factory-applied color finishes.
- E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- G. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- H. Preconstruction Mockup Submittals:
 - 1. Preconstruction Testing Program: Developed specifically for Project.
 - 2. Preconstruction Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
 - 3. Photographs:
 - a. Take a minimum of 10 photographs at locations and intervals as required by Architect.
 - b. Submit digital color images on CD-R of mockup before, during, and after preconstruction testing.
 - 4. Record Drawings: Submit record drawings of preconstruction mockups prepared by preconstruction testing agency.
- I. Qualification Data: For qualified Installer and preconstruction testing agency and testing agency.
- J. Seismic Qualification Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- K. Welding certificates.

- L. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
- M. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for glazed aluminum curtain walls, indicating compliance with performance requirements.
- N. Field quality-control reports.
- O. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.
- P. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating glazed aluminum curtain walls that meet or exceed energy performance requirements indicated and of documenting this performance by certification, labeling, and inclusion in lists.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- C. Preconstruction Testing Agency Qualifications: Qualified according to ISO/IEC 17025 and accredited by ICC-ES for preconstruction testing indicated.
- D. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- E. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- F. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
- G. Energy Performance Standards: Comply with NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
 - 1. Provide NFRC-certified glazed aluminum curtain walls with an attached label.

- H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- I. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

- A. Special Assembly Warranty: Standard form in which manufacturer Installer agrees to repair or replace components of glazed aluminum curtain walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis-of-Design New Curtian Wall Product: Subject to compliance with requirements, provide product EFCO XTherm 5600 system, size 2 ½"x 7 ¼" or comparable product by one of the following:

Basis-of Design replacement curtain wall product: EFCO 960 Wall as detailed on drawings or comparable product by one of the following:

Basis-of-Design interior curtain wall: EFCO 400 series as detailed on drawings or comparable product by one of the following:

1. Arcadia, Inc.
2. Arch Aluminum & Glass Co., Inc.
3. Bruce Wall Systems Corporation.
4. CMI Architectural.
5. EFCO Corporation. (Basis-of-Design)
6. Glassalum International Corporation.
7. Kawneer North America; an Alcoa company.
8. Pitco Architectural Metals, Inc.
9. Tingwall Inc.
10. TRACO.
11. Tubelite.
12. United States Aluminum.
13. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
14. Waltek & Company Limited.
15. Wausau Window and Wall Systems.
16. YKK AP America Inc.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING

- A. Framing Members: Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
- D. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing Sealants: Manufacturer's standard sealants.

2.4 GLAZING

- A. Glazing: Comply with Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from as required for each application.
 - 6. Provisions for safety railings mounted.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
 - 8. Components curved to indicated radii.
- D. Fabricate components that, when assembled, have the following characteristics:
 - 1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
 - 2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
- E. Curtain-Wall Framing: Fabricate components for assembly using per manufacturer standard fabrication.
- F. Factory-Assembled Frame Units:
 - 1. Rigidly secure nonmovement joints.
 - 2. Seal joints watertight unless otherwise indicated.
 - 3. Install glazing to comply with requirements in Division 08 Section "Glazing."
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES

- A. Finish

1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) resin in conformance with the following general requirements of AAMA 2605.
 - a. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Division 08 Section "Glazing."

3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.50 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
 - a. Test Area: One bay wide, but not less than 30 feet, by one story of glazed aluminum curtain wall.
 - b. Perform a minimum of three tests in areas as directed by Architect.
 - c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
 - a. Test Area: One bay wide, but not less than 30 feet, by one story of glazed aluminum curtain wall.
 - b. Perform a minimum of three tests in areas as directed by Architect.
 - c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

3. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Test Area: A minimum area of 75 feet by one story of glazed aluminum curtain wall.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 084413

SECTION 08711 - DOOR HARDWARE (SCHEDULED BY NAMING PRODUCTS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Commercial door hardware for the following:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Folding doors.
 - d. Other doors to the extent indicated.
- 2. Cylinders for doors.
- 3. Electrified door hardware.

- B. Related Sections include the following:

- 1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
- 2. Division 8 Section "Aluminum Entrances and Storefronts" for entrance door hardware, except cylinders.
- 3. Division 8 Section "Power Door Operators" for automatic door operators.

- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

- 1. Cylinders for locks on aluminum and glass entrance doors.
- 2. Final replacement cores, shall be Best, and keys to be installed by Owner.

1.3 DOOR HARDWARE ALLOWANCE

- A. Door Hardware Selection: Follow schedule in this section.
- B. Submittals: Coordinate and process Submittals and templates for door hardware in same manner as Submittals for other Work.
- C. Coordination: Coordinate door hardware with other Work. Furnish Shop Drawings of other Work where required or requested to coordinate installation.

1.4 SUBMITTALS

- A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. System schematic.
 - b. Point-to-point wiring diagram.
 - c. Riser diagram.
 - d. Elevation of each door.
 - 2. Detail interface between electrified door hardware and fire alarm, access control, security, and building control system.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.
- D. Samples: For exposed door hardware of each type indicated below, in specified finish, full size. Tag with full description for coordination with the Door Hardware Schedule. Submit samples before, or concurrent with, submission of the final Door Hardware Schedule.
 - 1. Door Hardware: See schedules:
 - 2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- E. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule in Part 2.
 - 2. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.

- g. Door and frame sizes and materials.
 - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
 - 3. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
 - 4. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.
 - F. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
 - G. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
 - 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
 - H. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
 - 1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.
 - I. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
 - J. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
 - K. Warranties: Special warranties specified in this Section.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who has completed door hardware 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.

- B. **Supplier Qualifications:** Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
1. **Electrified Door Hardware Supplier Qualifications:** An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
 - a. **Engineering Responsibility:** Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 2. **Scheduling Responsibility:** Preparation of door hardware and keying schedules.
- C. **Architectural Hardware Consultant Qualifications:** A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and 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.
1. **Electrified Door Hardware Qualifications:** Experienced in providing consulting services for electrified door hardware installations.
- D. **Source Limitations:** Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.
- E. **Regulatory Requirements:** Comply with provisions of the following:
1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:
 - a. **Handles, Pulls, Latches, Locks, and other Operating Devices:** Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. **Door Closers:** Comply with the following maximum opening-force requirements indicated:
 - 1) **Interior Hinged Doors:** 5 lbf applied perpendicular to door.
 - 2) **Sliding or Folding Doors:** 5 lbf applied parallel to door at latch.
 - 3) **Fire Doors:** Minimum opening force allowable by authorities having jurisdiction.

- c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.
 - c. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
 - d. Thresholds: Not more than 1/2 inch high.
 3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- F. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 1. Test Pressure: Test at atmospheric pressure.
- G. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 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. Address for delivery of keys.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
- I. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 2. Review sequence of operation for each type of electrified door hardware.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review required testing, inspecting, and certifying procedures.
- J. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

- K. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system, and detection devices access control system, security system, and building control system.

1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of operators and door hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Electromagnetic Locks: Five years from date of Substantial Completion.
- E. Warranty Period for Manual Closers: 10 years from date of Substantial Completion.
- F. Warranty Period for Concealed Floor Closers: Five years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

GENERAL DOOR HARDWARE

*******The following hardware is based on the standards of the University. Supply hardware as noted or approved equals. Best cores are required on all locksets.*******

3 Hat and coat hook	IVE
Hinge	Stanley Hardware (STA)
Hinge-dbl acting	Mckinney (MCK)
Electric Hinge	Stanley Hardware (STA)
Flush bolt	Rockwood (ROC)
Automatic Flushbolt	Rockwood (ROC)
Cylinder – Mortise	Best Access Systems (BEST)
Cylinder – Rim	Best Access Systems (BEST)
Cylinder – Dummy	Best Access Systems (BEST)
Lockset	Best Access Systems (BEST)
Passage set	Best Access Systems (BEST)
Mortise privacy	Best Access Systems (BEST)
Exit device	Von Duprin, Inc. (VDI)
Exit device – electrified	Von Duprin, Inc (VDI)
Dead lock	Best Access Systems (BEST)
Electric lock	Best Access Systems (BEST)
Push Plate	Rockwood (ROC)
Pull Plate	Rockwood (ROC)
Coordinator – Bar	Rockwood (ROC)
Door closer	LCN closers (LCN)
Kick plate	Korogard textured plastic sheets (color to be selected) 2.4 mm Mat. Korogard wall protection system (KOR)
Mop plate	Korogard textured plastic sheets (color to be selected) 2.4 mm Mat. Korogard wall protection system (KOR)
Armor plate	Korogard textured plastic sheets (color to be selected) 2.4 mm Mat. Korogard wall protection system (KOR)
Door frame guards	Korogard F360 48” high (color to be selected) – see drawing schedule for locations
Wall bumper	Rockwood (ROC)
Electro Magnetic holder	Security lock distributors (SLD)
Weather-stripping	National Guard Products, Inc. (NGP)
Astragal	National Guard Products, Inc. (NGP)
Door seal	National Guard Products, Inc. (NGP)
Sweep strip	National Guard Products, Inc. (NGP)
Threshold	National Guard Products, Inc. (NGP)
Misc.	BOSCH Security Systems (BOS)
Power supply	Von Duprin, Inc. (VDI)
Card reader	HID (HID)
Silencer	Rockwood (ROC)

120v Magnetic Door Holder

Rixson

Hardware Finishes

<u>Finish</u>	<u>Finish Description</u>
26D	
32D	
<u>Finish</u>	<u>Finish Description</u>
626	Satin chromium plated nickel
689	Aluminum painted
A	
AL	Aluminum
B	
BPC	
GRAY	
MILL	
Mill	
US26D	Satin chromium plated nickel
US26D/US32D	
US32D	Satin stainless steel
White	
White	

Hardware Groups**GROUP: #1 Standard office hardware (single)**

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	BEST	Lockset	9K3-7-AB-15-D-S3 x L/C Entrance	626
1	EA	ROC	Wall bumper	409	US32D
3	EA	ROC	Silencer	608	GRAY
1	EA	IVES	Hat and coat Hook	571	26D

GROUP: #3 Standard non-rated classroom hardware (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	BEST	Lockset	9K3-7-R-15-D-STK x CORMAX-Patented	626
1	EA	ROC	Wall bumper	409	US32D
3	EA	ROC	Silencer	608	GRAY

GROUP: #4 Standard fire rated storeroom, janitor, closet hardware (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	BEST	Lockset	9K3-7-D-15-D-S3 x Best Preferred Patented Storeroom	626
1	EA	LCN	Door closure	4040XP REG/PA DEL TBSRT	AL
1	EA	NGP	Door seal	5050Bx17'	B
3	EA	ROC	Silencer	608	GRAY

GROUP: #4A Standard non- rated storeroom, janitor, closet hardware (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	BEST	Lockset	9K3-7-D-15-D-S3 x Best Preferred Patented Storeroom	626
1	EA	NGP	Door seal	5050Bx17'	B
3	EA	ROC	Silencer	608	GRAY

GROUP: #5 Standard single stall toilet room hardware (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	BEST	Mortise privacy	5H-0-LB-15-S Privacy, Deadbolt*	626
1	EA	KOR	Kick plate	34"w 10"h	
1	EA	ROC	Wall bumper	409	US32D
3	EA	ROC	Silencer	608	GRAY

GROUP: #6 Standard multi stall toilet room hardware (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB179 4-1/2x4-1/2	26D
1	EA	ROC	Push plate	70C-RKW	US32D
1	EA	ROC	Pull plate	07 X 70C x Type 1	US32D
1	EA	KOR	Kick plater	34"w x 10"h	
1	EA	KOR	Mop plate	34"w x 6"h	
1	EA	ROC	Wall bumper	409	US32D
3	EA	ROC	Silencer	608	GRAY

GROUP: #9 Standard hardware for non-rated double egress or regular pair openings (pair)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
6	EA	STA	Hinge	CB168NPR 4-1/2x4-1/2	26D
2	EA	VDI	Exit device	9827EO x LBR	US26D both
2	EA	LCN	Door closure	4040XP EDA 30 SHOE Support DEL TBSRT	AU both
2	EA	KOR	Kick plater	34"w x 10"h	
2	EA	ROC	Silencer	608	GRAY

GROUP: #10 Standard fire rated double egress (pair)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
6	EA	STA	Hinge	CB168NPR 4-1/2x4-1/2	26D
2	EA	VDI	Exit device	9827EO x LBR	US26D both
2	EA	LCN	Door closure	4040XP EDA 30 SHOE Support DEL TBSRT	AU both
2	EA	KOR	Kick plater	34w x 10"h	
2	EA	SLD	ElectroMagnetic Hold	1504-AQNS 24VDC "EDWARDS"	689
1	EA	NGP	Door seal	5050Bx21'	B
2	EA	ROC	Silencer	608	GRAY

This opening is designed for the double egress application. The function for this opening is a labeled pass thru. These doors will be magnetically held opening with mag holder tie into the fire alarm system only.

*Magnetic Holders to be supplied by owner

GROUP: #11 Card access electric lever lock (single)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
2	EA	STA	Hinge	CB179NPR 4-1/2x4-1/2	26D
1	EA	STA	Electric hinge	CECSCB179-18 4 1/2 X 4 1/2	26D
1	EA	BEST	Electric lock	9KW3-7-DEU-24V-15-D-S3 x Best Preferred Patented Electrically Unlocked - 24 Volt (Electrified)	626
1	EA	LCN	Door closure	4040XP REG/PA DEL TBSRT	AL
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	
3	EA	ROC	Silencer	608	GRAY

*Request-To-Exit and Card Reader By Owner

GROUP: #12 Card access electric lever lock (pair) (rated or non-rated opening)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
4	EA	STA	Hinge	CB179NPR 4-1/2x4-1/2	26D
1	EA	STA	Electric hinge	CECSCB179-18 4 1/2 X 4 1/2	26D
1	EA	STA	Electric hinge	CSCB179 4 1/2 X 4 1/2	26D/Inactive
2	EA	ROC	Auto flushbolt	2842	US26D
1	EA	BEST	Electric lock	9KW3-7-DEU-24V-15-D-S3 x Best Preferred Patented Electrically Unlocked - 24 Volt (Electrified)	626
1	EA	ROC	Coordinator bar	1700	BPC
1	EA	LCN	Door closure	4040XP REG/PA DEL TBSRT	AL
1	EA	LCN	Door closure	4040XP REG/PA DEL TBSRT	AL/Active
1	EA	KOR	Kick plater	10"x22"	
1	EA	KOR	Kick plater	10"x34"	
1	EA	KOR	Kick plater	6"x34"	
1	EA	ROC	Wall bumper	409	US32D
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	
3	EA	ROC	Silencer	608	GRAY

*Request-To-Exit and Card Reader By Owner

GROUP: #13 Card access, standard pair, vertical rods active door (fire) (Electric vertical rod)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
4	EA	STA	Hinge	CB168NPR 4-1/2x4-1/2	26D
1	EA	STA	Electric hinge	CECSCB168-18 4 1/2 X 4 1/2	US26D/Active
1	EA	STA	Electric hinge	CSCB168-18 4 1/2 X 4 1/2	US32D/Inactive
1	EA	VDI	Exit device	9827EO-F x LBR	US26D/Inactive
1	EA	VDI	Exit device electrified	9827L-F x E996L-06 x LBR x FSE	US26D/Active
2	EA	KOR	Mop plater	6"x35"	both
2	EA	KOR	Armor plater	34"x34"	both
1	EA	ROC	Wall bumper	409	US32D
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	
2	EA	ROC	Silencer	608	GRAY

*Request-To-Exit and Card Access By Owner

GROUP: #14 Card access, non-rated, (pair) active leaf (electric mortise exit device)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
4	EA	STA	Hinge	CB179NPR 4-1/2x4-1/2	26D
1	EA	STA	Electric hinge	CECSCB179-18 4 1/2 X 4 1/2	US26D/Active
1	EA	STA	Electric hinge	CSCB179 4 1/2 X 4 1/2	626/Inactive
2	EA	ROC	Flush bolt	555	US26D/Inactive
1	EA	BEST	Cylinder mortise	1 E-7-4-C4-RP3 Standard Mortise	626/Active

1	EA	VDI	Exit device	9875L-E996L	626/Active
1	EA	ROC	Coordinator bar	1700	BPC
2	EA	LCN	Door closure	4040XP EDA 30 SHOE Support DEL TBSRT	AL both
2	EA	KOR	Kick plater	34" w x 10" h	both
2	EA	ROC	Wall bumper	409	US32D both
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	
2	EA	ROC	Silencer	608	GRAY

*Request-To-Exit and Card Access By Owner

GROUP: #15 Card Access, fire rated (pair) Active leaf (electric mortise exit device)

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
4	EA	STA	Hinge	CB179NPR 4-1/2x4-1/2	26D
1	EA	STA	Electric hinge	CECSCB179-18 4 1/2 X 4 1/2	US26D/Active
1	EA	STA	Electric hinge	CSCB179 4 1/2 X 4 1/2	626/Inactive
2	EA	ROC	Auto flushbolt	2842	US26D
1	EA	BEST	Cylinder mortise	1 E-7-4-C4-RP3 Standard Mortise	626/Active
1	EA	VDI	Exit device electrified	9875L-F E996L-M 24VDC 825-SNB FSE	US32D/Active
1	EA	ROC	Coordinator bar	1700	BPC
2	EA	LCN	Door closure	4040XP EDA 30 SHOE Support DEL TBSRT	AL both
2	EA	KOR	Kick plater	34" w x 10" h	both
2	EA	ROC	Wall bumper	409	US32D both
1	EA	NGP	Door seal	5050Bx21'	B
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	
2	EA	ROC	Silencer	608	GRAY

*Request-To-Exit and Card Access By Owner

GROUP: #16 Alum Single door card access

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
2	EA	STA	Hinge	CB199NPR 4-1/2x4-1/2	32D
1	EA	STA	Electric hinge	CECSCB199-18 4 1/2 X 4 1/2	US32D
1	EA	BEST	Cylinder – rim	12E-7-2-S2-RP3 Standard Rim	626
1	EA	VDI	Exit device electrified	98L x E996L-R&V 24VDC 299-F 825-SN	US32D
1	EA	LCN	Door closure	4040XP x CUSH x SRT	AL
1	EA	NGP	Sweep strip	198NA x 6x3/4-TEKS x 36"	A
1	EA	NGP	Threshold	1013 x Spanner 10-24 SSMS/LA	MILL
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	

Alum Single Door Card Access

*Request-To-Exit and Card Reader by Owner

GROUP: #17 Alum. Door single for operator operation. Additional Horton operator and push plates as required

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
2	EA	STA	Hinge	CB199NPR 4-1/2x4-1/2	32D
1	EA	STA	Electric hinge	CECSCB199-18 4 1/2 X 4 1/2	US32D
1	EA	BEST	Cylinder – rim	12E-7-2-S2-RP3 Standard Rim	626
1	EA	VDI	Exit device	QEL-98 motorized quiet unit	US26D/US32D
1	EA	NGP	Sweep strip	198NA x 6x3/4-TEKS x 36"	A
1	EA	NGP	Threshold	1013 x Spanner 10-24 SSMS/LA	MILL
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	

*Request-To-Exit and Card Reader by Owner

GROUP: #18 Stainless steel double door

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
6	EA	STA	Hinge	CB199NPR 4-1/2x4-1/2	32D
2	EA	STA	Electric hinge	CECSCB199-18 4 1/2 X 4 1/2	US32D
2	EA	BEST	Cylinder – rim	12E-7-2-S2-RP3 Standard Rim	626
2	EA	VDI	Exit device	98L x E996L-R&V 24VDC 299-F 825-SNB	US26D/US32D
2	EA	NGP	Sweep strip	198NA x 6x3/4-TEKS x 36"	A
1	EA	NGP	Threshold	1013 x Spanner 10-24 SSMS/LA	MILL
1	EA	BOS	Misc	DS-160 x TP-160 REQUEST TO EXIT	white
1	EA	HID	Card reader	920PMNNEKEA003 MOB1384	

*Request-To-Exit and Card Reader by Owner

GROUP: #22 Classroom greater than 100 people non-rated single

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
3	EA	STA	Hinge	CB168NPR 4-1/2x4-1/2	26D
1	EA	BEST	Cylinder – rim	12E-7-2-S2-RP Standard Rim	626
1	EA	VDI	Exit device	98L-F x 996L(#06) x 299F x 3-0	US26D
1	EA	LCN	Door closure	4040XP x CUSH x WMS	AL
1	EA	KOR	Kick plater	34" x 10"h	
1	EA	NGP	Door seal	5050Bx17'	B
3	EA	ROC	Silencer	608	GRAY

GROUP: #23 Classroom (pair) greater than 100 people non-rated

<u>Qty</u>	<u>UOM</u>	<u>Manf.</u>	<u>Item Type</u>	<u>Item Series/Description</u>	<u>Finish</u>
6	EA	STA	Hinge	CB168NPR 4-1/2x4-1/2	26D
2	EA	BEST	Cylinder – rim	12E-7-2-S2-RP Standard Rim	626 both
2	EA	VDI	Exit device	9827L X 996L(#06) X 299 X LBR X 3-0	US26D both
2	EA	LCN	Door closure	4040XP EDA 30 SHOE SUPPORT DEL TBSRT	AL both
2	EA	KOR	Kick plater	34"w x 10"h	both
2	EA	ROC	Silencer	608	

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening.
 - 2. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 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 is allowed to 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 so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary 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.

END OF SECTION 08711

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Glazed curtain walls.
 - 4. Glazed entrances.
 - 5. Storefront framing.
 - 6. Skylights.
 - 7. Sloped glazing.
 - 8. One-way Vision Glass
- B. Related Sections include the following:
 - 1. Division 5 Section "Ornamental Railings" for glass panels forming guards in railings.
 - 2. Division 8 Section "All-Glass Entrances and Storefronts."
 - 3. Division 8 Section "Structural-Sealant-Glazed Curtain Walls" for structural-sealant glazing requirements.

1.3 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 a specified gas.
- D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

- E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
- F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems 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 thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, 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: As indicated.
 - b. Specified Design Wind Loads: As indicated, but not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures": Section 6.0 "Wind Loads."
 - c. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - 1) Basic Wind Speed: Per New York State Building Code
 - 2) Importance Factor: Per New York State Building Code
 - 3) Exposure Category: Per New York State Building Code.
 - d. Specified Design Snow Loads: As indicated, 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."
 - e. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - 1) Load Duration: 60 seconds or less.

- f. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.
 - 1) Load Duration: 30 days.
 - g. 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.
 - 3) For laminated-glass lites.
 - h. Minimum Glass Thickness for Exterior Lites: Not less than 1".
 - i. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.
- 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 6.0 mm thick.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units with lites 6.0 mm thick and a nominal 1/2" wide interspace.
 - 4. 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. x h x deg F.
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.

Performance Characteristics **NEW CURTAIN WALL**. Design Based on Guardian SunGuard Triple-Glazed Insulating Glass SNR 43 Clear Tempered -Clear-Clear

Transmission		
a.	Visible Light	37%
b.	Ultra-violet	: 10%
c.	Solar Energy	15%
Reflectance		
d.	Visible Light Out	29%
e.	Visible Light in	17%
f.	Solar Energy Out	42%
U-Value Winter Nighttime		
g.	Argon U-Value	0.12

h.	Relative Heat Gain	46
i.	Shading Coefficient:	0.22
j.	SHGCC	0.19
k.	Light to Solar Gain	1.92

5.

1.5 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: For the following products, in the form of 12-inch- square Samples for glass and of 12-inch- long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- C. Samples: For the following products, in the form of 12-inch- square Samples for glass.
1. Each color of tinted float glass.
 2. Each type of patterned glass.
 3. Coated vision glass.
 4. Ceramic-coated spandrel glass.
 5. Each pattern and color of ceramic-coated vision glass.
 6. Wired glass.
 7. Fire-resistive glazing products.
 8. Each type of laminated glass with colored interlayer.
 9. Insulating glass for each designation indicated.
 10. For each color (except black) of exposed glazing sealant indicated.
- 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. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.
- H. Product Test Reports: For each of the following types of glazing products:
1. Tinted float glass.
 2. Coated float glass.
 3. Insulating glass.
 4. Glazing sealants.
 5. Glazing gaskets.

- I. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. 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).
- B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass, laminated glass, and insulating glass.
- C. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.
- D. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.
- E. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
 1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
 2. Glass Testing Agency Qualifications: An independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- F. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
 1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
- G. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:
 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 2. Submit not fewer than four pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 4. For materials failing tests, obtain 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.
- H. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
- I. Safety Glazing Products: Firelite Ceramic Glass to meet rating of opening
- J. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."
 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."
 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- K. 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.
- L. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 2. Build glass mockups by installing the following kinds of glass in mockups specified in Division 8 Section "Aluminum-Framed Entrances and Storefronts, Aluminum Windows, and Glazed Aluminum Curtain Walls " to match glazing systems required for Project, including glazing methods:
 - a. Heat-strengthened coated glass.
 - b. Fully tempered glass.
 - c. Spandrel glass.
 - d. Laminated glass.
 - e. Coated insulating glass.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- M. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 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. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturers written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

1.9 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Product: Subject to compliance with requirements, provide product specified.
 4. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 5. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 6. Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
1. Ultra-Clear (Low-Iron) Float Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.
 - a. Products:
 - 1) AFG Industries Inc.; Krystal Klear.
 - 2) Guardain Industries Corp. (Basis-of-Design)
 - 3) Pilkington Building Products North America; Optiwhite.
 - 4) PPG Industries, Inc.; Starphire.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
 3. For uncoated glass, comply with requirements for Condition A.
 4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
 5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.
- C. Wired Glass: ASTM C 1036, Type II (patterned and wired flat glass), Class 1 (clear), Quality-Q-6; and of form and mesh pattern specified.

- D. Laminated Glass: ASTM C 1172, and complying with other requirements specified and with the following:
1. Interlayer: Polyvinyl butyral or cured resin of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat plus pressure.
 - b. For cured-resin interlayers, laminate lites with laminated-glass manufacturer's standard cast-in-place and cured-transparent-resin interlayer.
 2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.
 3. For Animal Holding door window: Apply Light Gard RC-3 (Rose-Chocolate) window film to the outside face
- E. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
 2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.
 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
 4. Sealing System: Dual seal, with primary and secondary sealants as follows:
 - a. Manufacturer's standard sealants.
 - b. Polyisobutylene and polysulfide.
 - c. Polyisobutylene and silicone.
 - d. Polyisobutylene and hot-melt butyl.
 - e. Polyisobutylene and polyurethane.
 5. Spacer Specifications: Manufacturer's standard spacer material and construction.
 6. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
 - a. Spacer Material: Aluminum with black, color anodic finish.
 - b. Desiccant: Molecular sieve or silica gel, or blend of both.
 - c. Corner Construction: Manufacturer's standard corner construction.
 7. One-way Vision Glass: ¼" thick glazing quality, tempered clear glass with scratch-proof evaporated chromium alloy reflective coating one side to meet ASTM C1376, PPG Industries, Inc., or equal.

2.3 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. Neoprene, ASTM C 864.
 2. EPDM, ASTM C 864.
 3. Silicone, ASTM C 1115.
 4. Thermoplastic polyolefin rubber, ASTM C 1115.
 5. Any material indicated above.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
1. Neoprene.
 2. EPDM.
 3. Silicone.
 4. Thermoplastic polyolefin rubber.
 5. Any material indicated above.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.4 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
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.
- B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Single-Component Neutral-Curing Silicone Glazing Sealants GS-:
 - a. Products:
 - 1) Dow Corning Corporation; 790.
 - 2) GE Silicones; SilPruf LM SCS2700.
 - 3) Tremco; Spectrem 1 (Basic).
 - 4) GE Silicones; SilPruf SCS2000.

- 5) Sonneborn, Div. of ChemRex, Inc.; Omniseal.
- 6) Tremco; Spectrem 3.

- b. Type and Grade: S (single component) and NS (nonsag).
- c. Class: 100/50.
- d. Use Related to Exposure: NT (nontraffic).

- C. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.
- C. Grind smooth and polish exposed glass edges and corners.

2.8 FIRE RATED GLASS UNITS

- A. Firelite ceramic glass to meet the rating required for the opening

2.9 LAMINATED-GLASS UNITS

- A. Laminated-Glass Units LG-:
 - 1. Kind LA, consisting of two lites of annealed float glass.
 - 2. Outer Lite: Class 1 (clear) float glass.
 - a. Tint Color: To be selected by architect.
 - b. Thickness: As indicated.
 - c. Self-Cleaning, Low-Maintenance Coating: Pyrolytic coating on first surface.
 - 3. Plastic Interlayer:
 - a. Thickness: 0.060 inch, but not less than that required to comply as a Type II safety glass material.
 - b. Interlayer Color: To be select by architect.
 - c. Visible Light Transmittance of Interlayer: 75 percent minimum.

2.10 INSULATING-GLASS UNITS

- A. As called out on drawings and above in specification.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. 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.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.8 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08800

SECTION 088010 SPECIAL FUNCTION GLAZING (Sage Glass)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. SageGlass® electronically tintable insulating glass units for dynamic light and heat control.
- B. Related Sections:
 - 1. Division 8 – Openings.
 - 2. Division 25 - Integrated Automation.
 - 3. Section 26 09 00 – SageGlass Wired Control System-Instrumentation and Control for Electrical System.
 - 4. Division 26 - Electrical.

1.2 DEFINITIONS

- A. Fenestration: Openings in building's envelope including windows, doors, and skylights.
- B. Framing System: Basic rigid supporting structure of window.
- C. Glazing System: Soft material used in framing system.
- D. Bite: Dimension by which edge of glass product is engaged into glazing channel.
- E. IGU: Insulating Glass Unit.
- F. IGU Pigtail: Wire that extends from individual insulated glass units.
- G. Frame Cable: Wire that runs through framing system and connects IGU pigtail to low-voltage wiring on interior of building.
- H. 2-ply Laminated Glass: 2-sheets of monolithic glass bonded together with plastic interlayer by heat and pressure.
- I. Inboard Lite: Pane of IGU that faces interior of building.
- J. Outboard Lite: Pane of IGU that faces exterior of building.
- K. Performance Characteristics:
 - 1. Center-of-Glass Characteristics: Performance values that take only center portion of IGU into account and not framing members.
 - 2. Fenestration Performance: Performance based on total fenestration (glass and framing members). Values that can be validated and certified by National Fenestration Rating Council (NFRC).
- L. Sealing Insulating Glass Unit Surfaces and Coating Orientation:
 - 1. Surface 1: Exterior surface of outer laminated glass ply.
 - 2. Surface 2: Interior surface of outer laminated glass ply (surface facing the laminating material).
 - 3. Surface 3: Exterior surface of inner laminated glass ply (surface facing the laminating material).

4. Surface 4: Interior surface of inner laminated glass ply which is coated with the electrochromic layers.
 5. Surface 5: Exterior surface of inner pane.
 6. Surface 6: Room side surface of inner pane.
- M. Tinted: On state, with lowest visible light transmission.
- N. Clear: Off state, with highest visible light transmission.
- O. Variable Tint: Intermediate tint levels between fully tinted and clear.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
1. SageGlass® electronically tintable insulating glass units shall be operated by a SageGlass® control system as specified in Section 26 09 00.
- B. System must be capable of providing up to 3 independently tintable zones in each pane to provide adequate light quality in the space. Refer to project drawings for zoning specifics.

FRAMING AND GLAZING NOT PROVIDED BY SAGE ELECTROCHROMICS.

1. Framing and Glazing Systems:
 - a. Designed to accommodate IGU components below:
 - b. Edge clearance: 1/4 inch (6 mm).
 - c. Bite clearance: 5/8 inch (16 mm).
 - d. Face clearance: 3/16 inch (5 mm).
 - e. Accommodate controls wiring.
 - f. Has glazing materials that are compatible with materials of SageGlass® IGU.
 - g. Provide glazing and framing systems capable of withstanding normal thermal movements, wind loads, and impact loads, without failure, including loss due to defective manufacture, fabrication, and installation, deterioration of glazing materials, and other defects in construction.
 - 1) Normal Thermal Movement: Resulting from ambient temperature range of 120 degrees F (67 degrees C) and from consequent temperature range within glass and glass framing members of 180 degrees F (100 degrees C).
2. Provide glass products in thicknesses and strengths (annealed or heat-treated) required to meet or exceed the following criteria based on Project loads and in-service conditions per the methodology described in ASTM E1300.
 - a. Select minimum thickness of annealed or heat-treated glass products to ensure probability of failure does not exceed the following:
 - 1) 8 breaks per 1000 for glass installed vertically or not over 15 degrees or more from vertical plan and under wind action.
 - 2) 1 break per 1000 for glass installed 15 degrees or more from vertical plane and under action of wind, snow, or both.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's Product Data sheets including installation instructions.

- B. Documentation indicating compliance with ASTM E2141-14 and E2953-14, Standard Specification for Evaluating Accelerated Aging Performance of Electrochromic Devices in Sealed Insulating Glass Units as verified by third party test laboratory such as National Renewable Energy Laboratory (NREL).
- C. Test Report: ASTM E2190 Specification for IGU Seal Durability. Provide certificate or test report stating that IGUs that passed the testing requirement contained the electrochromic system (EC coatings, bus bars, wires etc.) as in the product specified herein. If triple glazing is specified herein, a test report for triple glazing is required.
- D. IG Certification: IGCC/IGMA certification for insulating glass units containing electrochromic system. Provide certificate stating that IGUs that passed the testing requirement contained the electrochromic system (EC coatings, bus bars, wires etc.) as in the product specified herein. If triple glazing is specified, certification covering triple glazing is required. If capillary tubes are required for altitude applications, certification covering units with capillary tubes is also required.

SHOP DRAWINGS NOT PROVIDED BY SAGE ELECTROCHROMICS. THESE NEED TO BE PROVIDED BY OTHERS.

- E. Shop Drawings: Indicate framing system and accommodations for wiring paths, connectors, routing, and exit from framing system.

STRUCTURAL CALCULATIONS NOT PROVIDED BY SAGE ELECTROCHROMICS. THESE NEED TO BE PROVIDED BY CONTRACTOR.

- F. Structural Calculations: Provide structural calculations for framing system certified by structural engineer licensed in the state in which Project is located.

1.5 QUALITY ASSURANCE

- A. Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
 - 1. GANA Publications.
 - 2. AAMA Publications.
 - 3. IGMA Publications.
- B. Safety glass products in the US are to comply with CPSC 16 CFR Part 1201 for Category II materials and ANSI Z97.1 2009.
- C. Glass thermal and optical performance properties shall be based on calculations from the current LBNL WINDOW 6.3 computer program.
- D. Provide glass that is heat-treated by horizontal (roller hearth) process with inherent roller wave distortion parallel to the base dimension, unless otherwise specified.
- E. Pre-Installation Meetings: Conduct pre-installation meeting/teleconference with the following parties in attendance:
 - 1. Architect, contractor, glazing contractor, framing manufacturer, SageGlass® IGU and controls manufacturer, electrical contractor, and other parties related to work of this section, to review procedures, schedules, safety, and coordination with other elements of Project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instruction for receiving, handling, storing, and protecting materials.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store materials in original packaging, protected from exposure to harmful environmental conditions, including static electricity, and at temperature and humidity conditions recommended by manufacturer.
- D. Exercise care to prevent edge damage to glass, wire, and coatings on glass.
- E. Where insulating glass units will be exposed to substantial altitude changes, avoid seal ruptures by complying with manufacturer's recommendations for venting and sealing.

1.7 PROJECT / SITE CONDITIONS

- A. Verify frame channel dimensions are adequate for wire runs as designed.
- B. Environmental Requirements:
 - 1. Ensure that substrate surface and ambient air temperature are minimum of 40 degrees F (5 degrees C) and rising at application time and remain above 40 degrees F (5 degrees C) for at least 24 hours after application of sealants.

1.8 WARRANTY

- A. Warrant SageGlass® IGUs against defects in material or workmanship causing material obstruction of vision as a result of fogging or film formation of the internal glass as a result of failure of the seal for a period of ten (10) years from the date of manufacture of the SageGlass® IGUs from the Manufacturer.
- B. Warrant SageGlass electrochromic glass against defects in material or workmanship, resulting in failure to tint, for a period of five (5) years from the date of manufacture of the SageGlass® electrochromic glass from the Manufacturer.
- C. Warrant SageGlass® laminated products against lamination defects, such as edge separation or delamination that materially obstruct vision through the glass for a period of five (5) years from the date of manufacture of the SageGlass® electrochromic glass from the Manufacturer.
- D. Warrant SageGlass® controls against defects in material or workmanship for a period of five (5) years from the date of manufacture of the SageGlass® controls from the manufacturer.
- E. Manufacturer is not responsible for any special punitive, indirect, incidental or consequential damages (including, without limitation, the cost to remove non-conforming product or install replacement product).

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The basis for design is SageGlass manufactured by SAGE Electrochromics, Inc.
2 Sage Way
Faribault, MN 55021

Matthew Cleary – Territory Manager Northeast

215-840-9940

E-mail: matt.cleary@sageglass.com.

Internet: <http://www.sageglass.com>.

- B. Alternate products and Substitutions: Listing other manufacturer's names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein. Alternate products may be considered if they comply with all of the performance requirements of this specification and evidence is submitted thereof. Samples and data sheets of alternate products must be submitted at least 14 days prior to bid date for review. By using products other than Basis of Design the Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

2.2 MATERIALS – NOTE: ADDITIONAL MAKEUPS ARE AVAILABLE TO MEET DESIGN REQUIREMENTS. PLEASE CONTACT SAGE TO LEARN WHAT INNER PLY THICKNESS, SPACER THICKNESS, GAS FILL AND OPTIONS ARE AVAILABLE.

- A. SageGlass Clear with SR2.0 Electrochromic Laminated Sealed Insulating Glass Units (IGUs), Argon Filled:

1. Laminated Outboard Lite:

a. Outer Ply (Surface 1 & 2):

- 1) Glass Type: SR2.0 coated float glass.
- 2) Glass Tint: Clear.
- 3) Nominal Thickness: 0.16 inch (3.9 mm).
- 4) Heat Treatment: Tempered.
- 5) Coating orientation: Surface No. 2.
- 6) Obscuration: <26.0mm from IGU edge black ink obscuration band on surface # 2 around the perimeter.

b. Interlayer (between surface 2 & 3):

- 1) Interlayer Type: SentryGlas® Ionoplast interlayer.
- 2) Interlayer Tint: Clear.
- 3) Nominal Thickness: 0.38 inch (0.90mm).

c. Inner Ply (Surface 3 & 4):

- 1) Glass Type: EC2.0 coated clear float glass.
- 2) Glass Tint: Electronically variable tintable.
- 3) Nominal Thickness: 0.087 inch (2.2 mm).
- 4) Heat treatment: Annealed.
- 5) Coating Orientation: Surface No. 4.

2. Cavity:

- a. Spacer Material: black finish.
- b. Nominal Thickness: 0.45" +/- 0.02 in (11.5 mm +/- 0.5mm).
- c. Cavity: 0.5" (12.2mm).
- d. Wall Thickness: >/= 0.007 inch (.178 mm).
- e. Gas Fill: 90% Argon/10% Air.
- f. Desiccant: Four legs filled with blend of 3A molecular sieve and silica gel desiccant.

3. Inboard Lite:

- a. Glass Type: Float glass.
 - b. Glass Tint: Clear.
 - c. Nominal Thickness: 3/8 in. (10 mm).
 - d. Heat Treatment: Tempered
 4. Pigtail:
 - a. Multi-conductor sheathed cable.
 - b. 2, 3 or 4 pin weather tight connector.
 5. Clear Performance Characteristics (Center of Glass):
 - a. Visible Transmittance: 60 percent.
 - b. Exterior Reflectance: No greater than 16 percent.
 - c. Interior Reflectance: No greater than 15 percent.
 - d. Summer U-factor (U-value): 0.28 with 90% argon fill.
 - e. Winter U-factor (U-value): 0.28 with 90% argon fill.
 - f. Solar Heat Gain Coefficient (SHGC): 0.41.
 - g. Shading Coefficient: 0.48.
 - h. Exterior reflected color using the $1^*a^*b^*$ color system shall have a negative value of b^* (blue). The b^* coordinate of the reflected exterior color shall not be positive (yellow) according to Window 6 calculations using appropriate NFRC approved International Glazing Database data file.
 6. Tinted Performance Characteristics (Center of Glass):
 - a. Visible Transmittance: 1 percent.
 - b. Exterior Reflectance: No greater than 11 percent.
 - c. Interior Reflectance: No greater than 10 percent.
 - d. Summer U-factor (U-value): 0.28 with 90% argon fill.
 - e. Winter U-factor (U-value): 0.28 with 90% argon fill.
 - f. Solar Heat Gain Coefficient (SHGC): 0.09.
 - g. Shading Coefficient: 0.10.
 - h. Exterior reflected color in the blue-green ($-a^*$, $-b^*$) quadrant of the a^*b^* color space according to Window 6 calculations using appropriate NFRC approved International Glazing Database data file.
 7. In-Pane Zoning
 - a. Provide up to 3 separate, independently tintable, sections (zones) within each electrochromic insulating glass unit to provide optimum daylight control, glare control and indoor light color quality (see architectural drawings for specific location and number of in-pane zones).
 - b. Each zone within the pane shall be individually controllable in accordance with standard, published capabilities of single zone panes with regard to level of tint and integration with system controllers and accessories.
 - c. For a three zone EC insulating glass unit, the individual pane is segmented so that zones/sections are vertically above the other to create a bottom, middle and top zone in the unit.
 - d. For a two zone EC insulating glass unit, the individual pane is segmented so that zones/sections are vertically above the other to create a bottom and top zone in the unit.
 - e. For a one zone electrochromic insulating glass unit, the entire area of the pane is controlled as one segment.
- B. Frame Cable (one per IGU):

1. Multi-conductor plenum rated sheathed cable type CMP/CL2P.
 2. 2, 3 or 4 pin weather tight connector.
 3. Connector shall be thin at <0.2" in height and installed in the glazing pocket or other easy to access space in the framing system for ease of maintenance.
- C. Off state: Clear.
- D. Operating Voltage: 5 volts DC or less applied to the EC insulating glass. Class 2 (low voltage, low current) electrical system.
- E. Requirements:
1. Control functionality: Automated control for daylight and glare shall be provided (reference Division 26 section 09 00). Manual over-ride must be provided in designated locations via wall mounted switch(es) or a software application. When a manual command is given via the wall switch or software application, it must over-ride the automated system immediately and initiate the requested change in state of the glass. Subsequent manual commands via the manual over-ride system must over-ride the previous command and be acted on by the control system immediately to initiate the requested change in state. This must occur no matter how soon the subsequent manual command(s) follow the previous manual command.
 2. Heat-Strengthened Float Glass: Comply with ASTM C1048, Type I, Class 1 (clear), Quality Q3, Kind HS.
 3. Tempered Float Glass: Comply with ASTM C1048, Type I, Class 1 (clear), Quality Q3, Kind FT.
 4. Safety Tempered Float Glass: Comply with ANSI Z97.1 and CPSC 16 CFR 1201.
 5. Laminated Glass: Comply with ASTM C1172 and other requirements as specified.
 6. Fabricate laminated glass products in autoclave with heat, plus pressure, free of foreign substances and air pockets.
 7. Coated glass: For point defects, comply with ASTM C1376-15 section 6.1 (vision glass) or 6.2 (overhead glass) as appropriate for the glazing application. For vision glass the ASTM C1376-15 standard requires that the glass be inspected at a distance of 10 ft (3m) at a 90° viewing angle against a bright uniform background. It allows for no more than 2 readily apparent blemishes in a 3" (75mm) diameter circle and no more than 5 readily apparent blemishes in a 12" (300mm) diameter circle. In addition, the maximum allowable pinhole and spot size is 1.6mm or 2.4mm in the central area and outer area respectively. The maximum length of a coating scratch or mark is 2" (50mm) and 3" (75mm) in the central and outer areas respectively. For more detail and definitions of central and outer area see ASTM C1376-15.
 8. Provide sealed IGU with dehydrated airspace, primary seal of polyisobutylene (PIB); color black and secondary seal of two part silicone; color- black, and >0.007 inch (.15mm) wall thickness stainless steel spacer as specified.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification and Conditions
1. Verify that site conditions are acceptable for glass installation.
 2. Verify openings for glazing are correctly sized and within tolerance.
 3. Verify that functioning weep system is present.
 4. Verify that minimum required face and edge clearances are being met.

5. Verify that glazing channels and recesses are clear and free of obstructions, weeps are clear, and channels and recesses are ready for glazing.
 6. Verify that framing system is appropriately sized for IGU thickness and that precautions are taken to not over compress the edge seals of the IGU when the glass is installed.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation:
1. Clean and prepare glazing channels and other framing members to receive glass and wire.
 2. Remove coatings and other harmful materials that will prevent glass and glazing installation required to comply with performance criteria specified.
 3. Install grommets at all locations where Frame Cable will penetrate metal framing or structure.

3.3 INSTALLATION

- A. Install products using recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".
- B. Verify that IGU secondary seal is compatible with glazing sealants.
- C. Install glass in prepared glazing channels and other framing members.
- D. Install glass per framing manufacturer's wiring diagram showing IGU orientation and wire exit point into building. Comply with glass manufacturer's labels and instructions for glass orientation.
- E. Protect IGU pigtail and Frame Cable from any damage during installation. Use grommets during installation to protect wire when routing through frame. If Frame Cable or the connector is damaged during installation the Frame Cable must be replaced. If the IGU pigtail connector is damaged during installation SAGE must be notified and the connector must be repaired with a SAGE approved method.
- F. PVC jacketed plenum cables (SageBus™, IGU Pigtails, 12 Conductor Cable, Frame Cables, Sensor Cables) should be conditioned for 24 hours at room temperature prior to installation and never installed below 0°C (32° F) ambient temperature. Once installed these wires must not be exposed to sunlight even through glass. If they are installed in an exposed location they must be covered or painted (latex / water based paint only).
- G. Verify glazing pocket where IGU Pigtail and Frame Cable connection is made is a dry location.
- H. Install silicone setting blocks in rabbets as recommended by referenced glazing standards in GANA Glazing Manual and IGMA Glazing Guidelines and manufacturer's Glazing Guidelines.
- I. Use silicone edge blocks for all installed panes to prevent glass from walking post installation.
- J. Provide bite on glass, minimum edge and face clearances, and glazing material tolerances recommended by GANA Glazing Manual and as approved by glass manufacturer.
- K. Provide weep system as recommended by GANA Glazing Manual.
- L. Distribute weight of glass unit along edge rather than at corners.

- M. Comply with framing manufacturer's and referenced industry recommendations on expansion joints and anchors, accommodating thermal movement, glass openings, use of setting and edge blocks, use of glass spacers, edge blocks, and installation of weep systems. Setting and edge blocks must be made from silicone. SAGE does not recommend the use of setting blocks made from other materials, as they been known to alter the chemical makeup of plastics and rubbers they come in contact with, resulting in seal failure.
- N. Protect glass from edge damage during handling and installation.
- O. Install per IGMA North American Glazing Guidelines for Sealed Insulated Glass Units, for Commercial and Residential Use TM-3000-90(04) states "For dry glazed systems, an adequate seal should consist of a minimum of 0.70 N/mm (4 lb/in) and not exceeding 1.75 N/mm (10 lb/in) applied to the edges of the insulated glass unit by gaskets or other fastening systems."
- P. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing, or plaster.
- Q. Once electronically tintable IGUs have been removed from SAGE Electrochromics' packaging, remove labels within 30 days of exposure to sunlight or other UV light sources.

3.4 ADJUSTING

- A. Remove glass that is broken, chipped, cracked, or damaged in any way, and replace with new materials. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

3.5 CLEANING

- A. Clean glass inside and outside, immediately after installation and sealants have cured, per SAGE Electrochromics' written recommendations.
- B. Remove labels and markings from glass.
- C. Clean glass per:
 1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
 2. GANA Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.
- D. Do not use scrapers or other metal tools to clean glass.

3.6 TESTING

- A. Do not use 'high voltage spark' gas analyzers such as Sparklike's Gasglass on this product. Film and controls damage may occur and potentially void the warranty.

END OF SECTION

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SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Silvered flat glass mirrors.

- B. Related Requirements:

- 1. Section 088000 "Glazing" for glass with reflective coatings used for vision and spandrel lites.
 - 2. Section 102800 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

- C. Samples: For each type of the following:

- 1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
 - 2. Mirror Clips: Full size.
 - 3. Mirror Trim: 12 inches long.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Certificates: For each type of mirror.

- C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
- D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mirrors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified Installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Avalon Glass and Mirror Company.
 2. Guardian Glass; SunGuard.
 3. Independent Mirror Industries, Inc.
 4. National Glass Industries.
 5. Trulite Glass & Aluminum Solutions, LLC.
- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C1503; manufactured using copper-free, low-lead mirror coating process.
- B. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.
 1. Nominal Thickness: 5.0 mm.
 2. Tint Color: Gray.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 - 1. Aluminum J Channel Bottom and Side Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
 - 2. Aluminum J Channel Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.
 - 3. Finish: Clear bright anodized.
- B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

- A. Shop fabricate mirrors to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.
- D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. NGA Publications: "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.
 - 2. Aluminum J-Channels and Cleat: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.
 - 3. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.
 - 4. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 08830

SECTION 092600 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Interior gypsum wallboard.
2. Exterior gypsum board.
3. Tile backing panels.
4. Non-load-bearing steel framing.

- B. Related Sections include the following:

1. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
2. Division 6 Section "Miscellaneous Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.
3. Division 7 Section "Building Insulation" for insulation and vapor retarders installed in gypsum board assemblies.
4. Division 9 Section "Gypsum Board Shaft-Wall Assemblies" for framing, gypsum panels, and other components of shaft wall assemblies.
5. Division 9 Section "Ceramic Tile" for cementitious backer units installed as substrates for ceramic tile.
6. Division 7 Section "Through-Penetration Fire stop Systems"

1.3 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- C. Samples: For the following products:

1. Trim Accessories: Full-size sample in 12-inch- long length for each trim accessory indicated.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
 1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."
- C. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and qualities of materials and execution.
 1. Install mockups for the following applications:
 - a. Surfaces indicated to receive nontextured paint finishes.
 2. Simulate finished lighting conditions for review of mockups.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturers written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products of the following:
 - 1. Steel Framing and Furring:
 - a. Consolidated Systems, Inc.
 - b. Dale Industries, Inc. - Dale/Incor.
 - c. Dietrich Industries, Inc.
 - d. MarinoWare; Division of Ware Ind.
 - e. National Gypsum Company.
 - f. Scafco Corporation.
 - g. Unimast, Inc.
 - h. Western Metal Lath & Steel Framing Systems.
 - 2. Gypsum Board and Related Products:
 - a. American Gypsum Co.
 - b. G-P Gypsum Corp.
 - c. National Gypsum Company.
 - d. United States Gypsum Co.
- C. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
 - b. Chicago Metallic Corporation; Drywall Furring 640 or Drywall Furring 660 System.
 - c. USG Interiors, Inc.; Drywall Suspension System.

2.2 STEEL PARTITION AND SOFFIT FRAMING

- A. Components, General: As follows:
 - 1. Comply with ASTM C 754 for conditions indicated.
 - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G60, hot-dip galvanized or manufacturer's standard corrosion-resistant zinc coating.
- B. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base Metal Thickness: 22 gauge.
 - 2. Depth: As indicated.

- C. Deep-Leg Deflection Track: ASTM C 645 top runner with 2-inch- deep flanges.
- D. Proprietary Deflection Track: Steel sheet top runner manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs.
 - 1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Product: Subject to compliance with requirements, provide one of the following:
 - a. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT).
 - b. Metal-Lite, Inc.; Slotted Track.
- E. Proprietary Firestop Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Product: Subject to compliance with requirements, provide the following:
 - a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
 - b. Metal-Lite, Inc.; The System.
- F. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.3 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36.
 - 1. Regular Type:
 - a. Thickness: 5/8 inch, type X, unless otherwise indicated.
 - b. Long Edges: Tapered.
 - c. Location: Vertical surfaces, unless otherwise indicated.
 - 2. Type X:
 - a. Thickness: 5/8 inch.
 - b. Long Edges: Tapered.
 - 3. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold resistant core and paper surfaces.

2.4 EXTERIOR GYPSUM PANELS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Exterior Gypsum Soffit Board: ASTM C 931/C 931M, with manufacturer's standard edges.
 - 1. Core: 5/8 inch, Type X.
- C. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M.
 - 1. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "Dens Element" by G-P Gypsum Corp. with Densdefy Liquid Barrier on all joints, screw heads, and penetrations
 - 2. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corp.
 - 3. Core: As indicated.

2.5 TILE BACKING PANELS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Cementitious Backer Units: ANSI A118.9.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide the following:
 - a. Custom Building Products; Wonderboard.
 - b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - c. United States Gypsum Co.; DUROCK Cement Board.
 - 3. Thickness: As indicated.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
 - 2. Shapes:
 - a. Cornerbead: Use at outside corners.
 - b. L-Bead: L-shaped; exposed long leg receives joint compound..
 - c. 3/4 in u-channel reveal joint and frame edge channel.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. 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:

2. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. MM Systems Corporation.
 - d. Pittcon Industries.
3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, alloy 6063-T5.
4. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
 1. Interior Gypsum Wallboard: Paper.
 2. Exterior Gypsum Soffit Board: Paper.
 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 4. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 5. Level 4 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
 1. Exterior Gypsum Soffit Board: Use setting-type taping and setting-type, sandable topping compounds.
 2. Glass-Mat Gypsum Sheathing Board: As recommended by manufacturer.
- E. Joint Compound for Tile Backing Panels:
 1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
 2. Glass-Mat, Water-Resistant Backing Panel: As recommended by manufacturer.
 3. Cementitious Backer Units: As recommended by manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
 - 3. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Thermal Insulation: As specified in Division 7 Section "Building Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
 - b. Use proprietary deflection track where indicated.
 - c. Use proprietary firestop track where indicated.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.4 CONTROL JOINTS:

- A. Two control joints shall be installed over every door on project from each corner at jamb/head to deck above. The control joints shall be installed with the drywall and not cut in after drywall is installed. See drawing A15.02 door type for locations.

3.5 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Suspend ceiling hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for

- structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. Wire-tie furring channels to supports, as required to comply with requirements for assemblies indicated.
- E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.6 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
1. Where studs are installed directly against exterior walls, install foam-gasket isolation strip between studs and wall.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. Cut studs 1/2 inch short of full height to provide perimeter relief.
 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 - a. Terminate partition framing at suspended ceilings where indicated.
- D. Install steel studs and furring at the following spacings:
1. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.
 2. Multilayer Construction: 16 inches o.c., unless otherwise indicated.

3. Cementitious Backer Units: 16 inches o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Install two studs at each jamb, unless otherwise indicated.
 2. 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.
 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. 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.

3.7 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.
- I. Form control and expansion joints with space between edges of adjoining gypsum panels.

- J. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- K. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- L. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
1. Space screws a maximum of 12 inches o.c. for vertical applications.
- N. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.8 PANEL APPLICATION METHODS

- A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers

at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

- C. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Tile Backing Panels:
 - 1. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
 - 2. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
 - 3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.9 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturers written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.10 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- E. All gypsum finish shall be brought to a level 4 finish.

3.11 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.

END OF SECTION 09260

SECTION 093100 - CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Ceramic mosaic tile.
2. Glazed wall tile.
3. Waterproof membrane for thin-set tile installations.
4. Cementitious backer units installed as part of tile installations.
5. Metal edge strips installed as part of tile installations.

- B. Related Sections include the following:

1. Division 1 Section "Selective Demolition" for removing existing finishes.
2. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
3. Division 7 Section "Self-Adhering Sheet Waterproofing" for waterproofing under thickset mortar beds.
4. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
5. Division 9 Section "Gypsum Board Assemblies" for cementitious backer units.

1.3 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 PERFORMANCE REQUIREMENTS

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Stone thresholds in 6-inch lengths.
 - 5. Metal edge strips in 6-inch lengths.
- E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- F. Product Certificates: For each type of product, signed by product manufacturer.
- G. Qualification Data: For Installer.
- H. Material Test Reports: For each tile-setting and -grouting product.

1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
 - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Waterproofing.
 - 3. Joint sealants.
 - 4. Cementitious backer units.
 - 5. Metal edge strips.
- D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Build mockup of each type of floor tile installation.

2. Build mockup of each type of wall tile installation.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 1. Manufacturer and model to be determined

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. As selected by Architect from manufacturer's full range.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS

- A. Manufacturers:
 - 1. American Olean; Div. of Dal-Tile International Corp.
 - 2. Crossville Ceramics Company, L.P.
 - 3. Florida Tile Industries, Inc.
 - 4. DalTile (Basis-of-Design)
 - 5. Caesar (Basis-of-Design)
 - 6. United States Ceramic Tile Company.
- B. Unglazed Ceramic Mosaic Tile: Factory-mounted flat tile as follows:
 - 1. Composition: Impervious natural clay or porcelain.
 - 2. Surface: Smooth, without abrasive admixture.
 - 3. Module Size: Match existing or as indicated.
 - 4. Nominal Thickness: 1/4 inch.
 - 5. Face: Pattern of design indicated, with cushion edges.
- C. Glazed Ceramic Mosaic Tile: Factory-mounted flat tile as follows:

1. Composition: Impervious natural clay or porcelain, and Vitreous or impervious natural clay or porcelain.
2. Module Size: Match size or as indicated.
3. Thickness: 1/4 inch.
4. Face: Pattern of design indicated, with cushion edges.
5. Finish: Match existing or to be selected by architect.

D. Glazed Wall Tile Including Trim Units : Flat tile as follows:

1. Module Size: Match existing or as indicated.
2. Thickness: 5/16 inch.
3. Face: Plain with modified square edges or cushion edges.
4. Finish: Match existing or as indicated by architect.
5. Mounting: Factory back-mounted.
6. Mounting: PregROUTED sheets of tiles factory assembled and grouted with manufacturer's standard silicone rubber.

E. Porcelain Tile: Flat tile as follows:

1. Module Size: 20" sq..
2. Thickness: 5/16 inch.
3. Face: Plain with modified square edges or cushion edges.
4. Finish: Polished

2.4 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. Atlas Minerals & Chemicals, Inc.
2. DAP, Inc.
3. Summitville Tiles, Inc.
4. TEC Specialty Products Inc.

B. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

- a. Weight: 2.5 lb/sq. yd..
2. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

C. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. For wall applications, provide nonsagging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A118.1.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
 2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
- E. Medium-Bed, Latex-Portland Cement Mortar: Provide materials composed as follows, with physical properties equaling or exceeding those required for thin-set mortars based on testing of medium-bed specimens according to ANSI A118.4:
1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
 2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
- F. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
- G. Standard Sanded Cement Grout: ANSI A118.6, color as indicated.
- H. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

2.5 CEMENTITIOUS BACKER UNITS

- A. Provide cementitious backer units complying with ANSI A118.9 in maximum lengths available to minimize end-to-end butt joints.
1. Thickness: Manufacturer's standard thickness, but not less than 1/4 inch.
 2. Width: Manufacturer's standard width, but not less than 32 inches.
 3. Width: Manufacturer's standard width, but not less than 800 mm.
- B. Products:
1. C-Cure; C-Cure Board 990.
 2. Custom Building Products; Wonderboard.
 3. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 4. USG Corporation; DUROCK Cement Board.

2.6 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material. Changes in level shall be a

maximum of ¼ inch for 90 deg. straight change and a maximum of 1/2" inch for 2 in 1 sloped transition.

- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
 - 1. Products:
 - a. C-Cure; Penetrating Sealer 978.
 - b. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - c. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - d. TEC Specialty Products Inc
- E. Marble Threshold: Marble thresholds shall be used to transition between ceramic tile floors and other floor finishes.

2.7 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.

- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Locate joints in tile surfaces directly above joints in concrete substrates.
 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- H. Grout tile to comply with requirements of the following tile installation standards:
1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
 2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.
 3. For chemical-resistant furan grouts, comply with ANSI A108.8.

3.4 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 8 by 8 inches or larger.
 - c. Tile floors composed of rib-backed tiles.
- B. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- C. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.5 WALL TILE INSTALLATION

- A. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
- B. Joint Widths: Install tile on walls with the following joint widths:
1. Ceramic Mosaic Tile: 1/16 inch.
 2. Glazed Wall Tile: 1/16 inch.

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310

SECTION 095110 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes acoustical panels and exposed suspension systems for ceilings.
- B. Related Sections include the following:
 - 1. Division 9 Section "Acoustical Snap-in Metal Pan Ceilings."
- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordinate Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

4. Minimum Drawing Scale: 1/4 inch = 1 foot for all ceiling layouts. All spaces shall be field measured and drawings created showing grid layout. Layout shall not be done in field.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 1. Acoustical Panel: Set of full-size Samples of each type, color, pattern, and texture.
 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.
- E. Qualification Data: For testing agency.
- F. Field quality-control test reports.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- H. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor type.
- I. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations:
 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
- D. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
 1. UBC Standard 25-2, "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings."
- E. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.
 3. Hold-Down Clips: Equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. CertainTeed Corporation.
 3. USG Corporation.
- B. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Products:
1. **Design based on:**

ACT as shown on room finishes schedule shall be - USG Radar ClimaPlus, high CAC, High NRS, 2x2 tile with (SLT) edge. All cut tile a perimeter of ceiling to wall shall have a field cut edge to produce a tegular edge and tile cut shall lay on wall angle. (public areas)

ACT-2 as shown on room finishes schedule shall be – Armstrong Kitchen Zone white 2x2 panel ceiling system. (toilet rooms)
- D. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
1. Type and Form: Type III, mineral base with painted finish; Form 4, cast or molded.
 2. Pattern: E (lightly textured) K (surface scored).

- E. Color: White or As selected from manufacturer's full range.
- F. LR: Not less than 0.75.
- G. NRC: Not less than 0.70.
- H. CAC: Not less than 30.
- I. AC: Not less than 170.
- J. Edge Detail: Reveal sized to fit flange of exposed suspension system members.
- K. Thickness: 3/4 inch.
- L. Size: As indicated on Drawings.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
 - 1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- diameter wire.
- E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- F. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- G. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

- H. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

2.4 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers:

1. Armstrong World Industries, Inc.
2. Chicago Metallic Corporation.
3. Fry Reglet Corporation.
4. USG Interiors, Inc. (drawings and design based on USG)

- B. Roll-Formed Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
3. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.

2.5 ACOUSTICAL SEALANT

A. Products:

1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corp; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

- A. General: Install acoustical panel ceilings to comply with UBC Standard 25-2 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

- B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers,

without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
 - 1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on shop drawing reflected ceiling plans.
 - 2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 - 3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 - 4. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Testing Services: Testing and inspecting of completed installations of acoustical panel ceiling hangers shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
- B. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - 1. Within each test area, testing agency will select 1 of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
 - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Remove and replace acoustical panel ceiling hangers where test results indicate that they do not comply with specified requirements.

- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09511

SECTION 096230 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thin-set epoxy-resin terrazzo flooring.

B. Related Section:

1. Division 07 Section "Joint Sealants" for sealants installed with terrazzo.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work.

C. Samples: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Supply sample of terrazzo for approval.

D. Installer certificates.

E. Qualification data.

F. Material certificates.

G. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is acceptable to terrazzo manufacturer to install manufacturer's products.

1. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.
2. Engage an installer who is a contractor member of NTMA.

B. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
- D. Preinstallation Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- C. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- D. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.
 - 1. Provide dustproof partitions and temporary enclosures to limit dust migration and to isolate areas from noise.

PART 2 - PRODUCTS

2.1 EPOXY-RESIN TERRAZZO

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Crossfield Products Corp., Dex-O-Tex Division; Cheminert Micro Terrazzo.
 - 2. General Polymers Corporation; Terrazzo 1100 2000.
 - 3. Key Resin Company; Key Epoxy Terrazzo.
 - 4. Master Terrazzo Technologies LLC; Morricite.
 - 5. Polymerica Incorporated; MasterPiece ETS.
 - 6. Quadrant Chemical Corporation; Quadset Epoxy Terrazzo.
 - 7. TEC Specialty Construction Brands, Inc.; Tuff-Lite Epoxy Terrazzo.
 - 8. Terrazzo & Marble Supply Companies; Terroxy Resin Systems.
- B. Materials:
 - 1. Flexible Reinforcing Membrane: Manufacturer's resinous membrane for substrate crack preparation and reflective crack reduction.
 - a. Reinforcement: Fiberglass scrim.
 - 2. Primer: Manufacturer's product recommended for substrate and use indicated.
 - 3. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.

- a. Physical Properties without Marble Chips Aggregates:
 - 1) Hardness: 60 to 85 per ASTM D 2240, Shore D.
 - 2) Minimum Tensile Strength: 3000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.
 - 3) Minimum Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.
 - 4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.
 - a) Distilled water.
 - b) Mineral water.
 - c) Isopropanol.
 - d) Ethanol.
 - e) 0.025 percent detergent solution.
 - f) 1.0 percent soap solution.
 - g) 10 percent sodium hydroxide.
 - h) 10 percent hydrochloric acid.
 - i) 30 percent sulfuric acid.
 - j) 5 percent acetic acid.
 - b. Physical Properties with Marble Chips Aggregates: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide," comply with the following:
 - 1) Flammability: Self-extinguishing, maximum extent of burning 0.25 inch per ASTM D 635.
 - 2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F for temperature range of minus 12 to plus 140 deg F per ASTM D 696.
4. Marble Chips Aggregates: Complying with NTMA gradation standards for mix indicated and containing no deleterious or foreign matter.
- a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
 - b. 24-Hour Absorption Rate: Less than 0.75 percent.
 - c. Dust Content: Less than 1.0 percent by weight.
 - d. Chips by %: (sample project actual will be as selected by architect)
 - 5% GA WHITE #0
 - 15% EG CLEAR #1
 - 35% EG CLEAR #0
 - 10% CRANBERRY GLASS #1
 - 5% BRICK RED #0
 - 5% BRICK RED #1
 - 15% CLASIC MOP #2 (MARBLE SIZE #1)

100% KPOXY RESIN SHERWIN-WILLIAMS COLOR, SW6252 ICE CUBE

200 GRIT DIAMOND FINISH W/ 1 COAT BRIGHT SEAL & 1 COAT POLISHINE
 - e. Accent colors to be selected by architect

5. Finishing Grout: Resin based.

C. Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and marble-chip proportions and mixing.

1. Formulated Mix Color and Pattern: As selected by Architect from manufacturer's full range.

D. Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and marble-chip aggregate proportions and mixing.

2.2 STRIP MATERIALS

A. Thin-Set Divider Strips: L-type angle or T-type, 1/4 inch deep.

1. Material: Brass.
2. Top Width: 1/8 inch.

B. Heavy-Top Divider Strips: L-type angle in depth required for topping thickness indicated.

1. Bottom-Section Material: Matching top-section material.
2. Top-Section Material: Brass.
3. Top-Section Width: 1/8 inch.

C. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material, thickness, and color of divider strips and in depth required for topping thickness indicated.

D. Accessory Strips: Match divider strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosings for terrazzo stair treads and landings.

E. Abrasive Strips: Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.

1. Width: 1/2 inch.
2. Depth: As required by terrazzo thickness.
3. Length: 4 inches less than stair width.
4. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use and acceptable to terrazzo manufacturer.

1. 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).
- B. Anchoring Devices:
1. Provide mechanical anchoring devices for strip materials as required for secure attachment to substrate.
- C. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- E. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- F. Sealer: Slip- and stain-resistant penetrating-type sealer that is chemically neutral with pH factor between 7 and 10; does not affect color or physical properties of terrazzo; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B. Concrete Slabs:
1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
 - c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
 2. Verify that concrete substrates are visibly dry and free of moisture.
 3. Moisture Testing:
 - a. Test for moisture by anhydrous calcium chloride method according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

- b. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170. Proceed with installation only after substrates have a maximum relative-humidity-measurement reading of 70 to 75 percent in 24 hours.
 - c. Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.
- C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.
- D. Installation of terrazzo indicates acceptance of surfaces and conditions.

3.2 EPOXY-RESIN TERRAZZO INSTALLATION

A. General:

- 1. Comply with NTMA's written recommendations for terrazzo and accessory installation.
- 2. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."
- 3. Installation Tolerance: Limit variation in terrazzo surface from level to 1/8 inch in 10 feet; noncumulative.
- 4. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
- 5. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Thickness: 3/8 inch nominal.

C. Flexible Reinforcing Membrane:

- 1. Prepare and prefill substrate cracks with membrane material.
- 2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
- 3. Reinforce membrane with fiberglass scrim.
- 4. Prepare membrane according to manufacturer's written instructions before applying substrate primer.

D. Primer: Apply to terrazzo substrates according to manufacturer's written instructions.

E. Strip Materials:

1. Divider and Control-Joint Strips:

- a. Locate divider strips in locations indicated.
- b. Install control-joint strips in locations indicated.
- c. Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap.

- d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
 2. Accessory Strips: Install accessory strips as required to provide a complete installation.
 3. Abrasive Strips: Install with surface of abrasive strip positioned 1/32 inch higher than terrazzo surface.
- F. Fine Grinding: Grind with stones 120 grit or finer until all grout is removed from surface. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding. Produce surface with a minimum of 70 percent aggregate exposure.
- G. Repair: Remove and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.3 CLEANING AND PROTECTION

- A. Cleaning:
1. Remove grinding dust from installation and adjacent areas.
 2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow to dry thoroughly.
- B. Sealing:
1. Seal surfaces according to NTMA's written recommendations.
 2. Apply sealer according to sealer manufacturer's written instructions.
- C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096623

SECTION 096466 - WOOD ATHLETIC FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes wood athletic flooring.

1.3 COORDINATION

- A. Coordinate layout and installation of slab depressions to accommodate layout and height of wood athletic flooring assembly.
- B. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wood athletic flooring.
- B. Shop Drawings: For each type of floor assembly, include the following:
 - 1. Plans, sections, and attachment details.
 - 2. Details of concrete-slab depressions.
 - 3. Expansion provisions and trim details.
 - 4. Layout, colors, widths, and dimensions of game lines and markers.
 - 5. Locations of floor inserts for athletic equipment installed through flooring assembly.
- C. Samples: For each exposed product and for each color and texture specified, approximately 12 inches long in size.
 - 1. Include Sample sets showing the full range of normal color and texture variations expected in wood flooring.
 - 2. Include Sample sets showing finishes and game-line and marker paints applied to wood flooring.
- D. Samples for Initial Selection: For each type of wood athletic flooring and accessory in each type of exposed color and finish.

1. Include manufacturer's color charts showing colors and glosses available for the following:
 - a. Floor finishes.
 - b. Game-line and marker paints.
 - E. Samples for Verification: For each type of wood athletic flooring and accessory required; approximately 12 inches long and of same thickness and material indicated for the Work.
 1. Include Sample sets showing the full range of normal color and texture variations expected in wood flooring.
 2. Include Sample sets showing finishes and game-line and marker paints applied to wood flooring.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Product Test Reports: For each wood athletic flooring system, for tests performed by a qualified testing agency.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For wood athletic flooring and finish systems to include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: A firm or individual that has been approved by MFMA as an accredited Installer according to the MFMA Accreditation Program.
 1. Installer responsibilities include installation and field finishing of wood athletic flooring components and accessories, and application of game lines and markers.
 - B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for installation.
 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver floor assembly materials in unopened cartons or bundles.
 - B. Protect wood from exposure to moisture. Do not deliver wood components until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.

- C. Store wood components in a dry, warm, well-ventilated, weathertight location and in a horizontal position.

1.9 FIELD CONDITIONS

- A. Conditioning period begins not less than seven days before wood athletic flooring installation, is continuous through installation, and continues not less than seven days after installation.
 - 1. Environmental Conditioning: Maintain ambient temperature between 65 and 75 deg F and relative humidity planned for building occupants, but not less than 35 percent or more than 50 percent, in spaces to receive wood athletic flooring during the conditioning period.
 - 2. Wood Conditioning: Move wood components into spaces where they will be installed, no later than beginning of the conditioning period.
 - a. Do not install wood athletic flooring until wood components adjust to relative humidity of, and are at same temperature as, spaces where they are to be installed.
 - b. Open sealed packages to allow wood components to acclimatize immediately on moving wood components into spaces in which they will be installed.
- B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- C. Install wood athletic flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Vapor Barrier** - 6-mil (0.2mm) polyethylene.
- B. Resilient Pad**
 - 1. Connor Rezill Cushion, Rebonded Polyurethane, 8 PCF (128 kg/m³) foam blanket.
 - A. Subfloor**
 - 1. Lower Layers - Pre-manufactured V I P sandwiched subfloor panels.
 - 2. Upper Layer – 11/32" (9mm) APA rated sheathing, Exposure 1.
- C. Flooring** (Connor Laytite Maple)
 - 1. 25/32" X 2-1/4" (20mm x 57mm), Second & Better Grade, Northern Hard Maple flooring, TGEM, MFMA Grade marked and stamped as manufactured by Connor Sports, Amasa, MI.
 - 2. Optional grades (specify above or delete) - First Grade, Third Grade
- D. Fasteners**
 - 1. Flooring Fasteners - Minimum 1-3/4" (44mm) barbed cleats or coated staples.
 - 2. Subfloor Fasteners - 3/4" (19mm) staples or equivalent.
 - 3. Concrete Fasteners – 1-1/2" (38mm) RAWL Spikes or equivalent as dictated by site conditions-achieving a minimum 900 lbs (408.6 Kg) pullout strength.
- E. Finish Materials** - Connor oil modified polyurethane seal and finish or equal.
- F. Game Lines** - Game line paint shall be compatible with finish.
- G. Wall Base** - 3" X 4" (76mm x 102mm), heavy duty, molded, vented cove base with pre-molded outside corners.
- H. Protective Floor Cover** – (specify or delete) Provide court tiles selected from manufacturer's standard dimensions and colors.

2.2 SYSTEM DESCRIPTION

- A. System Type: Floating.
- B. Overall System Height: As indicated on Drawings.

2.3 FLOORING MATERIALS

- A. Maple Flooring: Comply with MFMA grading rules for species, grade, and cut.
 - 1. Certification: Provide flooring that carries MFMA mark on each bundle or piece.
- B. Random-Length Strip Flooring: Northern hard maple (*Acer saccharum*), kiln dried, random length, tongue and groove, and end matched.
 - 1. Grade: MFMA-RL First.
 - 2. Cut: Edge.
 - 3. Thickness: 25/32 inch.
 - 4. Face Width: 2-1/4 inches.

2.4 SUBFLOOR MATERIALS

- A. Plywood Underlayment: APA rated, C-D plugged, exterior glue, tongue and groove, 23/32 inch thick.
- B. Resilient Underlayment: Flexible, multicellular, closed-cell, expanded polyethylene-foam sheet; nominal 2-lb/cu. ft. density.

2.5 FINISHES

- A. Floor-Finish System: System of compatible components recommended in writing by flooring manufacturer, and MFMA approved.
 - 1. Floor-Sealer Formulation: Pliable, penetrating type. MFMA Group 1, Sealers.
 - 2. Finish-Coat Formulation: Formulated for gloss finish indicated and multicoat application.
 - a. Type: MFMA Group 3, Gymnasium-Type Surface Finishes.
 - 3. Game-Line and Marker Paint: Industrial enamel compatible with finish coats and recommended in writing by manufacturers of finish coats, and paint for this use.

2.6 ACCESSORIES

- A. Vapor Retarder: ASTM D4397, polyethylene sheet not less than 6 mils thick.
- B. Resilient Wall Base: Molded, vented, rubber or vinyl cove base; 4 by 3 by 48 inches; with premolded outside corners.

1. Color: Black.
- C. Fasteners: Type and size recommended by manufacturer, but not less than those recommended by MFMA for application indicated.
- D. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood athletic flooring manufacturer.
- E. Adhesives: Manufacturer's standard for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Concrete Slabs: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

3.2 PREPARATION

- A. Concrete Slabs:
 1. Grind high spots and fill low spots on concrete substrates to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.
 2. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
 3. Remove coatings including curing compounds and other substances on substrates that are incompatible with installation adhesives and that contain soap, wax, oil, or silicone; use mechanical methods recommended by manufacturer. Do not use solvents.
- B. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Comply with wood athletic flooring manufacturer's written instructions, but not less than written recommendations of MFMA applicable to flooring type indicated.

- B. Pattern: Lay flooring parallel with long dimension of space to be floored unless otherwise indicated.
- C. Expansion Spaces: Provide as indicated, but not less than that required by manufacturer's written instructions and MFMA's written recommendations at walls and other obstructions, and at interruptions and terminations of flooring.
 - 1. Cover expansion spaces with base molding, trim, and saddles.
- D. Vapor Retarder: Cover entire slab area beneath wood flooring. Install with joints lapped a minimum of 6 inches and sealed.
- E. Underlayment: Install perpendicular to direction of flooring, staggering end joints in adjacent rows.

3.4 SANDING AND FINISHING

- A. Allow installed flooring to acclimate to ambient conditions before sanding.
- B. Follow applicable recommendations in MFMA's "Industry Recommendations for Sanding, Sealing, Court Lining, Finishing, and Resurfacing of Maple Gym Floors."
- C. Machine sand with coarse, medium, and fine grades of sandpaper to achieve a level, smooth, uniform surface without ridges or cups. Remove sanding dust by tack or vacuum.
- D. Finish: Apply seal and finish coats of finish system according to finish manufacturer's written instructions. Provide no fewer than four coats total and no fewer than two finish coats.
 - 1. Game-Line and Marker Paint: Apply game-line and marker paint between final seal coat and first finish coat according to paint manufacturer's written instructions.
 - a. Mask flooring at game lines and markers, and apply paint to produce lines and markers with sharp edges.
 - b. Where game lines cross, break minor game line at intersection; do not overlap lines.
 - c. Apply game lines and markers in widths and colors according to requirements indicated on Drawings.
 - d. Apply finish coats after game-line and marker paint is fully cured.

3.5 PROTECTION

- A. Protect wood athletic flooring during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion.
 - 1. Do not cover flooring after finishing until finish reaches full cure and not before seven days after applying last finish coat.
 - 2. Do not move heavy and sharp objects directly over flooring. Protect fully cured floor finishes and surfaces with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 096466

SECTION 096510 - RESILIENT FLOOR TILE**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid vinyl floor tile.
 - 2. Rubber floor tile.
 - 3. Vinyl composition tile (VCT).
 - 4. Resilient wall base and accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: Full-size units of each color and pattern of resilient floor tile required.
 - 1. Resilient Wall Base and Accessories: Manufacturer's standard-size Samples, but not less than 12 inches long, of each resilient product color and pattern required.
- D. Maintenance Data: For resilient products to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store tiles on flat surfaces.

1.6 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
 - 2. Resilient Wall Base and Accessories: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 COLORS AND PATTERNS

- A. Colors and Patterns: As shown on drawings or selected by Architect from manufacturer's full range.

2.3 SOLID VINYL FLOOR TILE See drawings A9.10, A9.20, A9.30, A9.40

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. [Armstrong World Industries, Inc.](#)
 2. [Congoleum Corporation.](#)
 3. [Johnsonite; a Tarkett company.](#) (Bases of Design: Johnsonite Azrock Collection, Cortina Grande Solid Vinyl Tile))
 4. [Mannington Mills, Inc.](#)
- B. Tile Standard: ASTM F1700.
1. Class: As indicated by product designations.
 2. Type: Smooth Surface.
- C. Thickness: 0.125 inch.
- D. Size: 16 by 16 inches.
- E. Seamless-Installation Method: Manufactures recommendation.
- F. Colors and Patterns: As indicated on drawings or selected by architect.

2.4 RUBBER FLOOR TILE See drawings A9.10, A9.20, A9.30, A9.40**2.5** Copy this article and re-edit for each product.

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. [Flexco.](#)
 2. [Johnsonite; a Tarkett company.](#) (Bases of Design: Johnsonite, Mesto Configuration, Rubber Planks)
 3. [VPI Corporation.](#)
- B. Tile Standard: ASTM F1344, Class I-B, Homogeneous Rubber Tile, solid color.
- C. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer according to ASTM D2240.
- D. Wearing Surface: Textured.
1. Molded-Pattern Figure: Hammered.
- E. Thickness: .080".
- F. Size: 6"x24" Planks.

- G. Seamless-Installation Method: Standard Manufacture's installation.
- H. Colors and Patterns: See drawings for color and pattern.

2.6 **VINYL COMPOSITION TILE** See drawings A9.10, A9.20, A9.30, A9.40

- A. Vinyl Composition Tile (VCT): ASTM F 1066.
 - 1. AB ColorPlus, American Biltrite (Canada) Ltd
 - 2. Armstrong World Industries, Inc.; Drawing design based on Standard Excelon Tile .
 - 3. Azrock Commercial Flooring, DOMCO.
 - 4. Congoleum CorporationMannington Mills, Inc.
 - 5. Tarkett Inc.
- B. Class: 1 (marbleized color tile) and 2 (through-pattern tile).
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch.
- E. Size: 12 by 12 inches.
- F. Fire-Test-Response Characteristics:
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.7 **RESILIENT WALL BASE**

- A. Wall Base: ASTM F 1861.

(Design bases on Johnsonite, 4 1/4" Perception/Royal base, color 40 Black (120' roll)
 - 1. Armstrong World Industries, Inc
 - 2. Azrock Commercial Flooring, DOMCO
 - 3. Johnsonite
 - 4. Marley Flexco (USA), IncRoppe Corporation;.
- B. Type (Material Requirement): TS (rubber, vulcanized thermoset).
- C. Group (Manufacturing Method): I (solid, homogeneous).
- D. Style: Cove (with top-set toe).
- E. Minimum Thickness: 0.125 inch.
- F. Height: 4 1/4 inches.
- G. Lengths: Coils in manufacturer's standard 120' length.
- H. Surface: Perception/Royal

2.8 RESILIENT STAIR ACCESSORIES

- A. Treads:
 - 1. Johnsonite; Drawing design based on Johnsonite, 55 silver gray, black visual strip, visually impaired bamboo rubber tread and riser
 - 2. Marley Flexco (USA), Inc.
 - 3. Pirelli Rubber Flooring
 - 4. Roppe Corporation
- B. Material: Rubber, Composition A.
- C. Surface Design: (designed).
 - 1. Bamboo.
- D. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
- E. Nosing Height: By code and ADA
- F. Size: Lengths and depths to fit each stair tread in one piece.
- G. Risers: Smooth, flat, toeless, height and length to cover risers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads. Tread and riser shall be one piece.
 - 1. Thickness: 0.125 inch.
- H. Fire-Test-Response Characteristics:
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.9 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- C. Metal Edge Strips: Metal edge strip shall not be used. Level between floor material with leveling compound so adjoining floor finishes are flush on the top surface of the adjoining materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 3. Moisture Testing:
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - c. If manufacturer's moisture level cannot be achieved in the time frame for floor installation install a moisture mitigation product per manufacturer's recommendation
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- E. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are same temperature as space where they are to be installed.
- G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles As directed by architect.
- C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- D. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required. Flooring shall be cut tight around concrete columns and caulked.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.5 RESILIENT ACCESSORY INSTALLATION

A. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.
 - a. Use commercially available product acceptable to manufacturer.
 - b. Coordinate selection of floor polish with Owner's maintenance service.
2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09651

SECTION 096566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interlocking, rubber floor tile.
2. Interlocking, suspended, polymer floor tile.
3. Interlocking, open-grid, vinyl floor tile.
4. Rubber mats.
5. Rubber floor tile.
6. Rubber-strip floor tile.
7. Rubber sheet flooring.
8. Sheet vinyl flooring.

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for wall base and accessories installed with resilient athletic flooring.

1.3 COORDINATION

- A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: Show installation details and locations of the following:

1. Border tiles.
2. Floor patterns.
3. Layout, colors, widths, and dimensions of game lines and markers.
4. Locations of floor inserts for athletic equipment installed through flooring.
5. Seam locations for sheet flooring.

- C. Samples: For each exposed product and for each type, color, and pattern specified, 6-inch-square in size and of the same thickness indicated for the Work.

1. Game-Line- and Marker-Paint Samples: Include Sample sets showing game-line- and marker-paint colors applied to flooring.
 2. Seam Samples: For each vinyl sheet flooring color and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- D. Samples for Initial Selection: For each type of resilient athletic flooring.
1. Game-Line and Marker Paint: Include charts showing available colors and glosses.
- E. Samples for Verification: For each type, color, and pattern of flooring specified, 6-inch- square in size and of same thickness and material indicated for the Work.
1. Game-Line- and Marker-Paint Samples: Include Sample sets showing game-line- and marker-paint colors applied to flooring.
 2. Seam Samples: For each vinyl sheet flooring color and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For sheet vinyl flooring Installer.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For resilient athletic flooring to include in maintenance manuals.
- 1.7 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Floor Tile: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of floor tile installed.
 2. Sheet Flooring: Furnish full-width rolls of not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, and pattern of flooring installed.
- 1.8 QUALITY ASSURANCE
- A. Sheet Vinyl Flooring Installer Qualifications: An experienced installer who has completed sheet vinyl flooring installations using seaming methods indicated for this Project and similar in material, design, and extent to that indicated for this Project; who is acceptable to manufacturer; and whose work has resulted in installations with a record of successful in-service performance.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. Store materials to prevent deterioration.
 - 1. Store tiles on flat surfaces.
 - 2. Store rolls upright.

1.10 FIELD CONDITIONS

- A. Adhesively Applied Products:
 - 1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
 - 3. Close spaces to traffic during flooring installation.
 - 4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 INTERLOCKING, RUBBER FLOOR TILE

- A. Manufacturer
 - 1. Tarkett (Bases of Design)
 - 2. Mondo
 - 3. Rubber Flooring Inc
- B. Description: Athletic flooring consisting of modular rubber tiles with precision cut, interlocking edges, for free-lay installation.
- C. Material: Rubber.
- D. Tile Interlock: Hidden.
- E. Traffic-Surface Texture: Nondirectional, stipple texture.
 - 1. Provide reversible tiles (with traffic-surface texture on both sides).
- F. Size: Manufacturer's standard-size square tile.
- G. Thickness: See drawings.

- H. Weight: Not less than See drawings per tile.
- I. Color and Pattern: As selected by Architect from manufacturer's full range.
- J. Border: Interlocking, beveled-edge tiles, of same material as floor tile; with bevels that transition from thickness of floor tile to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.
 - 1. Border Color and Pattern: As selected by Architect from manufacturer's full range to contrast with floor tile.

2.2 RUBBER MATS Copy this article and re-edit for each product.

- A. Manufacturer
 - 1. Tarkett (Bases of Design)
 - 2. Mondo
 - 3. Rubber Flooring Inc
- B. Description: Individual rubber mats specifically designed for free-lay athletic flooring applications.
- C. Traffic-Surface Texture: Smooth.
- D. Color: As selected by Architect from manufacturer's full range.

2.3 RUBBER FLOOR TILE

- A. Manufacturer
 - 1. Tarkett (Bases of Design)
 - 2. Mondo
 - 3. Rubber Flooring Inc
- B. Description: Athletic flooring consisting of modular rubber tiles with smooth edges for adhered application.
- C. Material: Rubber.
- D. Traffic-Surface Texture: Nondirectional, stipple texture.
- E. Size: Manufacturer's standard-size square tile.
- F. Color and Pattern: As selected by Architect from manufacturer's full range.
- G. Border: Interlocking, beveled-edge tiles, of same material as floor tile; with bevels that transition from thickness of floor tile to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.
 - 1. Border Color and Pattern: As selected by Architect from manufacturer's full range to contrast with floor tile.

2.4 RUBBER SHEET FLOORING Copy this article and re-edit for each product.

A. Manufacturer

1. Tarkett (Bases of Design)
2. Mondo
3. Rubber Flooring Inc

B. Description: Rubber athletic flooring provided as rolled goods for adhered installation.

C. Material: Rubber wear layer and rubber shock-absorbent layer, vulcanized together.

D. Traffic-Surface Texture: See Drawings.

E. Color and Pattern: As selected by Architect from manufacturer's full range.

F. Border: Interlocking, beveled-edge tiles, of same material as sheet flooring; with bevels that transition from thickness of sheet flooring to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.

1. Border Color and Pattern: As selected by Architect from manufacturer's full range to contrast with floor tile.

2.5 ACCESSORIES

A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.

B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

C. Game-Line and Marker Paint: Complete system including primer, if any, compatible with flooring and recommended in writing by flooring and paint manufacturers for use indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of flooring.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity Testing: Perform pH testing according to ASTM F710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
 - 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
 - 1. Do not install flooring until it is the same temperature as space where it is to be installed.
- F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOORING INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions.
- B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
- C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

3.4 FLOOR TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.

- B. Discard broken, cracked, chipped, or deformed tiles.
- C. Tile Matching: Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged if so numbered.
 - 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
- D. Adhered Floor Tile: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 SHEET FLOORING INSTALLATION

- A. Unroll sheet flooring and allow it to stabilize before cutting and fitting.
- B. Lay out sheet flooring as follows:
 - 1. Maintain uniformity of flooring direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
 - 3. Match edges of flooring for color shading at seams.
 - 4. Locate seams according to approved Shop Drawings.
- C. Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.6 GAME LINES AND MARKERS

- A. Mask flooring at game lines and markers, and apply paint to produce sharp edges. Where crossing, break minor game line at intersection; do not overlap lines.
- B. Apply game lines and markers in widths and colors according to requirements indicated on Drawings.

3.7 FIELD-APPLIED FINISHES

- A. Apply finish after game-line and marker paint is fully cured.
- B. Apply finish according to manufacturer's written instructions to produce a sealed surface that is ready for use.
- C. Do not cover flooring after finishing until finish reaches full cure.

3.8 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing flooring installation:
 - 1. Remove adhesive and other blemishes from flooring surfaces.
 - 2. Sweep and vacuum flooring thoroughly.
 - 3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.

- B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 096566

SECTION 096720 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes resinous flooring systems.
- B. Related Sections:
 - 1. Section 096623 "Resinous Matrix Terrazzo Flooring" for thinset, epoxy-matrix terrazzo.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site .

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Sustainable Design Submittals:
 - 1. For flooring products, indicating compliance with requirements for low-emitting materials.
- C. Samples for Initial Selection: For each type of exposed finish required.
- D. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 96-inch- square floor area selected by Architect.
 - a. Include 96-inch length of integral cove base.
 - 2. Simulate finished lighting conditions for Architect's review of mockups.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing according to ASTM D635.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. **Sika Corporation; Flooring.**
 - b. **Stonhard, Inc.**
- B. System Characteristics:
1. Color and Pattern: As selected by Architect from manufacturer's full range.
 2. Wearing Surface: Orange-peel texture.
 3. Overall System Thickness: 3/16 inch.
 4. Federal Agency Approvals: USDA approved for food-processing environments.
- C. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.
- D. Waterproofing Membrane: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.
- E. Reinforcing Membrane: Flexible resin formulation that is recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated and that inhibits substrate cracks from reflecting through resinous flooring.
- F. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- G. Body Coats:
1. Resin: Epoxy.

2. Formulation Description: 100 percent solids.
 3. Type: Pigmented.
 4. Application Method: Troweled or screeded.
 5. Number of Coats: One.
 6. Thickness of Coats: 1/8 inch.
 7. Aggregates: Manufacturer's standard.
- H. Grout Coat:
1. Resin: Epoxy.
 2. Formulation Description: 100 percent solids.
 3. Type: Pigmented.
 4. Thickness of Coat: 1/16 inch.
- I. Topcoats: Sealing or finish coats.
1. Resin: Epoxy.
 2. Formulation Description: 100 percent solids.
 3. Type: Clear.
 4. Number of Coats: Two.
 5. Finish: Gloss.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.
 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions and it not apply manufacturer's product to correct the issue
 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
 - 1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Reinforcing Membrane: Apply reinforcing membrane to entire substrate surface.
- D. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- E. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.
- F. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- B. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.4 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 099220 - INTERIOR PAINTING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of exposed interior items and surfaces.
1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork.
 - b. Acoustical wall panels.
 - c. Metal toilet enclosures.
 - d. Elevator entrance doors and frames.
 - e. Elevator equipment.
 - f. Finished mechanical and electrical equipment.
 - g. Light fixtures.
 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.

- g. Elevator shafts.
 - 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 - 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections include the following:
- 1. Division 5 Section "Structural Steel" for shop priming structural steel.
 - 2. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
 - 3. Division 8 Section "Steel Doors and Frames" for factory priming steel doors and frames.
 - 4. Division 9 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.
- E. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
- 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
- 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

2. **Manufacturer's Information:** Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. **Samples for Initial Selection:** For each type of finish-coat material indicated.
 1. After color selection, Architect will furnish color chips for surfaces to be coated.
- C. **Samples for Verification:** For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
 3. Submit Four Samples
- D. **Qualification Data:** For Applicator.

1.5 QUALITY ASSURANCE

- A. **Applicator Qualifications:** 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.
- B. **Source Limitations:** Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. **Benchmark Samples (Mockups):** Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
 1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. **Wall Surfaces:** Provide samples on at least 100 sq. ft..
 - b. **Small Areas and Items:** Architect will designate items or areas required.
 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
 3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Benjamin Moore & Co. (Benjamin Moore).

2. PP Industries, Inc. (Pittsburgh Paints).
3. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: As selected by Architect from manufacturer's full range.

2.3 CONCRETE UNIT MASONRY BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
 1. Benjamin Moore; Moorcraft Super Craft Latex Block Filler No. 285: Applied at a dry film thickness of not less than 8.1 mils.
 2. Pittsburgh Paints; 6-7 SpeedHide Interior/Exterior Masonry Latex Block Filler: Applied at a dry film thickness of not less than 6.0 to 12.5 mils.
 3. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than 8.0 mils.

2.4 INTERIOR PRIMERS

- A. Interior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
 1. Benjamin Moore; Regal FirstCoat Interior Latex Primer & Underbody No. 216: Applied at a dry film thickness of not less than 1.0 mil.
 2. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
 3. Sherwin-Williams; PrepRite Masonry Primer B28W300: Applied at a dry film thickness of not less than 3.0 mils.
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
 1. Benjamin Moore; Regal FirstCoat Interior Latex Primer & Underbody No. 216: Applied at a dry film thickness of not less than 1.0 mil.

2. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
 3. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
 4. Sherwin-Williams; PrepRite Masonry Primer B28W300 Series: Applied at a dry film thickness of not less than 3.0 mils.
- C. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Benjamin Moore; IronClad Alkyd Low Lustre Medal and Wood Enamel No. 163: Applied at a dry film thickness of not less than 1.3 mils.
 2. Pittsburgh Paints; 7-858 Pittsburgh Paints Industrial Rust Inhibitive Steel Primer: Applied at a dry film thickness of not less than 1.5 mils.
 3. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils.

2.5 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
1. Benjamin Moore; Regal Wall Satin No. 215 Premium Interior Finishes Flat Finish: Applied at a dry film thickness of not less than 1.3 mils.
 2. Pittsburgh Paints; 80-Line Wallhide Interior Wall Flat Latex Paint: Applied at a dry film thickness of not less than 1.2 mils.
 3. Sherwin-Williams; SuperPaint Interior Latex Flat Wall Paint, A86 Series: Applied at a dry film thickness of not less than 1.5 mils.
- B. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel.
1. Benjamin Moore; Moore's Regal AquaVelvet No. 319: Applied at a dry film thickness of not less than 1.4 mils.
 2. Pittsburgh Paints; 89-Line Manor Hall Interior Eggshell Wall and Trim: Applied at a dry film thickness of not less than 1.4 mils.
 3. Sherwin-Williams; SuperPaint Interior Latex Satin Wall Paint A87 Series: Applied at a dry film thickness of not less than 1.6 mils.
- C. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
1. Benjamin Moore; Regal AquaGlo No. 333 Premium Interior Finishes Latex Semi-Gloss: Applied at a dry film thickness of not less than 1.3 mils.
 2. Pittsburgh Paints; 88-110 Satinhide Interior Enamel Wall & Trim Lo-Lustre Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.1 mils.
 3. Sherwin-Williams; SuperPaint Interior Latex Semi-Gloss Enamel A88 Series: Applied at a dry film thickness of not less than 1.6 mils.
- D. Interior Semigloss Alkyd Enamel: Factory-formulated semigloss alkyd enamel for interior application.

1. Benjamin Moore; Satin Impervo Alkyd Low Lustre Enamel No. 235: Applied at a dry film thickness of not less than 1.3 mils.
2. Pittsburgh Paints; 27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil: Applied at a dry film thickness of not less than 1.5 mils.
3. Sherwin-Williams; Classic 99 Interior Alkyd Semi-Gloss Enamel A-40 Series: Applied at a dry film thickness of not less than 1.7 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturers written instructions for each particular substrate condition and as specified.
 1. Provide barrier coats over incompatible primers or remove and reprime.
 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze.

If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

- a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
- a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Material Preparation: Mix and prepare paint materials according to manufacturers written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 9. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

- F. Mechanical items to be painted include, but are not limited to, the following:
1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.
 5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Switchgear.
 2. Panelboards.
 3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
1. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
 2. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying

paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT SCHEDULE

- A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:
 - 1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior flat acrylic paint.
 - 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 - 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
 - 4. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior semigloss alkyd enamel.

- B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:
1. Flat Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
- D. Ferrous Metal: Provide the following finish systems over ferrous metal:
1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
 4. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

- a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss alkyd enamel.
- E. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:
- 1. Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coats: Interior flat latex-emulsion size.

END OF SECTION 099220

SECTION 101550 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes stainless-steel units as follows:
 - 1. Toilet Enclosures: Ceiling anchored.
 - 2. Entrance Screens: Ceiling anchored.
 - 3. Urinal Screens: Wall hung.
- B. Related Sections include the following:
 - 1. Division 5 Section "Metal Fabrications" for supports that attach ceiling-anchored units to overhead structural system. Supply as required to anchor units.
 - 2. Division 6 Section "Miscellaneous Carpentry" for blocking and overhead support of floor-and-ceiling-anchored units.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show locations of cutouts for compartment-mounted toilet accessories.
 - 2. Show locations of reinforcements for compartment-mounted grab bars.
- C. Samples for Initial Selection: For each type of unit indicated.
- D. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch-square Samples of same thickness and material indicated for Work.

1.4 QUALITY ASSURANCE

- A. Comply with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 METAL UNITS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Accurate Partitions Corporation.
 - 2. All American Metal Corp.
 - 3. American Sanitary Partition Corporation.
 - 4. Ampco.
 - 5. Bradley Corporation; Mills Partitions.
 - 6. Bobrick.
- C. Toilet-Enclosure Style: **Overhead braced, Ceiling hung. No part of partition compartment shall meet the floor. All bracing required for hanging is part of the installation. Everything needed from existing structure to hang partitions**
- D. Entrance-Screen Style: **Overhead braced Ceiling hung.**
- E. Urinal-Screen Style: **Wall hung, flat panel.**
- F. Stainless-Steel Units: Facing sheets and closures fabricated from ASTM A 666, Type 302 or 304, stainless-steel sheet, leveled to stretcher-leveled flatness.
 - 1. Stainless-Steel Facing Sheet Thicknesses: Specified thicknesses as follows:
 - a. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.0375 inch.
 - b. Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than 0.050 inch.
 - c. Panels: Manufacturer's standard thickness, but not less than 0.0312 inch.
 - d. Doors: Manufacturer's standard thickness, but not less than 0.0312 inch.
 - e. Integral-Flange, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.0312 inch.
 - f. Wedge-Shaped, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.0375 inch.

2. Finish: Manufacturer's standard textured hammered finish on exposed faces. Exposed surfaces are protected from damage by application of strippable, temporary protective covering before shipment.
- G. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets are pressure laminated to core material. Units have continuous, interlocking molding strip or lapped and formed edge closures. Exposed surfaces are free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections. Corners are sealed by welding. Exposed welds are ground smooth.
1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
 2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
 3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
 4. Urinal-Screen Construction: Matching panels.
- H. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets, stainless steel.
 2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.2 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. Material: Stainless steel.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

- A. Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with leveling adjustment at tops pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- B. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.
1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.

2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors and entrance screen doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
 2. Stirrup Brackets: Secure panels to walls and to pilasters with not less than two brackets attached near top and bottom of panel.
 - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.
- C. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors in entrance screens to return doors to fully closed position.

END OF SECTION 10155

SECTION 102800 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Public-use washroom accessories.
- 2. Public-use shower room accessories.
- 3. Custodial accessories.

- B. Related Requirements:

- 1. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.
- 2. Section 102813.63 "Detention Toilet Accessories" for accessories designed for installation in detention facilities.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
- 3. Include electrical characteristics.

- B. Samples: Full size, for each exposed product and for each finish specified.

- 1. Approved full-size Samples will be returned and may be used in the Work.

- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

- A. Owner-Furnished Materials: Toilet Paper disp., soap disp., paper towel disp.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Grab Bar:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.

- c. [Bradley Corporation.](#)
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 4. Outside Diameter: 1-1/4 inches.
 5. Configuration and Length: As indicated on Drawings.
- C. Mirror Unit
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [American Specialties, Inc.](#)
 - b. [Bobrick Washroom Equipment, Inc.](#)
 - c. [Bradley Corporation.](#)
 2. Frame: Stainless-steel channel Stainless steel, fixed tilt.
 - a. Corners: Manufacturer's standard.
 3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
 4. Size: As indicated on Drawings.
- D. Coat Hook
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [American Specialties, Inc.](#)
 - b. [Bobrick Washroom Equipment, Inc.](#)
 - c. [Bradley Corporation.](#)
 - d.
 2. Description: Double-prong unit.
 3. Material and Finish: Stainless steel, No. 4 finish (satin).

2.4 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

- B. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- C. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- E. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104130 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire-protection cabinets.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

- A. Size of fire-protection cabinets shall accommodate 10# ABC fire extinguisher.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Babcock-Davis.
 - b. Fire-End & Croker Corporation.
 - c. GMR International Equipment Corporation.
 - d. Guardian Fire Equipment, Inc.
 - e. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - f. Larsens Manufacturing Company.
 - g. Modern Metal Products, Division of Technico Inc.
 - h. MOON American.
 - i. Nystrom, Inc.
 - j. Potter Roemer LLC.
 - k. Strike First Corporation of America (The).
- B. Cabinet Construction: One-hour fire rated.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

- E. Cabinet Trim Material: Steel sheet.
- F. Door Material: Steel sheet.
- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Acrylic sheet.
 - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide continuous hinge, of same material and finish as trim,, permitting door to open 180 degrees.
- J. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Door Lock: the cabinet shall not be lockable
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet glazing.
 - 2) Application Process: Decals.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
- K. Materials:
 - 1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Color: White.
 - 2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.

2. Miter corners and grind smooth.
 3. Provide factory-drilled mounting holes.
 4. Prepare doors and frames to receive locks.
 5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:
 - 1. Fire-Protection Cabinets: 42 inches above finished floor to top of fire extinguisher.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi-recessed fire-protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification:
 - 1. Apply decals at locations indicated.
 - 2. Apply decals on field-painted fire-protection cabinets after painting is complete.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION EQUIPMENT

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. 210517 - Sleeves And Sleeve Seals For Fire-Suppression Piping
- B. 210518 - Escutcheons For Fire-Suppression Piping
- C. 210523 – General Duty Valves for Water Based Fire Suppression Piping
- D. 210529 – Hangers and Supports for Fire suppression Piping and Equipment
- E. 210553 – Identification for Fire-Suppression Piping and Equipment
- F. 211100 - Facility Fire-Suppression Water-Service Piping
- G. 211119 – Fire Department Connections
- H. 211313 - Wet-Pipe Sprinkler Systems

1.2 REGULATORY REQUIREMENTS

- A. Products requiring electrical connection: listed and classified by underwriter’s laboratories, as suitable for the purpose specified and indicated.

1.3 DEFINITIONS

- A. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and Fire protection equipment rooms.
- C. Finished Spaces: Spaces other than Fire protection, fire protection and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, space above ceilings, unexcavated spaces, crawl spaces, and tunnels.
- D. Furnish: Contractor shall supply (purchase) item and turn over to others for installation
- E. Install: Others shall purchase item and the contractor shall place item in position for service and or use
- F. Provide: Contractor shall furnish (purchase) and completely install item
- G. Owner: SUNY Binghamton University

- H. Storage: To provide a safe warehousing location to protect equipment and components that are to be implemented as part of the project. This includes but not limited to existing items to be relocated by the owner/contractor and items purchased by the owner/contractor.

1.4 PERFORMANCE

- A. All work shall be performed in cooperation with the Owner, Architect and other separate contractors. The contractor shall coordinate work with the construction schedule established by the Owner and Architect and shall immediately report any delays in materials receipt including circumstances causing the delays.

1.5 SUBMITTALS

- A. Product Data: For products listed under Part 2 of Division 21 technical specifications.
- B. Submit to architect/engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this project. Submittals that are not properly marked with all pertinent information identified will be returned.
- D. Product data: published literature: indicate dimensions, weights, capacities, ratings, gages and finishes of materials, electrical characteristics and connection requirements.
- E. Shop drawings: indicate assembly, dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics and connection requirements.
- F. In addition, the submittal shall bear the project name, the contractor's name, the date reviewed by the contractor, the contractor's control number (if applicable), and a stamp with the contractor's signature certifying that the item has been reviewed and it complies with the requirements of the contract documents.
- G. Any submittals not clearly marked as indicated above will be returned to the contractor for resubmission.

1.6 CLOSEOUT SUBMITTALS

- A. Provide 3-ring binder with the following items to be used as facility Operation and Maintenance Manual Minimum of one (1) hard copy and one (1) electrical (digital) copy unless note elsewhere in the project requirements.
 1. Product Data: Provide one copy of final approved product data for products listed under Part 2 of Division 21 technical specifications.
 2. Manufacturer's instructions: Include installation instructions.
 3. Manufacturer's data: Include instructions for lubrication, replace parts, motor and drive replacement, spare parts list, and wiring diagrams.
 4. Required NFPA 13 and NFPA 25 Testing certification.

- B. Product Date: Provide one copy of final approved product data for products listed under Part 2 of Division 21 technical specifications.
- C. Manufacturer's instructions: Include installation instructions.
- D. Manufacturer's data: Include instructions for lubrication, replace parts, motor and drive replacement, spare parts list, and wiring diagrams.

1.7 SUBSTITUTIONS

- A. Submittal of substitute equipment performance data shall be made in strict adherence to the requirements set forth in Section Division 01, Supplemental General Requirements, and in Instructions to Bidders.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate Fire protection equipment installation with other building components.
- B. Arrange for openings in building structure during progress of construction to allow for Fire protection installations.
- C. Sequence, coordinate, and integrate installations of fire protection materials and equipment for efficient flow of the Work.
- D. Coordinate requirements for access panels and doors if fire protection items requiring access are concealed behind finished surfaces.

1.9 QUALITY ASSURANCE

- A. Furnish and install necessary equipment and materials required to provide a complete fire protection system as shown on the Drawings.
- B. System shall be in place tested (as specified), inspected and approved by all authorities having jurisdiction (where applicable).
- C. Materials furnished and installations made under this specification shall conform with applicable requirements of the codes, regulations and standards described herein, unless specifically described otherwise.
- D. If any codes, standards or regulations conflict, the most stringent shall apply.
- E. Systems shall comply with the latest version and associated references standards of the following codes:
 - 1. Systems shall comply with the latest version and associated references standards of the following codes:
 - a. 2020 Building Code of New York State
 - b. 2020 Energy Conservation Construction Code of New York State
 - c. 2020 Existing Building Code of New York State
 - d. 2020 Fire Code of New York State

- e. 2020 Fuel Code of New York State
 - f. 2020 Plumbing Code of New York State
 - g. 2020 Mechanical Code of New York State
 - h. 2020 Property Maintenance Code of New York State
 2. Systems shall comply with the latest version of the following codes referenced standards:
 - a. NFPA -13 – 2016 Installation of Sprinklers
 - b. NFPA 25 – 2016 Testing of Fire Protection Systems
 - c. NFPA 70 – 2017 National Electrical Code
 - d. NFPA 72 – 2016 National Fire Alarm and Signaling Code
 3. All work shall meet the requirements of the afore mentioned codes and all codes and standards referenced in the specifications. Although the details of such work may not be shown on the drawings or referenced in the specifications
 4. Conflicts between the applicable codes, standards, and the plans and specifications must be brought to the attention of the engineer prior to proceeding with the work in question.
 5. Conflicting standards: in case of conflict between the contract documents and a governing code or ordinance, the more stringent standard shall apply.
- F. Materials and equipment installations shall comply with standards of:
1. National Fire Protection Agency (NFPA).
 2. Local Utilities.
 3. Owner's Insurance Underwriters.
 4. Applicable Government Agencies and Departments.
 5. Underwriters Laboratory (UL).
 6. Federal and State Occupational Safety and Health Act (OSHA).
 7. Local Municipality.
 8. Local Fire Department.
 9. American Gas Association (AGA).
 10. ANSI - American National Standards Institute.
 11. ASTM Regulations and Standards for pipe, fittings, pressure vessels, testing and insulation.
 12. Conformance with the applicable codes, rules and regulations of the State of New York, NYCRR, Code Rule 4 and Code Rule 14, pertaining to boilers, gas and oil burners, controls and protective devices.
 13. AWWA American Water Works Association.
 14. Electrically powered equipment shall comply with the National Electric Code (NEC) and shall be UL listed for the intended usage.
- G. Interpretations
1. The Engineer shall provide advisory interpretations to the code regulations as requested by the contractor during construction.
 2. The Department of State is the “Authorities having Jurisdiction” Construction must comply with their requirements. Work discovered not to be in compliance to the Authorities interpretation of the code regulations shall be corrected by the contractor at no additional cost to the owner.
 3. The Department of State code interpretations and construction requirements shall supersede that of the Engineer.
- H. Manufacturer qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- I. Approved Manufacturers:

1. A listed approved manufacturer does not relieve or relax any specification requirements.
2. Manufacturers listed in the specifications and/or under addendum still must fully comply with the technical description as described in the project documents.
3. Inferior manufacturers standard offerings of products will not be accepted in lieu of the specified product.
4. The Architect/Engineer shall make the final judgment in determining if a product meets the full intent of the specifications.

1.10 CONNECTIONS

- A. Furnish and install utilities serving equipment which is to be furnished by others in accordance with the sizes and locations shown on the drawings complete with final connections including provisions for shut-off and adapters as required.
- B. Furnish and install required piping and fittings for connection of equipment. Furnish and install balance shutoff valves as noted or specified.

1.11 STRUCTURAL SUPPORTS

- A. Furnish and install brackets and/or supports for the fire protection installations in excess of building structure as shown on drawings. Where detail is not shown, submit shop drawings of intended construction for approval.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- C. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.
- D. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.13 COORDINATION

- A. Layout of equipment, piping, etc. is diagrammatic. Check project drawings prior to making installations for interferences with other trades. Should the contractor find such interferences, he shall be responsible for coordinating his work with the other responsible trades. Owner reserves the right to make reasonable changes prior to "roughing-in" without added expense. Dimensions shown are subject to verification of exact site conditions.
- B. Refer to reflected ceiling plans, structural drawings and architectural drawings and coordinate fire protection installations with ceiling patterns, lighting layouts, building structural members, etc. Coordinate the fire protection installations with the work of others engaged in the

installation to preclude the possibility of interference with fire protection installations shown on the drawings.

- C. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire protection installations.
 - D. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
 - E. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.
 - F. Equipment configuration and layout has been developed on the 'basis of design equipment' noted in the equipment schedules. Final placement and layout of the equipment in the mechanical rooms shall be coordinated by the contractor based on the approved submittals to achieve recommended equipment clearances as required by the equipment manufacturer and maintenance clearances. The contractor shall be required to develop equipment room coordination plans noting the location of the equipment, piping, and other major components in the mechanical room prior to installation. Coordination drawings shall be submitted for approval.
 - G. All systems serving other areas of owner-occupied facilities shall remain fully active at all times. System shutdowns shall be coordinated with owner field representative as required to accomplish system tie in, system extension and/or system removal work.
 - H. All work on existing systems that are to remain active during construction shall be accomplished as coordinated with owner field representative.
 - I. Systems serving other areas of the owner-occupied facilities shall remain active at all times.
 - J. If a system serving the owner-occupied area is interrupted or made nonfunctional due to this project construction activity, the contractor disabling the service shall provide temporary services as required to keep owner operations fully functional within owner occupied facility.
 - K. System shutdowns shall be coordinated with owner field representative as required to accomplish system tie in, system extension and/or system removal work.
- 1.14 PROJECT CONDITIONS
- A. Verify location of existing utilities before proceeding with the work.
 - B. Proposed piping and piping connections to match existing materials being connected into unless noted otherwise.
 - C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued owner occupancy throughout the building.
 - D. Work areas are to be kept free of debris at all times and are to be left broom clean at the end of each working day.
 - E. Adjacent areas are to be protected from dust and debris.

- F. Do not close or obstruct egress width to any building or site exit.
- G. Contractor shall obtain and pay for required permits from authorities.
- H. Conform to applicable code for the work described within the construction documents. Base bid amount shall include additional work required by the authorities having jurisdiction pertaining to the completion of this project.
- I. Contractors shall follow owner's safety requirements during construction.
- J. Conform to owner's safety procedures if hazardous or contaminated materials are discovered.
- K. The owner shall direct the contractor where construction materials and equipment to be installed shall be staged and stockpiled during construction.
- L. The work specified herein and indicated on drawings shall be completed, tested and made ready for operation prior to turn over to the owner. Unless specifically indicated, materials and equipment shall be new and first class quality.

1.15 SYSTEMS

- A. The contractor shall be responsible to provide complete and operable systems, including operational properties to the extent necessary to link multiple components of a system together and to interface with other systems.

1.16 BASIS OF DESIGN EQUIPMENT

- A. Drawings equipment schedules. Add the following general note
 1. Manufacturer and Model number of equipment included in schedule is the basis of design for project.
 2. Adjustment shall be made by the contractor for equipment other than the bases of design to comply the installed equipment manufacturer's requirements.
- B. Project Manual
 1. Manufacturers
 - a. Manufacturer and Model number of equipment included in specifications is the basis of design for project.
 - b. Adjustment shall be made by the contractor for equipment other than the bases of design to comply the installed equipment manufacturer's requirements.

1.17 SALVAGED ITEMS

- A. Remove all unused existing equipment where accessible and offer all salvage material to the owner.
- B. Owner shall have first right of refusal of all salvageable materials removed from the building.
- C. Materials not claimed by the owner shall become the property of the contractor.

- D. The contractor shall dispose of all material not retained by the owner in a lawful and legal manner away from the site.
- E. Items salvaged shall be moved and stored in a location as directed by the owner.
- F. The owner shall direct the contractor where to store salvaged items, equipment and materials removed from the work area.
- G. At the start of the project, the Owner and contractor shall survey the building and identify all items to be salvaged and turn over to the owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials and equipment shall be in strict accordance with the parameters hereinafter specified and as shown on the drawings.
- B. Materials and equipment furnished/provided shall be new unless noted otherwise.
- C. Flanges shall be of U.S. or Canadian manufacturer only.

2.2 JOINING MATERIALS

- A. Refer to individual Division 21 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/16-inch maximum thickness unless thickness or specific material is indicated.
- C. Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element.
- D. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 ACCESSORIES

- A. It is the intent of this specification that systems and equipment shall be complete with all accessories required to insure a complete system.
- B. Sprinkler Guards:
 - 1. Standard: UL 199.
 - 2. Type: Wire cage with fastening device for attaching to sprinkler.

2.5 ELECTRICAL CONNECTIONS

- A. The contractor for fire protection equipment shall provide required motor disconnects and starters for equipment motors unless specified and noted elsewhere.
 - 1. Unless noted otherwise in the construction documents, it is the HVAC/Mechanical contractors' responsibility to coordinate with the Electrical Contractor to determine what components are to be provided by each contractor.
- B. Electrical components provided shall be in compliances and sized in accordance with the National Electrical Code NFPA 70.
- C. Electrical equipment shall be UL listed

2.6 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Basis of Design: Subject to compliance with requirements, provide products by the manufacturers specified.

PART 3 - EXECUTION

3.1 FIRE PROTECTION DEMOLITION

- A. Refer to specification Sections for "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove fire protection systems, equipment, and components indicated to be removed.
 - 1. Piping to be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to be Removed: Disconnect and cap services and remove equipment.

4. Equipment to be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.
 - D. Contractor shall notify the owner in advance of any shutdown necessary of the existing systems. Minimum notification time shall be 72 hours.
 - E. Do not disable or disrupt building systems without 3 days prior written notice to owner.
 - F. Provide temporary services if required to maintain existing systems in service during construction.
 - G. Abandoned and inactive components shall be removed back to their active main or area and terminated.

3.2 CUTTING AND PATCHING

- A. Connection of new services to existing shall be in a neat and approved manner with disturbed services restored to original condition.
- B. Do cutting and patching work as noted and as necessary for the installation of the fire protection work.
- C. Cut, channel, chase, and drill ceilings, and other surfaces necessary for fire protection installations. Perform cutting by skilled mechanics of trade involved.
- D. Repair cut surfaces to match adjacent surfaces.
- E. The contractor is responsible for cutting and patching of existing work to facilitate and to conceal the work described within these documents. Surfaces to be patched shall be finished to match the existing surface. Owner has final say as to the acceptability of the finished patched work.
- F. Core drill openings in concrete floors necessary for Fire Protection Systems

3.3 INSTALLATION

- A. Unless otherwise noted or specified, materials and equipment shall be installed in strict accordance with the manufacturer's instructions and recommendations.
- B. Do not scale Drawings.
- C. The location of new piping is approximate. The exact location of piping shall be determined in the field to:

1. Avoid interference with existing conditions.
 2. Avoid interference with new work of other trades.
- D. Provide additional fittings as required to effect required changes in slope, direction and elevation without added expense.
- E. Do not cut any structural building member without permission of the Architect.
- F. The contractor shall provide required offset, transitions, fittings, and components etc. as required to complete the installation of the systems in order to conform to the building structure and existing building systems.
- G. Systems serving other areas of owner facilities shall remain active and fully functional throughout the duration of the project for Owner occupied areas. System shutdowns shall be coordinated with owner's field representative as required to accomplish system tie in, system extension and/or system removal work.
- H. Work on existing systems that are to remain active during construction shall be coordinated with owner's field representative.
- I. Contractor is responsible for verification of all dimensions.
- J. The layout of piping, equipment etc. is diagrammatic in nature. After field verification of actual site conditions, Provide required offsets to accommodate obstructions and final system placement without added expense.
- K. Protect remaining piping that is to remain from damage during construction.
- L. Repair damages to the existing pipe within the work area that is to remain.
- M. Connect piping to existing piping as indicated on the plans. Provide necessary transitions, elbows, etc.
- N. Unless noted otherwise, system components shall not be exposed. Piping shall be concealed within the ceilings and wall structures.

3.4 PROTECTION

- A. All materials, equipment and accessories shall be suitably protected and covered during construction.
- B. Damage responsibility: The contractor shall be responsible for any loss or damage caused by him or his workmen to the facility, building surfaces or equipment during the course of construction, and shall be fully responsible for repairing or replacing as required to insure restoration to original condition.
- C. Damaged items: Where items scheduled for reuse are found to be in damaged condition, the contractor shall call the attention of the owner to such items and receive further instructions prior to removal. Items damaged during removal shall be repaired or replaced by the contractor at no additional cost to the owner.

- D. Repair damages: Promptly repair damage to adjacent facilities by demolition operations at no cost to the owner.
- E. Sprinkler Guards: Where sprinkler heads are exposed to damage, provide sprinkler guards. Locations include but not limited to:
 - 1. Heads below 8'-0" above finished floor
 - 2. Gyms and sport centers
 - 3. Mechanical Rooms
 - 4. Equipment Rooms
 - 5. Storage Rooms
 - 6. Janitors Closets
 - 7. Utility Closets
 - 8. As directed by the Owner after installation

3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing 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 unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Install distribution piping to allow draining to the main drain valve, wherever feasible. Where draining distribution piping to the main drain is not feasible, provide auxiliary drainage per NFPA 13.
- L. Select system components with pressure rating equal to or greater than system operating pressure.
- M. Install escutcheons for penetrations of walls, ceilings, and floors.

3.6 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. 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 ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.7 PAINTING AND FINISHING

- A. Painting of fire protection systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire protection materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.9 GROUTING

- A. Clean surfaces that will come into contact with grout.
- B. Provide forms as required for placement of grout.
- C. Avoid air entrapment during placement of grout.
- D. Cure placed grout.

3.10 PIPE TESTING

- A. Piping shall be tested as required by the construction documents, NFPA (including but not limited to NFPA13, 25) and the Building Code of New York State.
- B. Unless stated otherwise Piping systems shall be tested to the following minimum conditions as noted below:

FIRE PROTECTION PIPE AND FITTING SCHEDULE - ABOVE GRADE		
System	Service	
	RANGES	TESTING (WHICHEVER IS GREATER)
Fire Protection Piping	0-175 PSIG	Not less than 200 psi pressure Hydrostatic test for 2 hours Or 50 psi pressure in excess of the maximum pressure for above 150 psig for 2 hours

FIRE PROTECTION PIPE AND FITTING SCHEDULE - BELOW GRADE		
SYSTEM	SERVICE	
	RANGES	TESTING (WHICHEVER IS GREATER)
Fire Protection Piping	0-175 Psi	Not less than 200 psi pressure Hydrostatic test for 2 hours Or 50 psi pressure in excess of the maximum pressure for above 150 psig. for 2 hours

3.11 CEILING SYSTEM NOTES

- A. Lay-in frames shall be compatible with the ceiling grid system. Note where standard and micro-grid ceiling systems are to be installed throughout the project area. Coordinate equipment frames accordingly.

3.12 FIRE PROTECTION

- A. Fire rated assemblies: Provide fire retardant NRTL approved sealant on raceway penetrations of fire rated ceilings, partitions, walls, and structural slabs. It shall be the responsibility of the Contractor to verify locations of such fire rated partitions, walls and structural slabs prior to submitting bid.
- B. Fire rated assemblies: Fire rated assemblies to be penetrated shall be installed with applicable through-penetration fire-stop system determined by U.L. classification.
- C. Fire alarm system modification shall be coordinated with central security before making any alterations.

3.13 INSPECTIONS

- A. The Contractor shall have:
 - 1. New York Board of Fire Underwriters inspect completed installation and present Owner with certificate of inspection showing approval.
 - 2. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.

3.14 OWNER TRAINING

- A. Conduct training sessions to familiarize facility staff with the features, operation, and maintenance of the new system.

END OF SECTION 210500

SECTION 210517 - SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves without waterstop.
 - 2. Sleeves with waterstop.
 - 3. Sleeve-seal systems.
 - 4. Grout.
 - 5. Silicone sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES WITHOUT WATERSTOP

- A. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends.
- B. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.2 SLEEVES WITH WATERSTOP

- A. Description: Manufactured galvanized steel, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2.3 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - 1. Designed to form a hydrostatic seal of 20 psig minimum.
 - 2. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.
 - 3. Pressure Plates: Carbon steel.
 - 4. Connecting Bolts and Nuts: Carbon steel, with ASTM B633 coating of length required to secure pressure plates to sealing elements.

2.4 GROUT

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000 psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Foam: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES - GENERAL

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. 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.
 - 3. Using grout or silicone sealant, seal space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 INSTALLATION OF SLEEVES WITH WATERSTOP

- A. Install sleeve with waterstop as new walls and slabs are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout or silicone sealant, seal space around outside of sleeves.

3.3 INSTALLATION OF STACK-SLEEVE FITTINGS

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
 - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
 - 3. Install section of cast-iron soil pipe to extend sleeve to 3 inches above finished floor level.
 - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
- B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- or smoke-stop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.4 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
 - 2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

3.6 SLEEVE SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above and below Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 2. Concrete Slabs-on-Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Interior Walls and Partitions:
 - a. Sleeves without waterstops.

END OF SECTION 210517

SECTION 210518 - ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 DEFINITIONS

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping and Relocated Existing Piping:

- a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
- b. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
- c. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
- d. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
- e. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons.

END OF SECTION 210518

SECTION 210523 - GENERAL-DUTY VALVES FOR WATER-BASED FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Bronze butterfly valves with indicators.
 2. Iron butterfly valves with indicators.
 3. Trim and drain valves.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
 2. Protect threads, flange faces, and weld ends.
 3. Set valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store valves indoors and maintain at higher-than-ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.
- D. Protect flanges and specialties from moisture and dirt.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of valve from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. UL Listed: Valves shall be listed in UL's "Online Certifications Directory" under the headings listed below and shall bear UL mark:
1. Fire Main Equipment: HAMV - Main Level.

- a. Butterfly Valves: HLXS - Level 3.
 2. Sprinkler System and Water Spray System Devices: VDGT - Main Level.
 - a. Valves, Trim and Drain: VQGU - Level 1.
 - B. FM Global Approved: Valves shall be listed in its "Approval Guide," under the headings listed below:
 1. Automated Sprinkler Systems:
 - a. Valves.
 - 1) Miscellaneous valves.
 - C. ASME Compliance:
 1. ASME B1.20.1 for threads for threaded-end valves.
 2. ASME B16.1 for flanges on iron valves.
 3. ASME B31.9 for building services piping valves.
 - D. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
 - E. NFPA Compliance for Valves:
 1. Comply with NFPA 13.
 - F. Valve Pressure Ratings: Not less than the minimum pressure rating indicated or higher, as required by system pressures.
 - G. Valve Sizes: Same as upstream piping unless otherwise indicated.
 - H. Valve Actuator Types:
 1. Worm-gear actuator with handwheel for quarter-turn valves, except for trim and drain valves.
 2. Handwheel: For other than quarter-turn trim and drain valves.
 3. Handlever: For quarter-turn trim and drain valves NPS 2 and smaller.
- 2.3 BRONZE BUTTERFLY VALVES WITH INDICATORS
- A. Description:
 1. Standard: UL 1091 and FM Global standard for indicating valves, (butterfly), Class Number 1112.
 2. Minimum: Pressure rating: 175 psig.
 3. Body Material: Bronze.
 4. Seat Material: EPDM.
 5. Stem Material: Bronze or stainless steel.
 6. Disc: Stainless steel.
 7. Actuator: Worm gear.
 8. Supervisory Switch: Internal or external.
 9. Ends Connections for Valves NPS 2-1/2: Grooved ends.
- 2.4 IRON BUTTERFLY VALVES WITH INDICATORS
- A. Description:

1. Standard: UL 1091 and FM Global standard for indicating valves, (butterfly), Class Number 112.
2. Minimum Pressure Rating: 175 psig.
3. Body Material: Cast or ductile iron with nylon, EPDM, epoxy, or polyamide coating.
4. Seat Material: EPDM.
5. Stem: Stainless steel.
6. Disc: Ductile iron, nickel plated and EPDM or SBR coated.
7. Actuator: Worm gear.
8. Supervisory Switch: Internal or external.
9. Body Design: Lug or wafer.

2.5 TRIM AND DRAIN VALVES

A. Ball Valves:

1. Description:
 - a. Pressure Rating: 175 psig.
 - b. Body Design: Two piece.
 - c. Body Material: Forged brass or bronze.
 - d. Port size: Full or standard.
 - e. Seats: PTFE.
 - f. Stem: Bronze or stainless steel.
 - g. Ball: Chrome-plated brass.
 - h. Actuator: Handlever.
 - i. End Connections for Valves NPS 1 through NPS 2-1/2: Threaded ends.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION, GENERAL

- A. Comply with requirements in the following Sections for specific valve-installation requirements and applications:
 - 1. Section 211313 "Wet Pipe Sprinkler Systems" for application of valves in fire-suppression standpipes; wet-pipe, fire-suppression sprinkler systems.
 - 2. Section 331415 "Site Water Distribution Piping" for application of valves in fire-suppression water-service piping.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply, except from fire-department connections. Install permanent identification signs, indicating portion of system controlled by each valve.
- C. Install double-check valve assembly in each fire-protection water-supply connection.
- D. Install valves having threaded connections with unions at each piece of equipment arranged to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above the pipe center.
- F. Install valves in position to allow full stem movement.
- G. Install valve tags. Comply with requirements in Section 210553 "Identification for Fire-Suppression Piping and Equipment" for valve tags and schedules and signs on surfaces concealing valves; and the NFPA standard applying to the piping system in which valves are installed. Install permanent identification signs indicating the portion of system controlled by each valve.

END OF SECTION 210523

SECTION 210529 - HANGERS AND SUPPORTS FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Fastener systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for fire-suppression piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. NFPA Compliance: Comply with NFPA 13.
- C. UL Compliance: Comply with UL 203.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: Factory-fabricated components, NFPA approved, UL listed, or FM approved for fire-suppression piping support.
 - 2. Galvanized Metallic Coatings: Pre-galvanized or hot-dip galvanized.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.3 FASTENER SYSTEMS

- A. Mechanical-Expansion Anchors: NFPA-approved, UL-listed, or FM-approved, insert-wedge-type anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - 2. Indoor Applications: Stainless steel.
 - 3. Outdoor Applications: Stainless steel.

2.4 MATERIALS

- A. Carbon Steel: ASTM A1011/A1011M.
- B. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; black and galvanized.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

- A. Metal Pipe-Hanger Installation: Comply with installation requirements of approvals and listings. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Fastener System Installation:
 - 1. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Install in accordance with approvals and listings.
- C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

- E. Install lateral bracing with pipe hangers and supports to prevent swaying.
- F. Install building attachments to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping.
- G. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

3.3 INSTALLATION OF FLOOR PIPE SUPPORTS

- A. Fabricate structural-steel stands to support piping above floor at water service entrance main.
- B. Install stand to prevent swaying of pipe.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe floor supports.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with NFPA requirements for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use carbon-steel pipe hangers and supports and attachments for general service applications.

- E. Horizontal-Piping Hangers and Supports: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Steel Pipe Clamps (MSS Type 4): For suspension of NPS 1/2 to NPS 24 if little or no insulation is required.
 3. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 4. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 5. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
- F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- G. Hanger-Rod Attachments: Comply with NFPA requirements.
- H. Building Attachments: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. C-Clamps (MSS Type 23): For structural shapes.
 3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

END OF SECTION 210529

SECTION 210553 - IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Warning tape
 - 2. Pipe labels.
 - 3. Valve tags.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 WARNING TAPE

- A. Material: Vinyl.
- B. Minimum Thickness: 0.005 inch.
- C. Letter, Pattern, and Background Color: As indicated for specific application under Part 3.
- D. Waterproof Adhesive Backing: Suitable for indoor or outdoor use.
- E. Maximum Temperature: 160 deg F.
- F. Minimum Width: 4 inches.

2.2 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Brady Corporation.
 - 2. Kolbi Pipe Marker Co.
 - 3. Pipemarket.com; Brimar Industries, Inc.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- C. Letter and Background Color: As indicated for specific application under Part 3.

- D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- F. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include the following:
 - 1. Pipe size.
 - 2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
 - 3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

2.3 VALVE TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Brady Corporation.
 - 2. Kolbi Pipe Marker Co.
 - 3. Pipemarker.com; Brimar Industries, Inc.
- B. Description: Stamped or engraved with 1/4-inch letters for piping-system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Brass, 0.04 inch thick, with predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass S-hook.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Include valve-tag schedule in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION GENERAL REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be installed.
- B. Coordinate installation of identifying devices with locations of access panels and doors.

- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF WARNING TAPE

- A. Warning Tape Color and Pattern: Yellow background with black diagonal stripes.
- B. Install warning tape on pipes and ducts, with cross-designated walkways providing less than 6 ft. of clearance.
- C. Locate tape so as to be readily visible from the point of normal approach.

3.4 INSTALLATION OF PIPE LABELS

- A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- B. Pipe-Label Locations: Locate pipe labels where piping is exposed within utility rooms, utility closets, and mechanical rooms or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; as follows:
 - 1. Within 3 ft. of each valve and control device.
 - 2. At access doors, manholes, and similar access points that permit a view of concealed piping.
 - 3. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.
- C. Flow- Direction Arrows: Provide arrows to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Fire-Suppression Pipe Label Color Schedule:
 - 1. Fire-Suppression Pipe Labels: White letters on an ANSI Z535.1 safety-red background.

3.5 INSTALLATION OF VALVE TAGS

- A. Install tags on valves and control devices in fire-suppression piping systems. List tagged valves in a valve-tag schedule in the operating and maintenance manual. Include the identification "FSV" on all fire-suppression system valve tags.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below.
 - 1. Valve-Tag Size and Shape:
 - a. Wet-Pipe Sprinkler System: 1-1/2 inches, round.
 - 2. Valve-Tag Color: White letters on an ANSI Z535.1 safety-red background.

END OF SECTION 210553

SECTION 211100 - FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes fire-suppression water-service piping and related components outside the building and service entrance piping through floor into the building and the following:
 - 1. Pipes, fittings, and specialties.
 - 2. Fire-suppression specialty valves.
 - 3. Alarm devices.
- B. Utility-furnished products include water meters that are furnished to the site, ready for installation.
- C. Related Requirements:
 - 1. Section 211119 "Fire-Department Connections" for exposed-, flush-, and yard-type, fire-department connections.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 - 2. Include diagrams for power, signal, and control wiring.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying the water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- 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. Comply with FM Global's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-suppression water-service piping.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Suppression Water-Service Piping: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

- A. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.
- B. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end.

- C. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end.
- D. Grooved-End, Ductile-Iron Pipe Appurtenances:
 - 1. Grooved-End, Ductile-Iron Fittings: ASTM A47/A47M, malleable-iron castings or ASTM A536, ductile-iron castings with dimensions matching pipe.
 - 2. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.
- E. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 1. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- F. Push-on-Joint, Ductile-Iron Fittings: AWWA C153, ductile-iron compact pattern.
 - 1. Gaskets: AWWA C111, rubber.
- G. Flanges: ASME B16.1, Class 125, cast iron.

2.2 JOINING MATERIALS

- A. Gaskets for Ferrous Piping and Copper-Alloy Tubing: ASME B16.21, asbestos free.

2.3 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 - 1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners, and with ends of same sizes as piping to be joined.
 - 2. Standard: AWWA C219.
 - 3. Center-Sleeve Material: Manufacturer's standard.
 - 4. Gasket Material: Natural or synthetic rubber.
 - 5. Pressure Rating: 200 psig minimum.
 - 6. Metal Component Finish: Corrosion-resistant coating or material.

2.4 BACKFLOW PREVENTERS

- A. Double-Check, Detector-Assembly Backflow Preventers:
 - 1. Standards: ASSE 1048 and UL's "Fire Protection Equipment Directory" listing or FM Global's "Approval Guide."
 - 2. Operation: Continuous-pressure applications.
 - 3. Pressure Loss: 5 psig maximum, through middle one-third of flow range.
 - 4. Size: 4 NPS.
 - 5. Design Flow Rate: 316 gpm.
 - 6. Selected Unit Flow Range Limits: 750 gpm.

7. Pressure Loss at Design Flow Rate: 5 psig.
8. Body Material: Stainless steel.
9. End Connections: Flanged.
10. Configuration: Designed for horizontal, straight through flow.
11. Accessories:
 - a. Valves: UL 262 and FM Global's "Approval Guide" listing; OS&Y gate type with flanged ends on inlet and outlet.
 - b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

B. Backflow Preventer Test Kits:

1. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.5 ALARM DEVICES

- A. General: UL 753 and FM Global's "Approval Guide" listing, of types and sizes to mate and match piping and equipment.
- B. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with excavating, trenching, and backfilling requirements in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. Comply with NFPA 24 for fire-service-main piping materials and installation.
- B. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- C. Bury piping with depth of cover over top at least 60 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
 1. In Loose Gravelly Soil and Rock: With at least 12 inches of additional cover.
- D. Extend fire-suppression water-service piping and connect to water-supply source and building fire-suppression water-service piping systems at locations and pipe sizes indicated.
 1. Terminate fire-suppression water-service piping within the building at the floor slab until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building's fire-suppression water-service piping systems when those systems are installed.
- E. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

- F. Comply with requirements for fire-suppression water-service piping inside the building in the following Sections:
 - 1. Section 211313 "Wet-Pipe Sprinkler Systems"
- G. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
- H. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

3.3 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure rating same as or higher than systems pressure rating for aboveground applications unless otherwise indicated.
- B. Install flanges, flange adaptors, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- C. Ream ends of tubes and remove burrs.
- D. Remove scale, slag, dirt, and debris from outside and inside of pipes, tubes, and fittings before assembly.
- E. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
- F. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts.
- G. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with bolts according to ASME B31.9.
- H. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.
- I. Do not use flanges or unions for underground piping.

3.4 VALVE INSTALLATION

- A. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- B. UL-Listed or FM Global-Approved Valves Other Than Gate Valves: Comply with NFPA 24.
- C. MSS Valves: Install as component of connected piping system.

3.5 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.

3.6 FIRE-DEPARTMENT CONNECTION INSTALLATION

- A. Install ball drip valves at each check valve for fire-department connection to mains.

3.7 ALARM DEVICE INSTALLATION

- A. General: Comply with NFPA 24 for devices and methods of valve supervision.
- B. Supervisory Switches: Supervise valves in open position.
 - 1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
- C. Locking and Sealing: Secure unsupervised valves as follows:
 - 1. Valves: Install chain and padlock on open OS&Y gate valve.
- D. Connect alarm devices to building's fire-alarm system. Wiring and fire-alarm devices are specified in Section 283111 "Digital, Addressable Fire-Alarm Systems."

3.8 CONNECTIONS

- A. Connect fire-suppression water-service piping to underground water main.
- B. Connect fire-suppression water-service piping to interior fire-suppression piping.

3.9 FIELD QUALITY CONTROL

- A. Use test procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described below.
- B. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- C. Hydrostatic Tests: Test at not less than one-and-one-half times the working pressure for two hours.
 - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to zero psig. Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts per hour per 100

joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

- D. Prepare test and inspection reports.

3.10 IDENTIFICATION

- A. Install continuous underground warning tape during backfilling of trench for underground fire-suppression water-service piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving" and in Section 210553 "Identification for Fire Suppression Piping and Equipment."

3.11 CLEANING

- A. Clean and disinfect fire-suppression water-service piping as follows:
1. Purge new piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow it to stand for 24 hours.
 - b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

3.12 PIPING SCHEDULE

- A. Underground fire-suppression water-service piping NPS 6 to NPS 12 shall be one of the following:
1. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
 2. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile- or gray-iron, standard-pattern fittings; glands, gaskets, and bolts; and gasketed joints.
 3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and gasketed joints.
- B. Aboveground fire-suppression water-service piping NPS 3 and NPS 4 shall be one of the following:
1. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.
- C. Underslab fire-suppression water-service piping NPS 6 to NPS 12 shall be one of the following:
1. Grooved-end, ductile-iron pipe; grooved-end, ductile-iron pipe appurtenances; and grooved joints.

2. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile- or gray-iron, standard-pattern fittings; glands, gaskets, and bolts; and restrained, gasketed joints.
3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron compact-pattern fittings; and restrained, gasketed joints.

3.13 VALVE SCHEDULE

- A. Standard-pressure, aboveground fire-suppression water-service shutoff valves NPS 3 and larger shall be one of the following:
 1. AWWA or UL-listed or FM Global-approved butterfly valves.

END OF SECTION 211100

SECTION 211119 – FIRE DEPARTMENT CONNECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Flush-type fire-department connections.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each fire-department connection.

PART 2 - PRODUCTS

2.1 FLUSH-TYPE FIRE-DEPARTMENT CONNECTION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Elkhart Brass Mfg. Co., Inc.
 - 2. Guardian Fire Equipment, Inc.
 - 3. Potter Roemer LLC; a Division of Morris Group International.
- B. Standard: UL 405.
- C. Type: Flush, for wall mounting.
- D. Pressure Rating: 175 psig minimum.
- E. Body Material: Corrosion-resistant metal.
- F. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
- G. Caps: Brass, lugged type, with gasket and chain.
- H. Escutcheon Plate: Rectangular, brass, wall type.

- I. Outlet: With pipe threads.
- J. Body Style: Horizontal .
- K. Number of Inlets: One.
- L. Outlet Location: Back.
- M. Escutcheon Plate Marking: Similar to "AUTO SPKR."
- N. Finish: Polished chrome plated.
- O. Outlet Size: NPS 4.
- P. Fire Department Connection: 5" Storz

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fire-department connections.
- B. Examine roughing-in for fire-suppression standpipe system to verify actual locations of piping connections before fire-department connection installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall-type fire-department connections.
- B. Install two protective pipe bollards around each fire-department connection. Comply with requirements for bollards in Section 055000 "Metal Fabrications."
- C. Install automatic (ball-drip) drain valve at each check valve for fire-department connection.

END OF SECTION 211119

SECTION 211313 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and fittings.
2. Specialty valves.
3. Air vent.
4. Sprinkler piping specialties.
5. Sprinklers.
6. Alarm devices.
7. Pressure gauges.

B. Related Requirements:

1. Section 211119 "Fire Department Connections" for flush fire department connections.
2. Section 211100 "Facility Fire Suppression Water Service Piping" for fire water-service backflow prevention devices.

1.2 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For wet-pipe sprinkler systems.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler system plans and sections, or Building Information Model (BIM), drawn to scale, showing the items described in this Section and coordinated with all building trades.

1. Provide Coordination drawings for mechanical (hydronic piping and ductwork) and fire protection elements in areas of congestion. These areas include but are not limited to corridors and water utility rooms.

- B. Design Data: Approved sprinkler piping working plans, prepared according to NFPA 13, including documented approval by authorities having jurisdiction, and including hydraulic calculations.
- C. Field Test Reports:
 - 1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
 - 2. Fire-hydrant flow test report.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by NICET Level III-certified technician, "Water-Based Systems Layout."
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

1.8 FIELD CONDITIONS

- A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
 - 2. Do not proceed with interruption of sprinkler service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Sprinkler system equipment, specialties, accessories, installation, and testing to comply with NFPA 13.
- C. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- D. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design wet-pipe sprinkler systems.
 - 1. Available fire-hydrant flow test records indicate the following conditions (Note this information is for reference only – hydrant flow test is required to be conducted within 1 year for shop drawings to be approved):
 - a. Date: June 6th, 2023.
 - b. Time: 7:30 a.m.
 - c. Performed by: Jack Raynor of Evan's Mechanical.
 - d. Location of Residual Fire Hydrant R: Adjacent Existing Exterior Bathrooms (North Side of East Gym).
 - e. Location of Flow Fire Hydrant F: Adjacent Existing Chiller Room (East Side of East Gym).
 - f. Static Pressure at Residual Fire Hydrant R: 133 psig.
 - g. Measured Flow at Flow Fire Hydrant F: 750 gpm.
 - h. Residual Pressure at Residual Fire Hydrant R: 58 psig.
 - 2. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - 3. Sprinkler Occupancy Hazard Classifications:
 - a. Utility/ Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - b. General Storage Areas: Ordinary Hazard, Group 1.
 - c. Offices and Conference Rooms: Light Hazard.
 - d. Gymnasium: Light Hazard.
 - e. Fit Space: Light Hazard.
 - f. Multipurpose Rooms: Light Hazard.
 - g. Corridors, Lobbies and Vestibules: Light Hazard.
 - h. Bathrooms: Light Hazard.
 - 4. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm/sq. ft. over 1500 sq. ft. area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm/sq. ft. over 1500 sq. ft. area.
 - 5. Maximum Protection Area per Sprinkler:
 - a. Utility/ Mechanical Equipment Rooms: 130 Sq Ft.
 - b. General Storage Areas: 130 Sq Ft.
 - c. Offices and Conference Rooms: 225 Sq Ft.
 - d. Gymnasium: 225 Sq Ft.
 - e. Fit Space: 225 Sq Ft.
 - f. Multipurpose Rooms: 225 Sq Ft.
 - g. Corridors, Lobbies and Vestibules: 225 Sq Ft.
 - h. Bathrooms: 225 Sq Ft.

- i. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
- E. Obtain documented approval of sprinkler system design from authorities having jurisdiction.

2.2 STEEL PIPE AND FITTINGS

- A. Standard-Weight Steel Pipe: black-steel pipe, ASTM A53/A53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Steel Couplings: uncoated steel, ASTM A865/A865M, threaded.
- C. Gray-Iron Threaded Fittings: uncoated gray-iron threaded fittings, ASME B16.4, Class 125, standard pattern.
- D. Malleable- or Ductile-Iron Unions: UL 860.
- E. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil; an ASC Engineered Solution.
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - c. Victaulic Company.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Grooved-End Fittings for Steel Piping: Painted or Uncoated grooved-end fittings, ASTM A47/A47M, malleable-iron casting or ASTM A536, ductile-iron casting, with dimensions matching steel pipe.
 - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 - 1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.
- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Alarm Valves:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - b. Victaulic Company.

- c. Viking Group Inc.
2. Standard: UL 193.
3. Design: For horizontal or vertical installation.
4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges, and fill-line attachment with strainer.
5. 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.

G. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
2. Standard: UL 1726.
3. Pressure Rating: 175-psig minimum.
4. Type: Automatic draining, ball check.
5. Size: NPS 3/4.
6. End Connections: Threaded.

2.4 AIR VENT

A. Manual Air Vent/Valve:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGF Manufacturing, Inc.
 - b. Shurjoint; a part of Aalberts Integrated Piping Systems.
 - c. Victaulic Company.
2. Description: Ball valve that requires human intervention to vent air.
3. Body: Forged brass.
4. Ends: Threaded.
5. Minimize Size: 1/2 inch.
6. Minimum Water Working Pressure Rating: 300 psig.

B. Automatic Air Vent:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Engineered Corrosion Solutions.
 - b. Metraflex Company (The).
 - c. Reliable Automatic Sprinkler Co., Inc. (The).
2. Description: Automatic air vent that automatically vents trapped air without human intervention.
3. Standard: UL listed or FM Global approved for use in wet-pipe fire sprinkler systems.
4. Vents oxygen continuously from system.
5. Float valve to prevent water discharge.
6. Minimum Water Working Pressure Rating: 175 psig.

2.5 SPRINKLER PIPING SPECIALTIES

A. Branch Outlet Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil; an ASC Engineered Solution.
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - c. Victaulic Company.
2. Standard: UL 213.
3. Pressure Rating: 175-psig minimum.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-tee and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - c. Victaulic Company.
2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig minimum .
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded or grooved.

C. Branch Line Testers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGF Manufacturing, Inc.
 - b. Elkhart Brass Mfg. Co., Inc.
 - c. Potter Roemer LLC; a Division of Morris Group International.
2. Standard: UL 199.
3. Pressure Rating: 175 psig.
4. Body Material: Brass.
5. Size: Same as connected piping.
6. Inlet: Threaded.
7. Drain Outlet: Threaded and capped.
8. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.

- b. Victaulic Company.
 - c. Viking Group Inc.
 2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 3. Pressure Rating: 175-psig minimum.
 4. Body Material: Cast- or ductile-iron housing with sight glass.
 5. Size: Same as connected piping.
 6. Inlet and Outlet: Threaded.
 - E. Adjustable Drop Nipples:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aegis Technologies, Inc.
 - b. CPS Products, Inc.
 - c. Merit Manufacturing.
 2. Standard: UL 1474.
 3. Pressure Rating: 250-psig minimum.
 4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
 5. Size: Same as connected piping.
 6. Length: Adjustable.
 7. Inlet and Outlet: Threaded.
 - F. Flexible Sprinkler Hose Fittings:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flexhead; an ASC Engineered Solution.
 - b. Reliable Automatic Sprinkler Co., Inc. (The).
 - c. Victaulic Company.
 2. Standard: UL 1474.
 3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
 4. Pressure Rating: 175-psig minimum.
 5. Size: Same as connected piping, for sprinkler.
- 2.6 SPRINKLERS
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Reliable Automatic Sprinkler Co., Inc. (The).
 2. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 3. Viking Group Inc.
 - B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - C. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
 - D. Automatic Sprinklers with Heat-Responsive Element:
 1. Nonresidential Applications: UL 199.

2. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- E. Sprinkler Finishes: Chrome plated.
- F. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
- G. Sprinkler Guards:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - c. Viking Group Inc.
 2. Standard: UL 199.
 3. Type: Wire cage with fastening device for attaching to sprinkler.

2.7 ALARM DEVICES

- A. Alarm-device types to match piping and equipment connections.
- B. Electrically Operated Notification Appliances:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fire-Lite Alarms; Honeywell International, Inc.
 - b. Notifier; Honeywell International, Inc.
 - c. Potter Electric Signal Company, LLC.
 2. Electric Bell:
 - a. Standard: UL 464.
 - b. Type: Vibrating, metal alarm bell.
 - c. Size: 10-inch diameter.
 - d. Voltage: 120 V ac, 60 Hz, 1 phase.
 - e. Finish: Red-enamel or polyester powder-coat factory finish, suitable for outdoor use with approved and listed weatherproof backbox.
 3. Strobe/Horn:
 - a. Standard: UL 464.
 - b. Tone: Selectable, steady, Temporal-3 (T-3) in accordance with ISO 8201 and ANSI/ASA S3.41, 2400 Hz, electromechanical, broadband.
 - c. Voltage: 120 V ac, 60 Hz.
 - d. Effective Intensity: 110 cd.
 - e. Finish: Red, suitable for outdoor use with approved and listed weatherproof backbox. White letters on housing identifying device as for "Fire."
 - f. Sign, Integrated: Mount between backbox and strobe/horn with text visible on both sides, above and below strobe/horn. Housing to be shaped to cover surface-mounted weatherproof backbox. Sign is to consist of white lettering on red plastic

identifying it as a "Sprinkler Fire Alarm" and instructing viewers to call 911, police, or fire department.

C. Water-Flow Indicators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Potter Electric Signal Company, LLC.
 - b. Viking Group Inc.
 - c. WATTS; A Watts Water Technologies Company.
2. Standard: UL 346.
3. Water-Flow Detector: Electrically supervised.
4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
5. Type: Paddle operated.
6. Pressure Rating: 250 psig.
7. Design Installation: Horizontal or vertical.

D. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Potter Electric Signal Company, LLC.
 - b. Tyco Fire Products; brand of Johnson Controls International plc, Building Solutions North America.
 - c. Viking Group Inc.
2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

E. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fire-Lite Alarms; Honeywell International, Inc.
 - b. Kennedy Valve Company; a division of McWane, Inc.
 - c. Potter Electric Signal Company, LLC.
2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.
6. 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.

2.8 PRESSURE GAUGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AGF Manufacturing, Inc.

2. AMETEK, Inc.
 3. WIKA Instrument Corporation.
- B. Standard: UL 393.
- C. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- D. Pressure Gauge Range: 0- to 250-psig minimum.
- E. Label: Include "WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping in Section 211100 "Facility Fire Suppression Water Service Piping" for exterior piping.

3.3 INSTALLATION OF PIPING

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

- G. Install sprinkler piping with drains for complete system drainage.
- H. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- I. Install alarm devices in piping systems.
- J. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- K. Install pressure gauges on riser or feed main, and at each sprinkler test connection. Include pressure gauges with connection not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal and install where they are not subject to freezing.
- L. Fill sprinkler system piping with water.
- M. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210500 "Common Work Results for Fire Suppression."
- N. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210500 "Common Work Results for Fire Suppression."
- O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210500 "Common Work Results for Fire Suppression."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. 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 ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- I. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- J. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF VALVES AND SPECIALTIES

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
1. Install valves in vertical position for proper direction of flow, in main supply to system.
 2. Install alarm valves with bypass check valve and retarding chamber drain-line connection.
- E. Air Vent:
1. Provide at least one air vent at high point in each wet-pipe sprinkler system in accordance with NFPA 13 requirements. Connect vent into top of fire sprinkler piping.
 2. Provide dielectric union for dissimilar metals, ball valve, and strainer upstream of automatic air vent.
 3. Pipe from outlet of air vent to drain.

3.6 INSTALLATION OF SPRINKLERS

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.
- B. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.
 - 5. Coordinate with fire-alarm tests. Operate as required.
 - 6. Coordinate with fire-pump tests. Operate as required.
 - 7. Verify that equipment hose threads are same as local fire department equipment.
- B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.10 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Demonstrate Alarm System.

3.11 PIPING SCHEDULE

- A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2 and Smaller, to Be One of the Following:

1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. Standard-weight, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- D. Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2-1/2 to NPS 4, to Be One of the Following:
1. Standard-weight, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.12 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
1. Rooms without Ceilings: Upright sprinklers.
 2. Rooms with Suspended Ceilings: Concealed pendent sprinklers.
 3. Cold Rooms/ Enclosures: Dry Barrel Pendent sprinklers.
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 2. Upright Sprinklers: Chrome plated in finished spaces exposed to view.

END OF SECTION 211313

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Motors.
2. Packless expansion joints.
3. Alignment guides and anchors.
4. Sleeves without waterstop.
5. Sleeves with waterstop.
6. Sleeve-seal systems.
7. Grout.
8. Silicone sealants.
9. Escutcheons.
10. Thermometers, liquid in glass, lead free.
11. Thermowells, lead free.
12. Pressure gauges, dial type, lead free.
13. Gauge attachments, lead free.

B. Related Requirements:

1. Section 221119 "Domestic Water Piping Specialties" for water meters.

1.2 ACTION SUBMITTALS

A. Product data.

B. Delegated Design Submittals: For each anchor and alignment guide, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and swing connections.
2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure.
3. Alignment Guide Details: Detail field assembly and attachment to building structure.
4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each expansion joint.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.
- B. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators in accordance with 2021 ASME Boiler and Pressure Vessel Code, Section IX.

1.6 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Domestic water expansion fittings and loops for plumbing piping intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act, with requirements of authorities having jurisdiction, and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
- B. Compatibility: Provide products suitable for piping service fluids, materials, working pressures, and temperatures.
- C. Capability: Provide products and installations to accommodate maximum axial movement as scheduled or indicated on Drawings.

2.2 MOTORS

- A. Motor Requirements, General:
 - 1. Content includes motors for use on alternating-current power systems of up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Comply with requirements in this Section except when stricter requirements are specified in equipment schedules or Sections.
3. Comply with NEMA MG 1 unless otherwise indicated.

B. Motor Characteristics:

1. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 ft. above sea level.
2. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

C. Single-Phase Motors:

1. Motors larger than 1/20 hp must be one of the following, to suit starting torque and requirements of specific motor application:
 - a. Permanent-split capacitor.
 - b. Split phase.
 - c. Capacitor start, inductor run.
 - d. Capacitor start, capacitor run.
2. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
3. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
4. Motors 1/20 HP and Smaller: Shaded-pole type.
5. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device will automatically reset when motor temperature returns to normal range.

D. Electronically Commutated Motors:

1. Microprocessor-Based Electronic Control Module: Converts 120 V single-phase AC power to three-phase DC power to operate the brushless DC motor.

2.3 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

A. Performance Requirements:

1. Compatibility: Provide products suitable for piping service fluids, materials, working pressures, and temperatures.
2. Capability: Provide products and installations that will accommodate maximum axial movement as scheduled or indicated on Drawings.

B. Packless Expansion Joints:

1. Rubber Union Connector Expansion Joints, Lead Free:
 - a. Source Limitations: Obtain rubber union connector expansion joints from single manufacturer.

- b. Material: Twin reinforced EPDM rubber spheres with external restraining cables.
 - c. Minimum Pressure Rating: 150 psig at 170 deg F unless otherwise indicated.
 - d. End Connections for NPS 2 (DN 50) and Smaller: Threaded.
 - e. End Connections for Greater than NPS 2 (DN 50): Flanged.
 - f. End Fittings: Stainless steel.
2. Flexible-Hose Packless Expansion Joints, Lead Free:
- a. Source Limitations: Obtain flexible-hose packless expansion joints from single manufacturer.
 - b. Description: Manufactured assembly with inlet and outlet elbow fittings and two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose.
 - c. Flexible Hose: Corrugated-metal inner hoses and braided outer sheaths.
 - d. Expansion Joints for Copper Tubing NPS 2 (DN 50) and Smaller: Copper-alloy fittings with solder-joint end connections.
 - 1) Bronze hoses and double-braid bronze sheaths with 700 psig at 70 deg F and 500 psig at 450 deg F ratings.
 - e. Expansion Joints for Copper Tubing NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Copper-alloy fittings with threaded end connections.
 - 1) Stainless steel hoses and double-braid, stainless steel sheaths with 420 psig at 70 deg F and 315 psig at 450 deg F ratings.
3. Externally Pressurized Metal-Bellows Packless Expansion Joints, Lead Free:
- a. Source Limitations: Obtain externally pressurized metal-bellows packless expansion joints from single manufacturer.
 - b. Minimum Pressure Rating: 150 psig unless otherwise indicated.
 - c. Description:
 - 1) Totally enclosed, externally pressurized, multi-ply, stainless steel bellows isolated from fluid flow by an internal pipe sleeve.
 - 2) Carbon-steel housing.
 - 3) Drain plugs and lifting lug for NPS 3 and larger.
 - 4) Joint Axial Movement: 4 inches of compression and 1 inch extension.
4. Source Limitations: Obtain grooved-joint expansion joints from single manufacturer.
5. Description: Factory-assembled expansion joint made of several grooved-end pipe nipples, couplings, and grooved joints.
6. Standard: AWWA C606, for grooved joints.
7. Material: ASTM A53/A53M, Schedule 40 stainless steel pipe with grooved ends.

C. Alignment Guides and Anchors:

1. Alignment Guides:
 - a. Source Limitations: Obtain alignment guides from single manufacturer.
 - b. Description: Steel, factory-fabricated alignment guide, with bolted two-section outer cylinder and base for attaching to structure; with two-section guiding slider for bolting to pipe. Provide dielectric spacer for use with copper tubing/piping.
2. Anchor Materials:

- a. Steel Shapes and Plates: ASTM A36/A36M.
- b. Bolts and Nuts: ASME B18.10 or ASTM A183, steel hex head.
- c. Washers: ASTM F844, steel, plain, flat washers.
- d. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, with tension and shear capacities appropriate for application.
 - 1) Stud: Threaded, stainless steel.
 - 2) Expansion Plug: Stainless steel.
 - 3) Washer and Nut: Stainless steel.
- e. Chemical Fasteners: Insert-type stud, bonding-system anchor for use with hardened portland cement concrete, with tension and shear capacities appropriate for application.
 - 1) Bonding Material: ASTM C881/C881M, Type IV, Grade 3, two-component epoxy resin suitable for surface temperature of hardened concrete where fastener is to be installed.
 - 2) Stud: ASTM A307, Stainless steel with continuous thread on stud unless otherwise indicated.
 - 3) Washer and Nut: Stainless steel.

2.4 SLEEVES AND SLEEVE SEALS

A. Sleeves without Waterstop:

1. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron, with plain ends.
2. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.
3. Steel Sheet Sleeves: ASTM A653/A653M, 24 gauge minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.

B. Sleeves with Waterstop:

1. Description: Manufactured PVC/HDPE, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

C. Sleeve-Seal Systems:

1. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - a. Hydrostatic Seal: 20 psig minimum.
 - b. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - c. Pressure Plates: Carbon steel.
 - d. Connecting Bolts and Nuts: Carbon steel, with zinc coating, ASTM B633 of length required to secure pressure plates to sealing elements.

D. Grout:

1. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
2. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
3. Design Mix: 5000 psi, 28-day compressive strength.
4. Packaging: Premixed and factory packaged.

2.5 ESCUTCHEONS

A. Escutcheon Types:

1. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
2. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.
3. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.
4. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

B. Floor Plates:

1. Split Floor Plates: Cast brass with concealed hinge.

2.6 METERS AND GAUGES FOR PLUMBING PIPING

A. Thermometers, Liquid in Glass, Lead Free - Metal Case, Industrial Style:

1. Source Limitations: Provide liquid-in-glass, lead-free, metal-case, industrial-style thermometers from single manufacturer.
2. Standard: ASME B40.200.
3. Case: Cast aluminum; 9-inch nominal size unless otherwise indicated.
4. Case Form: Adjustable angle unless otherwise indicated.
5. Tube: Glass with magnifying lens and blue or red organic liquid, mercury free.
6. Tube Background: Nonreflective aluminum with permanent scale markings graduated in deg F.
7. Window: Glass.
8. Stem: Aluminum and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
9. Connector: 1-1/4 inches, with ASME B1.1 or ASME B1.20.1 screw threads to fit thermowell.
10. Accuracy: Plus or minus 1 percent of span or one scale division, to a maximum of 1.5 percent of span.

B. Thermowells, Lead Free:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.

3. Material for Use with Copper Tubing: Lead-free copper.
4. Material for Use with Steel Piping: Type 304 stainless steel.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, or as required to match threaded opening in pipe.
7. Internal Threads: Size and thread type as required to match thermometer mounting threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length to extend to center of pipe.
10. Lagging Extension: Include on thermowells for insulated piping and tubing. Extension is to be of sufficient length to extend beyond finished insulation surface.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.
12. Heat-Transfer Medium: Mixture of graphite and glycerin.

C. Pressure Gauges, Dial Type, Lead Free - Direct Mounted, Metal Case:

1. Source Limitations: Provide dial-type, lead-free, direct-mounted, metal-case pressure gauges from single manufacturer.
2. Standard: ASME B40.100.
3. Case: Liquid-filled; cast aluminum; 6-inch nominal diameter.
4. Pressure-Element Assembly: Lead-free Bourdon tube.
5. Pressure Connection: Lead-free brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanent scale markings graduated in psi.
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Metal.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of span.

D. Gauge Attachments, Lead Free:

1. Snubbers: ASME B40.100, lead-free brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and porous-metal-type surge-dampening device. Include extension for use on insulated piping.
2. Valves: Lead-free brass ball, with NPS 1/4 or NPS 1/2 ASME B1.20.1 pipe threads.

PART 3 - EXECUTION

3.1 INSTALLATION OF EXPANSION JOINTS, GENERAL

- A. Install expansion joints of sizes matching sizes of piping in which they are installed.

3.2 INSTALLATION OF ALIGNMENT GUIDES AND ANCHORS

- A. Install alignment guides to guide expansion and to avoid end-loading and torsional stress.

- B. Install one guide on each side of pipe expansion fittings and loops. Install guides nearest to expansion joint not more than four pipe diameters from expansion joint.
- C. Attach guides to pipe, and secure guides to building structure.
- D. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
- E. Anchor Attachments:
 - 1. Anchor Attachment to Steel Pipe: Attach by welding. Comply with ASME B31.9.
 - 2. Anchor Attachment to Copper Tubing: Attach with pipe hangers. Use MSS SP-58, Type 24; U bolts bolted to anchor.
- F. Fabricate and install steel anchors by welding steel shapes, plates, and bars. Comply with ASME B31.9 and AWS D1.1/D1.1M.
 - 1. Anchor Attachment to Steel Structural Members: Attach by welding.
 - 2. Anchor Attachment to Concrete Structural Members: Attach by fasteners. Follow fastener manufacturer's written instructions.
 - 3. Use grout to form flat bearing surfaces for guides and anchors attached to concrete.

3.3 INSTALLATION OF PIPE LOOP AND SWING CONNECTIONS

- A. Connect risers and branch connections to mains with at least five pipe fittings, including tee in main.
- B. Connect risers and branch connections to terminal units with at least four pipe fittings, including tee in riser.
- C. Connect mains and branch connections to terminal units with at least four pipe fittings, including tee in main.

3.4 INSTALLATION OF SLEEVES - GENERAL

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 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.
 - 2. Using grout, seal the space outside of sleeves in floors/slabs/walls without sleeve-seal system. Select to maintain fire resistance of floor/slab/wall.

- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants that joint sealant manufacturer's literature indicates is appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF SLEEVES WITH WATERSTOP

- A. Install sleeve with waterstop as new walls and slabs are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange centered across width of concrete slab or wall.
- C. Secure nailing flanges to wooden concrete forms.
- D. Using grout, seal space around outside of sleeves. Select to maintain fire resistance of floor/slab/wall.

3.6 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.7 INSTALLATION OF ESCUTCHEONS

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

3.8 INSTALLATION OF METERS AND GAUGES

- A. Install thermometer with thermowell at each required thermometer location.

- B. Install thermowells in vertical position in piping tees.
- C. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- D. Install thermowells with extension on insulated piping.
- E. Fill thermowells with heat-transfer medium.
- F. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- G. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks.
- H. Install direct-mounted pressure gauges in piping tees with pressure gauge located on pipe at most readable position.
- I. Install remote-mounted pressure gauges on panel.
- J. Install valve and snubber in piping for each pressure gauge for fluids.
- K. Install thermometers in the following locations:
 - 1. Inlet and outlet of each water heater.
 - 2. Inlets and outlets of each domestic water heat exchanger.
 - 3. Inlet and outlet of each domestic hot-water storage tank.
 - 4. Inlet and outlet of each remote domestic water chiller.
 - 5. Outlet side of hot-water-balancing valve.
 - 6. Each main hot-water-recirculating line return pipe.
- L. Install pressure gauges in the following locations:
 - 1. Building water service entrance into building.
 - 2. Inlet and outlet of each pressure-reducing valve.
 - 3. Suction and discharge of each domestic water pump.

3.9 CONNECTIONS

- A. Install meters and gauges adjacent to machines and equipment to allow space for service and maintenance of meters, gauges, machines, and equipment.

3.10 ADJUSTING

- A. After installation, calibrate meters according to manufacturer's written instructions.
- B. Adjust faces of meters and gauges to proper angle for best visibility.

3.11 FIELD QUALITY CONTROL

A. Sleeves and Sleeve Seals:

1. Perform the following tests and inspections:
 - a. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
 - b. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
2. Prepare test and inspection reports.

B. Escutcheons:

1. Using new materials, replace broken and damaged escutcheons and floor plates.

3.12 SLEEVES APPLICATION

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above and below Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
2. Concrete Slabs-on-Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
3. Concrete Slabs above Grade:
 - a. Sleeves with waterstops.
4. Interior Wall and Partitions:
 - a. Sleeves without waterstops.

3.13 ESCUTCHEONS APPLICATION

A. Escutcheons for New Piping and Relocated Existing Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Chrome-Plated Piping: One piece, steel with polished, chrome-plated finish.
3. Insulated Piping:

- a. One piece, steel with polished, chrome-plated finish.
 - 4. Bare Piping at Wall and Floor Penetrations in Finished Spaces:
 - a. One piece, steel with polished, chrome-plated finish.
 - 5. Bare Piping at Ceiling Penetrations in Finished Spaces:
 - a. One piece, steel with polished, chrome-plated finish.
 - B. Install floor plates for piping penetrations of equipment-room floors.
 - C. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping and Relocated Existing Piping: One piece, floor plate.
 - 2. Existing Piping: Split floor plate.
- 3.14 THERMOMETER, LEAD FREE, APPLICATION

- A. Thermometers at inlet and outlet of each domestic water heater are to be the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Direct-mounted, metal-case, vapor-actuated type.
 - 3. Metal case, industrial-style, liquid-in-glass type.
- B. Thermometer stems are to be of length to match thermowell insertion length.

3.15 THERMOMETER, LEAD FREE, SCALE-RANGE APPLICATION

- A. Scale Range for Domestic Cold-Water Piping:
 - 1. 0 to 100 deg F.
- B. Scale Range for Domestic Hot-Water Piping:
 - 1. 0 to 250 deg F.

3.16 PRESSURE-GAUGE APPLICATION

- A. Pressure gauges at discharge of each water service into building are to be the following:

Retain one or more of three subparagraphs below. If retaining more than one type of pressure gauge, indicate location of each on Drawings.

- 1. Liquid filled , direct mounted, metal case.

2. Test plug with EPDM self-sealing rubber inserts.
- B. Pressure gauges at inlet and outlet of each water pressure-reducing valve are to be the following:
1. Liquid filled, direct mounted, metal case.
 2. Test plug with EPDM self-sealing rubber inserts.
- C. Pressure gauges at suction and discharge of each domestic water pump are to be the following:
1. Liquid filled, direct mounted, metal case.
 2. Test plug with EPDM self-sealing rubber inserts.

3.17 PRESSURE-GAUGE SCALE-RANGE APPLICATION

- A. Scale Range for Water Service Piping:
1. 0 to 200 psi.
- B. Scale Range for Domestic Water Piping:
1. 0 to 200 psi.

END OF SECTION 220500

SECTION 220501 - COMMON WORK RESULTS FOR PLUMBING SUPPLEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Basic Plumbing Requirements specifically applicable to Division 22 sections, in addition to Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 General Requirements and Supplemental Requirements Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. All Division 22 section noted included in the Project Manuals.

1.3 REGULATORY REQUIREMENTS

- A. Products requiring electrical connection: listed and classified by underwriters' laboratories, as suitable for the purpose specified and indicated.

1.4 DEFINITIONS

- A. 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.
- B. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and Plumbing equipment rooms.
- E. Finished Spaces: Spaces other than Plumbing, plumbing and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, space above ceilings, unexcavated spaces, crawl spaces, and tunnels.
- F. Furnish: Contractor shall supply (purchase) item and turn over to others for installation.
- G. Install: Others shall purchase item and the contractor shall place item in position for service and or use.
- H. Provide: Contractor shall furnish (purchase) and completely install item.

- I. Owner: New York State University Binghamton
- J. Salvage: Remove unused existing equipment where accessible and offer salvage material to the owner. Owner shall have first right of refusal of salvageable materials removed from the building. Materials not claimed by the owner shall become the property of the contractor. The contractor shall dispose of material not retained by the owner in a lawful and legal manner away from the site.
- K. Storage: To provide a safe warehousing location to protect equipment and components that are to be implemented as part of the project. This includes but not limited to existing items to be relocated by the owner/contractor and items purchased by the owner/contractor.

1.5 PERFORMANCE

- A. All work shall be performed in cooperation with the Owner, Architect, and other contractors. The contractor shall coordinate work with the construction schedule established by the Owner and Architect and shall immediately report any delays in materials receipt including circumstances causing the delays.

1.6 ACTION SUBMITTALS

- A. Refer to Division 1
 - 1. Submittal procedures.
 - 2. Shop Drawings and Samples.
 - 3. Coordination Drawings.
- B. Product Data: For products listed under Part 2 of Division 22 technical specifications
- C. Coordination Drawings: Provide drawings to include but not limited to:
 - 1. Drawings to coordinate space above ceilings with all other trades.
 - 2. Provide plans for all mechanical and equipment rooms.
 - 3. Drawings coordinating light fixtures.
 - 4. Drawings coordinating sprinklers.
 - 5. Drawings coordinating ductwork.
 - 6. Drawings coordinating piping.
- D. Drawings coordinating mechanical rooms noting, equipment pads, equipment, piping, ductwork, starters, etc.
- E. Submit to architect/engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- F. Submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the architect/engineer for product data.
- G. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this project. Submittals that are not properly marked with all pertinent information identified will be returned.

- H. Submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the architect/engineer for product data.
- I. Product data: published literature: indicate dimensions, weights, capacities, ratings, gages and finishes of materials, electrical characteristics, and connection requirements.
- J. Shop drawings: Indicate assembly, dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics, and connection requirements.
- K. Manufacturer's instructions: Include installation instructions.
- L. Maintenance data: Include instructions for lubrication, replacement parts, motor and drive replacement, spare parts lists, and wiring diagrams.
- M. In addition, the submittal shall bear the project name, the contractor's name, the date reviewed by the contractor, the contractor's control number (if applicable), and a stamp with the contractor's signature certifying that the item has been reviewed and it complies with the requirements of the contract documents.
- N. Any submittals not clearly marked as indicated above will be returned to the contractor for resubmission.

1.7 CLOSEOUT SUBMITTALS AND OWNER TRAINING

- A. Provide 3-ring binder with the following items to be used as facility Operation and Maintenance Manual Minimum of one (1) hard copy and one (1) electrical copy unless note elsewhere in the project requirements.
 - 1. Product Date: Provide one copy of final approved product data for products listed under Part 2 of Division 22 technical specifications.
 - 2. Manufacturer's instructions: Include installation instructions.
 - 3. Manufacturer's data: Include instructions for lubrication, replace parts, motor and drive replacement, spare parts list, and wiring diagrams.
- B. Upon completion of installation, prior to Owner accepting portions of building and equipment for operational use, instruct the Owner's operating personnel in the operation of the systems and equipment. Instruction shall be performed by equipment and controls vendors' factory-trained personnel. Owner shall determine which systems require additional instruction. Duration of training shall vary based on the piece of equipment that will be accepted by BU. Duration of instructions for controls shall take the equipment through a complete cycle of operation (at least five working days). Make adjustments under operating conditions.
- C. Provide electronic Operation and Maintenance Manuals at the completion of the project. Contractor shall obtain, at time of purchase of equipment, electronically formatted versions of operation, lubrication, and maintenance manuals for all items. Contractor shall assemble this literature along with other information in coordinated electronic manuals with additional information describing combined operation of field assembled units, including as-built wiring diagrams.

- D. Provide a list containing names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment.
- E. Divide manuals into three sections or books as follows:
 - 1. Engineering flow diagrams and controls sequences from project plumbing drawings, approved automatic temperature controls submittal, equipment startup procedures and operational instructions. Startup and operational instructions shall list valves, switches, and other devices used to start, stop, and control systems. Describe procedures to be followed in case of malfunctions. Include approved valve directory showing each valve number, location of each valve, and equipment or fixture controlled by the valve.
 - 2. Detailed maintenance and troubleshooting manuals containing data furnished by the manufacturer for complete maintenance. Include a copy of the balancing report.
 - 3. Lubrication instructions detailing the type of lubricant, amount, and intervals recommended by the manufacturer for each item of equipment. Include additional instructions necessary for the implementation of a first-class lubrication program. Where appropriate, include an approved summary of the lubrication instructions in a chart form.
- F. Submit an electronic format version of the manual(s) to the Architect for approval. After approval, submit electronic version and one hard copy for the Architect's distribution to the Owner. Deliver manuals no less than 30 days prior to acceptance of the equipment to permit the Owner's personnel to become familiar with the equipment and operation prior to acceptance.

1.8 SUBSTITUTIONS

- A. Submittal of substitute equipment performance data shall be made in strict adherence to the requirements set forth in Division 01 OMH/DASNY General Requirements, Supplemental General Requirements and in Instructions to Bidders.

1.9 SEQUENCING AND SCHEDULING

- A. Coordinate Plumbing equipment installation with other building components.
- B. Arrange for openings in building structure during progress of construction to allow for Plumbing installations.
- C. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work.
- D. Coordinate requirements for access panels and doors if plumbing items requiring access are concealed behind finished surfaces.

1.10 QUALITY ASSURANCE

- A. Electrical Characteristics for plumbing equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

- B. Furnish and install necessary equipment and materials required to provide a complete plumbing system as shown on the Drawings.
- C. System shall be in place tested (as specified), inspected and approved by all authorities having jurisdiction (where applicable).
- D. Materials furnished and installations made under this specification shall conform with applicable requirements of the codes, regulations and standards described herein, unless specifically described otherwise.
- E. If any codes, standards, or regulations conflict, the most stringent shall apply.
- F. Systems shall comply with the latest version and associated references standards of the following codes:
 - 1. Code compliance: all work shall comply with or surpass the requirements of the New York State codes and reference standards. Conform to applicable code for the work described within the contraction documents.
 - 2. Systems shall comply with the latest version and associated references standards of the following codes:
 - a. 2020 Building Code of New York State
 - b. 2020 Energy Conservation Construction Code of New York State
 - c. 2020 Existing Building Code of New York State
 - d. 2020 Fire Code of New York State
 - e. 2020 Fuel Code of New York State
 - f. 2020 Plumbing Code of New York State
 - g. 2020 Mechanical Code of New York State
 - h. 2020 Property Maintenance Code of New York State
 - 3. All work shall meet the requirements of the afore mentioned codes and all codes and standards referenced in the specifications. Although the details of such work may not be shown on the drawings or referenced in the specifications
 - 4. Conflicts between the applicable codes, standards, and the plans and specifications must be brought to the attention of the engineer prior to proceeding with the work in question.
 - 5. Conflicting standards: in case of conflict between the contract documents and a governing code or ordinance, the more stringent standard shall apply.
- G. Materials and equipment installations shall comply with standards of:
 - 1. National Fire Protection Agency (NFPA).
 - 2. Local Utilities.
 - 3. Owner's Insurance Underwriters.
 - 4. Applicable Government Agencies and Departments.
 - 5. Underwriters Laboratory (UL).
 - 6. Federal and State Occupational Safety and Health Act (OSHA).
 - 7. Local Municipality.
 - 8. Local Fire Department.
 - 9. American Gas Association (AGA).
 - 10. ANSI - American National Standards Institute.
 - 11. ASTM Regulations and Standards for pipe, fittings, pressure vessels, testing and insulation.
 - 12. Conformance with the applicable codes, rules, and regulations of the State of New York, NYCRR, Code Rule 4 and Code Rule 14, pertaining to boilers, gas and oil burners, controls, and protective devices.

13. AWWA American Water Works Association.
14. Electrically powered equipment shall comply with the National Electric Code (NEC) and shall be UL listed for the intended usage
15. The Joint Commission (TJC).

H. Interpretations

1. The Engineer shall provide advisory interpretations to the code regulations as requested by the contractor during construction.
2. The Department of State and OMH/DASNY are the “Authorities having Jurisdiction” Construction must comply with their requirements. Work discovered not to be in compliance to the Authorities interpretation of the code regulations shall be corrected by the contractor at no additional cost to the owner.
3. The Department of State and OMH/DASNY code interpretations and construction requirements shall supersede that of the Engineer.

I. Manufacturer qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

J. Approved Manufacturers:

1. A listed approved manufacturer does not relieve or relax any specification requirements.
2. Manufacturers listed in the specifications and/or under addendum still must fully comply with the technical description as described in the project documents.
3. Inferior manufacturers standard offerings of products will not be accepted in lieu of the specified product.
4. The Architect / Engineer shall make the final judgment in determining if a product meets the full intent of the specifications.

1.11 CONNECTIONS

- A. Furnish and install utilities serving equipment which is to be furnished by others in accordance with the sizes and locations shown on the drawings complete with final connections including provisions for shut-off and adapters as required.
- B. Furnish and install required piping and fittings for connection of equipment. Furnish and install balance shutoff valves as noted or specified.
- C. Provide isolation valves at each unit.

1.12 STRUCTURAL SUPPORTS

- A. Furnish and install brackets and/or supports for the plumbing installations in excess of building structure as shown on drawings. Where detail is not shown, submit shop drawings of intended construction for approval.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- C. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.
- D. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.14 COORDINATION

- A. Layout of equipment, piping, etc. is diagrammatic. Check project drawings prior to making installations for interferences with other trades. Should the contractor find such interferences, he shall be responsible for coordinating his work with the other responsible trades. Dimensions shown are subject to verification of exact site conditions.
- B. Refer to reflected ceiling plans, structural drawings and architectural drawings and coordinate fire protection, Plumbing, HVAC and Electrical installations with ceiling patterns, lighting layouts, building structural members, etc. Coordinate the fire protection installations with the work of others engaged in the installation to preclude the possibility of interference with fire protection installations shown on the drawings.
- C. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- D. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- E. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."
- F. **Equipment configuration and layout has been developed on the 'BASIS OF DESIGN EQUIPMENT' noted in the equipment schedules. Final placement and layout of the equipment in the mechanical rooms shall be coordinated by the contractor based on the approved submittals to achieve recommended equipment clearances as required by the equipment manufacturer and maintenance clearances. The contractor shall be required to develop equipment room coordination plans noting the location of the equipment, piping, and other major components in the mechanical room prior to installation. Coordination drawings shall be submitted for approval.**
- G. All systems serving other areas of owner-occupied facilities shall remain fully active at all times. System shutdowns shall be coordinated with owner field representative as required to accomplish system tie in, system extension and/or system removal work.

- H. All work on existing systems that are to remain active during construction shall be accomplished as coordinated with owner field representative.
- I. Systems serving other areas of the owner-occupied facilities shall remain active at all times.
- J. If a system serving the owner-occupied area is interrupted or made nonfunctional due to this project construction activity, the contractor disabling the service shall provide temporary services as required to keep owner operations fully functional within owner occupied facility.
- K. System shutdowns shall be coordinated with owner field representative as required to accomplish system tie in, system extension and/or system removal work.
- L. Duct detectors shall be furnished per Division 26, installed per Division 23, and wired per Division 26.

1.15 PROJECT CONDITIONS

- A. Contract Drawings are in part diagrammatic, intended to convey to the Contractor for the Electrical Work, the scope of work and indicate general arrangement of equipment and outlets. Follow these drawings in laying out the work. Verify spaces in which the work will be installed.
- B. Verify location of existing utilities before proceeding with the work.
- C. Proposed piping and piping connections to match existing materials being connected into unless noted otherwise.
- D. Verify scope of work: Contractor shall visit the job site prior to submitting a bid to ascertain existing field conditions and to determine the scope of the work, and to become familiar with the existing conditions that will affect his work and, therefore, the bid. Additional cost resulting from the contractor's failure to verify the scope of the work shall be the contractor's responsibility and shall be paid by the contractor.
- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued owner occupancy throughout the building.
- F. Work areas are to be kept free of debris at all times and are to be left broom clean at the end of each working day.
- G. Adjacent areas are to be protected from dust and debris.
- H. Do not close or obstruct egress width to any building or site exit.
- I. Contractor shall obtain and pay for required permits from authorities.
- J. Conform to applicable code for the work described within the construction documents. Base bid amount shall include additional work required by the authorities having jurisdiction pertaining to the completion of this project.
- K. Contractors shall follow owner's safety requirements during construction.
- L. Conform to owner's safety procedures if hazardous or contaminated materials are discovered.

- M. The owner shall direct the contractor where to store salvaged items, equipment and materials removed from the work area.
- N. The owner shall direct the contractor where construction materials, furniture, and equipment to be installed shall be staged and stockpiled during construction.
- O. The work specified herein and indicated on drawings shall be completed, tested, and made ready for operation prior to turn over to the owner. Unless specifically indicated, materials and equipment shall be new and first-class quality.
- P. Follow owner's safety requirements during construction.
- Q. Obtain and pay for required permits from authorities.
- R. Refrigerant reclamation is required for the removal of equipment noted in the contract documents prior to disposal.

1.16 SYSTEMS

- A. The contractor shall be responsible to provide complete and operable systems, including operational properties to the extent necessary to link multiple components of a system together and to interface with other systems.

1.17 BASIS OF DESIGN EQUIPMENT

- A. Drawings equipment schedules. Add the following general note.
 - 1. Manufacturer and Model number of equipment included in schedule is the basis of design for project.
 - 2. Adjustment shall be made by the contractor for equipment other than the bases of design to comply the installed equipment manufacturer's requirements.
- B. Project Manual Add the following general note.
 - 1. Manufacturer and Model number of equipment included in specifications is the basis of design for project.
 - 2. Adjustment shall be made by the contractor for equipment other than the bases of design to comply the installed equipment manufacturer's requirements.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PEX TUBING

- 1. PEX Tubing shall not be allowed.

3.2 TESTING – PLUMBING CODE of NEW YORK STATE

A. CHAPTER P3 - GENERAL REGULATIONS

1. §P312.1.1 Required tests. The permit holder shall make the applicable tests prescribed in §P312.2 through §P312.9 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code enforcement official when the plumbing work is ready for tests. The equipment, material, power, and labor necessary for the inspection and test shall be furnished by the permit holder and the permit holder shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. All plumbing system piping shall be tested with either water or air. Plumbing system pipe shall be tested in accordance with the manufacturer's installation instructions. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests. The code enforcement official shall require the removal of any cleanouts, if necessary, to ascertain whether the pressure has reached all parts of the system.
2. §P312.1.1.1 Test gauges. Gauges used for testing shall be as follows:
 - a. Tests requiring a pressure of 10 pounds per square inch (psi) (69 kPa) or less shall utilize a testing gauge having increments of 0.10 psi (.69 kPa) or less.
 - b. Tests requiring a pressure of greater than 10 psi (69 kPa) but less than or equal to 100 psi (689.5 kPa) shall utilize a testing gauge having increments of 1 psi (6.9 kPa) or less.
 - c. Tests requiring a pressure of greater than 100 psi (689.5 kPa) shall utilize a testing gauge having increments of 2 psi (13.79 kPa) or less.
3. §P312.1.2 Required inspections and testing. The holder of the permit shall be responsible for the scheduling of the following inspections.
 - a. Underground inspection and testing shall be made after trenches or ditches are excavated and bedded, piping installed, and before any backfill is put in place.
 - b. Rough-in inspection and testing shall be made of completed portions of all sanitary, storm and water distribution piping, after the framing, fireblocking, firestopping, draftstopping and bracing for that portion is in place, and prior to the installation of wall or ceiling membranes.
 - c. Final inspection and testing shall be made after the building is complete, all plumbing fixtures are in place and properly connected, and the structure is ready for occupancy.
4. §P312.2 Drainage and vent water test. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for at least 15 minutes before the start of the test. The system shall then be tight at all points.
5. §P312.3 Drainage and vent air test. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

6. §P312.4 Drainage and vent final test. The final test of the completed drainage and vent system shall be visual and insufficient detail to determine compliance with the provisions of this code except that the plumbing shall be subjected to a smoke test where necessary for cause. Where the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be held for a test period of not less than 15 minutes.
7. §P312.5 Water supply system test. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for at least fifteen (15) minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with §P312.1. Water supply pipe shall be tested in accordance with the manufacturer's installation instructions.
8. §P312.6 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer, filling the building sewer with water, testing with not less than a 10-foot (3048 mm) head of water and maintaining such pressure for 15 minutes.

3.3 ACCESS DOORS – FINISHED SURFACES

- A. Coordinate with other trades to provide wall, ceiling or floor access doors at locations where equipment, data and cable raceways, j-boxes, and other components needing access that are located within concealed spaces. Typical for walls, floor and ceilings.
- B. Coordinate with other trades to provide wall, ceiling or floor access doors where equipment and raceways are not exposed. Doors shall be flushed mounted with key lock, with full piano hinge sized to adequately access components and raceways.
- C. Provide wall, ceiling, or floor access doors at locations where equipment, valves, j-boxes, controls, fire dampers, control dampers, and other components needing access that are located within concealed spaces that require access per code or maintenance. Typical for walls, floor, and ceilings.
- D. Provide wall, ceiling, or floor access doors where valves and fittings are not exposed.
- E. Access doors shall be flushed mounted with key lock to Owners keying system, with full piano hinge sized to adequately access components and not smaller than 18"x18" Wall 24"x24" Ceiling.
- F. Access doors for high-risk areas shall be as per Division 8 high security access doors.
- G. All access doors shall have tamper proof fasteners.
- H. Doors shall be polished stainless steel finished unless noted otherwise
- I. Access doors shall be rated for the assembly they are to be installed in.
- J. Refer to Division 8 specifications for additional information.

3.4 ADA WALL MOUNTING HEIGHT

- A. Wall mounted components that require adjustment or manual operation shall be mounted so the top of the unit is 40” above the finish floor or below.
- B. Wall mounted sensors that do not require adjustment or manual operations shall be mounted so the top of the unit is 54” above the finish floor or below.

3.5 INSPECTIONS

- A. The Contractor shall have:
- B. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.

3.6 OWNER TRAINING

- A. Conduct training sessions to familiarize facility staff with the features, operation, and maintenance of the new system.
- B. Training shall be a minimum of two 8-hour sessions.
- C. Repeat training session quarterly for the duration of the Warranty Period.

END OF SECTION 220501

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ball valves.
2. Butterfly valves.
3. Check valves.
4. Gate valves.
5. Chainwheels.

1.2 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene-diene terpolymer.
- C. FKM: Fluoroelastomer.
- D. NBR: Nitrile butadiene rubber (also known as Buna-N).
- E. NRS: Nonrising stem.
- F. OS&Y: Outside screw and yoke.
- G. PTFE: Polytetrafluoroethylene.
- H. RPTFE: Reinforced polytetrafluoroethylene.
- I. RS: Rising stem.

1.3 ACTION SUBMITTALS

- A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Standards:

1. Domestic-water piping valves intended to convey or dispense water for human consumption must comply with the U.S. Safe Drinking Water Act (SDWA), requirements of authorities having jurisdiction, and NSF 61/NSF 372; or to be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded-end valves.
2. ASME B16.1 for flanges on iron valves.
3. ASME B16.5 for flanges on steel valves.
4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
5. ASME B16.18 for cast-copper solder-joint connections.
6. ASME B16.22 for wrought-copper solder-joint connections.
7. ASME B16.34 for flanged- and threaded-end connections.
8. ASME B16.51 for press joint connections.
9. ASME B31.9 for building services piping valves.

C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.

D. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are unacceptable.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Bypass and Drain Connections: MSS SP-45.

H. Valve Actuator Type:

1. Gear Actuator: For quarter-turn ball valves NPS 4 and larger.
2. Hand Lever: For quarter-turn ball valves smaller than NPS 4.

I. Valves in Insulated Piping:

1. Provide 2-inch extended neck stems.
2. Provide extended operating handles with nonthermal-conductive covering material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Provide memory stops that are fully adjustable after insulation is applied.

2.2 BALL VALVES, LEAD FREE

A. Ball Valves, Lead Free, Threaded or Soldered Ends - Brass, Two Piece with Full Port and Brass Trim:

1. Standards: MSS SP-110 and MSS SP-145.

2. CWP Rating: 600 psig.
3. Body Design: Two piece.
4. Body Material: Forged brass.
5. Ends: Threaded or soldered. See Part 3 ball valve schedule articles.
6. Seats: PTFE.
7. Stem: Brass.
8. Ball: Chrome-plated brass.
9. Port: Full.

2.3 BALL VALVES, GENERAL PURPOSE

A. Ball Valves, Threaded or Soldered Ends - Brass, Two Piece with Full Port and Brass Trim:

1. Standard: MSS SP-110.
2. SWP Rating: 150 psig.
3. CWP Rating: 600 psig.
4. Body Design: Two piece.
5. Body Material: Forged brass.
6. Ends: Threaded or soldered. See Part 3 ball valve schedule articles.
7. Seats: PTFE.
8. Stem: Brass.
9. Ball: Chrome-plated brass.
10. Port: Full.
11. Port: Full.

2.4 BUTTERFLY VALVES, LEAD FREE

A. Butterfly Valves, Lead Free, Single Flange (Lug Type) - Iron, with Aluminum-Bronze Disc:

1. Standard: MSS SP-67, Type I.
2. CWP Rating: 150 psig, or 200 psig. See Part 3 butterfly valve schedule articles.
3. Body Design: Single flange (lug type), suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
4. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
5. Seat: EPDM or NBR. See Part 3 butterfly valve schedule articles.
6. Stem: One- or two-piece stainless steel.
7. Disc: Aluminum bronze.

2.5 CHECK VALVES, LEAD FREE

A. Check Valves, Lead Free, Swing Type, Threaded or Soldered Ends - Bronze, with Bronze Disc, Class 125:

1. Standard: MSS SP-80, Type 3.
2. CWP Rating: 200 psig.
3. Body Design: Horizontal flow.
4. Body Material: ASTM B62, bronze.
5. Ends: Threaded or soldered. See Part 3 check valve schedule articles.

6. Disc: Bronze.
- B. Check Valves, Lead Free, Swing Type, Threaded or Soldered Ends - Bronze, with Bronze Disc, Class 150:
1. Standard: MSS SP-80, Type 3.
 2. CWP Rating: 300 psig.
 3. Body Design: Horizontal flow.
 4. Body Material: ASTM B62, bronze.
 5. Ends: Threaded or soldered. See Part 3 check valve schedule articles.
 6. Disc: Bronze.

PART 3 - EXECUTION

3.1 INSTALLATION OF VALVES

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Provide support of piping adjacent to valves such that no force is imposed upon valves.
- C. Locate valves for easy access and where not blocked by equipment, other piping, or building components.
- D. For valves in horizontal piping, install valves with stem at or above center of pipe.
- E. Install valves in position that does not project into aisles or block access to other equipment.
- F. Install valves in position to allow full stem and actuator or manual operator movement.
- G. Verify that joints of each valve have been properly installed and sealed to assure there is no leakage or damage.
- H. Install check valves for proper direction of flow and as follows:
 1. Check Valves, Swing Type: In horizontal position with hinge pin level.
- I. Valve Tags: Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
- J. Adhere to manufacturer's written installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's written recommended maximum.

3.2 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.

3.3 DOMESTIC HOT- AND COLD-WATER BALL VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Ball valves, lead free, threaded or soldered ends - brass, two piece with full port and brass trim; threaded or soldered ends.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Ball valves, lead free, flanged or threaded ends - iron, Class 125; flanged or threaded ends.

3.4 DOMESTIC HOT- AND COLD-WATER BUTTERFLY VALVE SCHEDULE

A. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Butterfly valves, lead free, single flange (lug type) - iron, with aluminum-bronze disc; 200 CWP, EPDM seat.

3.5 DOMESTIC HOT- AND COLD-WATER CHECK VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Check valves, lead free, swing type, threaded or soldered ends - bronze, with bronze disc, Class 125; threaded or soldered ends.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Check valves, lead free, swing type, flanged or threaded ends - iron, with metal seats, Class 125; flanged or threaded ends.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal hanger-shield inserts.
4. Fastener systems.
5. Pipe-positioning systems.
6. Equipment supports.

B. Related Requirements:

1. Section 220500 "Common Work Results for Plumbing."
2. Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Pipe Welding Qualifications: Qualify procedures and operators according to "2015 ASME Boiler and Pressure Vessel Code, Section IX."

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.

2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 THERMAL HANGER-SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- C. For Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 1. Indoor Applications: Zinc-coated or stainless steel.
 2. Outdoor Applications: Stainless steel.

2.4 PIPE-POSITIONING SYSTEMS

- A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.5 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-carbon-steel shapes.

2.6 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- C. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

- D. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.
- J. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches long and 0.048 inch thick.
 - b. NPS 4 (DN 100): 12 inches long and 0.06 inch thick.

- c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
 6. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 INSTALLATION OF EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use stainless steel pipe hangers and corrosion-resistant attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and copper or stainless steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal hanger-shield inserts for insulated piping and tubing.
- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 - 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 - 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.

12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 15. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction occurs.
 16. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction occurs.
 17. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction occurs but vertical adjustment is unnecessary.
 18. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction occurs and vertical adjustment is unnecessary.
 19. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation, in addition to expansion and contraction, is required.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.

6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include

auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

- a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- P. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- R. Use pipe-positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 220548.13 - VIBRATION CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Housed-spring isolators.
 - 2. Spring hangers.
 - 3. Snubbers.
 - 4. Post-installed concrete anchors.
 - 5. Concrete inserts.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
 - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 HOUSED-SPRING ISOLATORS

- A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing.

1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
5. Minimum deflection as indicated on Drawings.
6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.
 - a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psi.

2.2 PIPE-RISER RESILIENT SUPPORT

- A. All-Directional, Acoustical Pipe Anchor Consisting of Two Steel Tubes Separated by a Minimum 1/2-inch-Thick Neoprene.
 1. Vertical-Limit Stops: Steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions.
 2. Maximum Load Per Support: 500 psi on isolation material providing equal isolation in all directions.
 3. Minimum deflection as indicated on Drawings.

2.3 RESILIENT PIPE GUIDES

- A. Telescopic Arrangement of Two Steel Tubes or Post and Sleeve Arrangement Separated by a Minimum 1/2-inch-Thick Neoprene.
 1. Factory-Set Height Guide with Shear Pin: Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.4 SPRING HANGERS

- A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression.
 1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 5. Minimum deflection as indicated on Drawings.

6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

2.5 SNUBBERS

- A. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
 1. Post-Installed Concrete Anchor Bolts: Secure to concrete surface with post-installed concrete anchors. Anchors to be prequalified in accordance with ACI 355.2 testing and designated in accordance with ACI 318-08 Appendix D for 2009 IBC
 2. Preset Concrete Inserts: Prequalified in accordance with ICC-ES AC446 testing.
 3. Anchors in Masonry: Design in accordance with TMS 402.
 4. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
 5. Resilient Cushion: Maximum 1/4-inch air gap, and minimum 1/4 inch thick.

2.6 POST-INSTALLED CONCRETE ANCHORS

- A. Mechanical Anchor Bolts:
 1. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.
- B. Adhesive Anchor Bolts:
 1. Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.

2.7 CONCRETE INSERTS

- A. Provide preset concrete inserts that are prequalified in accordance with ICC-ES AC466 testing.
- B. Comply with ANSI/MSS SP-58.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Hanger-Rod Stiffeners: Install where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to wind load forces.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength is adequate to carry static forces within specified loading limits.

3.2 INSTALLATION OF VIBRATION-CONTROL DEVICES

- A. Provide vibration-control devices for systems and equipment where indicated in Equipment Schedules or Vibration-Control Device Schedules, where indicated on Drawings, or where the Specifications indicate they are to be installed on specific equipment and systems.
- B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
- C. Installation of vibration isolators must not cause any stresses, misalignment or change of position of equipment or piping.
- D. Comply with requirements in Section 077200 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
- E. Equipment Restraints:
 - 1. Install snubbers on plumbing equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
 - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
- F. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
 - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
 - 3. Brace a change of direction longer than 12 feet.
- G. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

J. Post-Installed Concrete Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify Project structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.3 ACCOMMODATION OF DIFFERENTIAL MOTION

- A. Provide flexible connections in piping systems where they cross structural joints and other point where differential movement may occur. Provide adequate flexibility to accommodate differential movement as determined in accordance with ASCE/SEI 7. Comply with requirements in Section 221116 "Domestic Water Piping" and Section 221119 "Domestic Water Piping Specialties" for piping flexible connections.

3.4 ADJUSTING

- A. Adjust isolators after system is at operating weight.
- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION 220548.13

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
 2. Warning signs and labels.
 3. Pipe labels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
1. Material and Thickness: Brass, 0.032-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
 2. Letter and Background Color: As indicated for specific application under Part 3.
 3. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 4. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 5. Fasteners: Stainless steel rivets or self-tapping screws.
 6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
 2. Letter and Background Color: As indicated for specific application under Part 3.
 3. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.

4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 6. Fasteners: Stainless steel rivets or self-tapping screws.
 7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
- B. Letter and Background Color: As indicated for specific application under Part 3.
- C. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
- D. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- E. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- F. Fasteners: Stainless steel rivets or self-tapping screws.
- G. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- H. Arc-Flash Warning Signs: Provide arc-flash warning signs in locations and with content in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.
- I. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- B. Letter and Background Color: As indicated for specific application under Part 3.
- C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

- D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- E. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:
 - 1. Pipe size.
 - 2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
 - 3. Lettering Size: Size letters in accordance with ASME A13.1 for piping At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS

- A. Permanently fasten labels on each item of plumbing equipment.
- B. Sign and Label Colors.
 - 1. White letters on an ANSI Z535.1 safety-green background.
- C. Locate equipment labels where accessible and visible.
- D. Arc-Flash Warning Signs: Provide arc-flash warning signs on electrical disconnects and other equipment where are-flash hazard exists, as indicated on Drawings, and in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.

3.4 INSTALLATION OF PIPE LABELS

- A. Piping Color Coding: Painting of piping is specified in Section 099123 "Interior Painting."
- B. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- C. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Within 3 ft. of each valve and control device.
 - 2. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 3. Within 3 ft. of equipment items and other points of origination and termination.
 - 4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.
- D. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.
- E. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- F. Pipe-Label Color Schedule:
 - 1. Domestic Cold-Water Piping: White letters on an ANSI Z535.1 safety-green background.
 - 2. Domestic Hot-Water Piping: White letters on an ANSI Z535.1 safety-green background.
 - 3. Domestic Hot-Water Return Piping White letters on an ANSI Z535.1 safety-green background.
 - 4. Sanitary Waste and Storm Drainage Piping: White letters on a black background.

END OF SECTION 220553

SECTION 220593 - TESTING, ADJUSTING, AND BALANCING FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. TAB of domestic water system.
2. TAB of plumbing equipment:
 - a. Domestic hot-water in-line circulation pumps.
3. Pipe-leakage test verification.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 60 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 60 days of Contractor's Notice to Proceed, submit the Contract Documents review report, as specified in Part 3.
- C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures, as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 60 days of Contractor's Notice to Proceed, submit system readiness checklists, as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.

- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.4 QUALITY ASSURANCE

- A. TAB Specialists Qualifications, Certified by NEBB or TABB:
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
 - 2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. Code and Authorities Having Jurisdiction Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

1.5 FIELD CONDITIONS

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, and balancing valves and fittings. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine approved submittals for plumbing systems and equipment.

- D. Examine design data, including plumbing system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about plumbing system and equipment controls.
- E. Examine equipment performance data, including pump curves.
 - 1. Relate performance data to Project conditions and requirements, including pump system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate pump system-effect factors to reduce performance ratings of plumbing equipment when installed under conditions different from the conditions used to rate equipment performance. Compare results with the design data and installed conditions.
- F. Examine system and equipment installations, and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine plumbing equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- I. Examine temporary and permanent strainers. Verify that temporary strainer screens used during system cleaning and flushing have been removed and permanent strainers are installed and clean.
- J. Examine control valves for proper installation for their intended function of isolating, throttling, diverting, or mixing fluid flows.
- K. Examine system pumps to ensure absence of entrained air in the suction piping.
- L. Examine operating safety interlocks and controls on plumbing equipment.
- M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of plumbing systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Domestic Water System:

- a. Verify leakage and pressure tests on water distribution systems have been satisfactorily completed in accordance with applicable code and authority having jurisdiction.
 - b. Water heaters are installed and functioning.
 - c. Piping is complete and all points of outlet are installed.
 - d. Water treatment is complete.
 - e. Systems are flushed, filled, and air purged.
 - f. Strainers are clean.
 - g. Control valves are functioning in accordance with the sequence of operation.
 - h. Shutoff and balance valves are 100 percent open.
 - i. hot-water circulating pumps are operational and proper rotation is verified.
 - j. Pump gauge connections are installed directly at pump inlet and outlet flanges or in discharge and suction pipe prior to valves or strainers.
 - k. Variable-frequency controllers' startup is complete and safeties are verified.
 - l. Suitable access to balancing devices and equipment is provided.
2. Sanitary Sewage/Drainage System:
- a. Leakage and pressure tests on sanitary sewage/drainage systems have been completed in accordance with applicable code and authority having jurisdiction requirements.
 - b. Piping is complete.
 - c. Shutoff valves are 100 percent open.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system in accordance with the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.
- B. Cut insulation, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.
 1. Where holes for probes are required in piping or equipment, install pressure and temperature test plugs to seal systems.
 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish in accordance with Section 220716 "Plumbing Equipment Insulation" and Section 220719 "Plumbing Piping Insulation."
- C. Mark equipment and balancing devices, including valve position indicators and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR PLUMBING EQUIPMENT

- A. Test, adjust, and balance plumbing equipment indicated on Drawings, including, but not limited to, the following:

1. Domestic water in-line pumps.
2. Domestic water heaters.

3.5 PROCEDURES FOR DOMESTIC WATER SYSTEMS

- A. Prepare test reports for pumps and other equipment. Obtain approved submittals and manufacturer-recommended testing procedures. Crosscheck the summation of required equipment flow rates with system design flow rates.
- B. Prepare schematic diagrams of systems' Record drawings piping layouts.
- C. In addition to requirements in "Preparation" Article, prepare domestic water systems for testing and balancing as follows:
 1. Check expansion tank for proper setting.
 2. Check water heater for proper discharge temperature setting.
 3. Check remotest point of outlet for adequate pressure.
 4. Check flow-control valves for proper position.
 5. Locate start-stop and disconnect switches, electrical interlocks, and motor controllers.
 6. Verify that motor controllers are equipped with properly sized thermal protection.
 7. Check that air has been purged from the system.
- D. Measure and record upstream and downstream pressure of each piece of equipment.
- E. Measure and record upstream and downstream pressure of pressure-reducing valves.
- F. Check settings and operation of automatic temperature-control valves, self-contained control valves, and pressure-reducing valves. Record final settings.
- G. Check settings and operation of each safety valve. Record settings.

3.6 PROCEDURES FOR DOMESTIC HOT-WATER CIRCULATING INLINE PUMP

- A. Balance system with manual or automatic balancing valves by setting at design flow.
 1. Measure flow in main and branch pipes.
 2. Adjust main and branch balance valves for design flow.
 3. Re-measure each main and branch after all have been adjusted.
- B. Adjust pump to deliver total design flow.
 1. Measure pump TDH as follows:
 - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - c. Convert pressure to head and correct for differences in gauge heights.

- d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow, and verify that the pump has the intended impeller size.
2. Monitor motor performance during procedures, and do not operate motor in an overloaded condition.
3. Mark final settings and verify that all memory stops have been set.
4. Verify final system conditions as follows:
 - a. Re-measure and confirm that total flow is within design.
 - b. Re-measure final pumps' operating data, TDH, volts, amps, speed, and static profile.
 - c. Mark final settings.

3.7 PROCEDURES FOR WATER HEATERS

A. Electric Water Heaters:

1. Measure and record entering- and leaving-water temperatures.
2. Measure and record water flow.
3. Measure and record pressure drop.
4. Record relief valve(s) pressure setting.
5. Capacity: Calculate in Btu/h of heating output.
6. Efficiency: Calculate operating efficiency for comparison to submitted equipment.

3.8 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record flows, temperatures, and pressures of each piece of equipment. Compare the values to design or nameplate information, where information is available.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the condition of filters.
4. Check bearings and other lubricated parts for proper lubrication.
5. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. TAB After Construction: Before performing testing and balancing of renovated existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished in accordance with renovation scope indicated by Contract Documents. Verify the following:

1. New filters are installed.
2. Bearings and other parts are properly lubricated.
3. Deficiencies noted in the preconstruction report are corrected.

3.9 TOLERANCES

- A. Set plumbing system's flow rates within the following tolerances:
 - 1. Domestic Water Flow Rate: Plus or minus 10 percent. If design value is less than 10 gpm, within 10 percent.

3.10 PROGRESS REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for system-balancing devices. Recommend changes and additions to system-balancing devices, to facilitate proper performance measuring and balancing. Recommend changes and additions to plumbing systems and general construction to allow access for performance-measuring and -balancing devices.
- B. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
 - 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Pump curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB specialist.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.

9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents, including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Notes to explain why certain final data in the body of reports vary from indicated values.
 14. Test conditions for pump performance forms, including the following:
 - a. Variable-frequency controller settings for variable-flow hydronic systems.
 - b. Settings for pressure controller(s).
 - c. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of distribution systems. Present each system with single-line diagram and include the following:
1. Flow rates.
 2. Pipe and valve sizes and locations.
 3. Balancing stations.
 4. Position of balancing devices.
- E. Electric Water Heater Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Model number and unit size.
 - d. Manufacturer's serial number.
 - e. Output capacity in Btu/h.
 - f. Number of stages.
 - g. Connected volts, phase, and hertz.
 - h. Rated amperage.
 2. Test Data (Indicated and Actual Values):
 - a. Heat output in Btu/h.
 - b. Entering-water temperature in deg F.
 - c. Leaving-water temperature in deg F.
 - d. High-temperature-limit setting in deg F.
 - e. Operating set point in deg F.
 - f. Voltage at each connection.
 - g. Amperage for each phase.

- F. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves, and include the following:

1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Service.
 - d. Make and size.
 - e. Model number and serial number.
 - f. Water flow rate in gpm.
 - g. Water-pressure differential in feet of head or psig.
 - h. Required net positive suction head in feet of head or psig.
 - i. Pump speed.
 - j. Motor make and frame size.
 - k. Motor horsepower and rpm.
 - l. Voltage at each connection.
 - m. Amperage for each phase.
 - n. Full-load amperage and service factor.
 - o. Seal type.

- G. Instrument Calibration Reports:

1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.12 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

END OF SECTION 220593

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Domestic recirculating hot-water piping.
 - 4. Sanitary waste piping exposed to freezing conditions.
 - 5. Storm-water piping exposed to freezing conditions.
 - 6. Roof drains and rainwater leaders.
 - 7. Supplies and drains for handicap-accessible lavatories and sinks.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at pipe expansion joints for each type of insulation.
 - 3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 4. Detail removable insulation at piping specialties, equipment connections, and access panels.
 - 5. Detail application of field-applied jackets.
- C. Samples: For each type of insulation and jacket indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material test reports.
- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.
 1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Comply with ASTM C552.
 - 1. Preformed Pipe Insulation: Type II, Class 1, unfaced.
 - 2. Fabricated shapes in accordance with ASTM C450, ASTM C585, and ASTM C1639.
 - 3. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Flexible Elastomeric: Closed-cell or expanded-rubber materials; suitable for maximum use temperature between minus 70 deg F and 220 deg F. Comply with ASTM C534/C534M, Type I for tubular materials.
- H. Glass-Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to 850 deg F in accordance with ASTM C411. Comply with ASTM C547.
 - 1. Preformed Pipe Insulation: Type I, Grade A, unfaced with factory-applied ASJ.
 - 2. Fabricated shapes in accordance with ASTM C450 and ASTM C585.
 - 3. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
- C. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
 - 1. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less as tested in accordance with ASTM E84.
 - 2. Wet Flash Point: Below 0 deg F.
 - 3. Service Temperature Range: 40 to 200 deg F.
 - 4. Color: Black.
- D. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- E. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.
- F. PVC Jacket Adhesive: Compatible with PVC jacket.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.

2. Service Temperature Range: 0 to plus 180 deg F.
3. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
2. Service Temperature Range: 0 to plus 180 deg F.
3. Color: White.

2.5 SEALANTS

A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.

B. Joint Sealants:

1. Permanently flexible, elastomeric sealant.
2. Service Temperature Range: Minus 58 to plus 176 deg F.
3. Color: White or gray.

C. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Fire- and water-resistant, flexible, elastomeric sealant.
2. Service Temperature Range: Minus 40 to plus 250 deg F.
3. Color: White.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.
4. ASJ+: Aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film leaving no paper exposed; complying with ASTM C1136, Types I, II, III, IV, and VII.
5. PSK Jacket: Aluminum foil fiberglass reinforced scrim with polyethylene backing, complying with ASTM C1136, Type II.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.

- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Adhesive: As recommended by jacket material manufacturer.
 - 2. Color: White.
 - 3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- D. Self-Adhesive Indoor/Outdoor Jacket (Non-Asphaltic): Vapor barrier and waterproofing jacket for installation over insulation located aboveground outdoors or indoors. Specialized jacket has five layers of laminated aluminum and polyester film with low-temperature acrylic pressure-sensitive adhesive. Outer aluminum surface is coated with UV-resistant coating for protection from environmental contaminants.
 - 1. Permeance: 0.00 perm as tested in accordance with ASTM F1249.
 - 2. Flamespread/Smoke Developed: 25/50 as tested in accordance with ASTM E84.
 - 3. Aluminum Finish: Embossed.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Mesh: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.
- B. Woven Polyester Mesh: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 11.5 mils.
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch in width.
 - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 6.5 mils.

3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Width: 2 inches.
2. Thickness: 6 mils.
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal.
2. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

C. Wire: 0.062-inch soft-annealed, stainless steel.

2.11 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures:

1. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.
- D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the contract documents.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation,

- install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered or routed fittings made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter,

whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.5 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as that of pipe insulation. Where voids are difficult to fill with block insulation, fill the voids with a fibrous insulation material suitable for the specific operating temperature.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered or routed sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install sections of pipe insulation and miter if required in accordance with manufacturer's written instructions.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated valve covers manufactured of same material as that of pipe insulation when available.
2. When prefabricated valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with glass-fiber or mineral-wool blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 INSTALLATION OF FIELD-APPLIED JACKETS

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

- B. Where FSK jackets are indicated, install as follows:
1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.9 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
- C. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two number locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective if they do not pass tests and inspections.

- E. Prepare test and inspection reports.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Underground piping.
 - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 - 1. NPS 1 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
 - 2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:
 - 1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - 2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- C. Stormwater and Overflow:
 - 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- D. Roof Drain and Overflow Drain Bodies:
 - 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- E. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
 - 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
- F. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. None.
- D. Piping, Exposed:
 - 1. PVC: 30 mils.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings - domestic water.
2. Ductile-iron pipe and fittings - domestic water.
3. Piping joining materials - domestic water.
4. Transition fittings - domestic water.
5. Dielectric fittings - domestic water.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Piping layout, or BIM model, drawn to scale, showing the items described in this Section, and coordinated with all building trades.
- B. System purging and disinfecting activities report.
- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installers of pressure-sealed joints are to be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Domestic water piping, tubing, fittings, joints, and appurtenances intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act, with requirements of authorities having jurisdiction, and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PIPING MATERIALS

- A. Potable-water piping and components are to comply with NSF 14, NSF 61, and NSF 372.

2.3 COPPER TUBE AND FITTINGS - DOMESTIC WATER

- A. Drawn-Temper Copper Tube: ASTM B88, Type K and ASTM B88, Type L.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Do not use solder joints on pipe sizes greater than NPS 4.
- E. Cast Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends. Do not use solder joints on pipe sizes greater than NPS 4.
- F. Wrought Copper Unions: ASME B16.22. Do not use solder joints on pipe sizes greater than NPS 4.
- G. Pressure-Seal-Joint Fittings, Copper or Bronze - Domestic Water:
 - 1. Housing: Copper.
 - 2. O-Rings and Pipe Stops: EPDM.
 - 3. Tools: Manufacturer's special tools.
 - 4. Minimum 200 psig working-pressure rating at 250 deg F.

2.4 DUCTILE-IRON PIPE AND FITTINGS - DOMESTIC WATER

- A. Mechanical-Joint, Ductile-Iron Pipe:
 - 1. AWWA C151/A21.51, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Standard-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C110/A21.10, ductile or gray iron.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- C. Compact-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C153/A21.53, ductile iron.

2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

D. Plain-End, Ductile-Iron Pipe: AWWA C151/A21.51.

2.5 PIPING JOINING MATERIALS - DOMESTIC WATER

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B32, lead-free alloys.

D. Flux: ASTM B813, water flushable.

E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

F. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.6 TRANSITION FITTINGS - DOMESTIC WATER

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.7 DIELECTRIC FITTINGS - DOMESTIC WATER

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions - Domestic Water:

1. Standard: ASSE 1079.
2. Pressure Rating: 150 psig at 180 deg F.
3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges - Domestic Water:

1. Standard: ASSE 1079.
2. Factory-fabricated, bolted, companion-flange assembly.
3. Pressure Rating: 150 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits - Domestic Water:

1. Nonconducting materials for field assembly of companion flanges.
2. Pressure Rating: 150 psig.
3. Gasket: Phenolic, Temperature Rating: 225 deg F.
4. Bolt Sleeves: Phenolic or polyethylene.
5. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples - Domestic Water:

1. Standard: IAPMO PS 66.
2. Electroplated steel nipple complying with ASTM F1545.
3. Pressure Rating and Temperature: 300 psig at 225 deg F.
4. End Connections: Male threaded or grooved.
5. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller is to be the following:
 1. Annealed-temper copper tube, ASTM B88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
- E. Under-building-slab, domestic water, building-service piping, NPS 4 to NPS 8 and larger is to be the following:
 1. Annealed-temper copper tube, ASTM B88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
 2. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
- F. Aboveground domestic water piping, NPS 2 and smaller is to be the following:

1. Drawn-temper copper tube, ASTM B88, Type; cast- or wrought- copper, solder-joint fittings; and soldered joints.
 2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
- G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 is to be the following:
1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought- copper, solder-joint fittings; and brazed joints.
 2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Galvanized-steel pipe and nipples; galvanized, gray-iron threaded fittings; and threaded joints.

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab in accordance with CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints in accordance with AWWA C600 and AWWA M41.
- D. Install underground copper tube and ductile-iron pipe in PE encasement in accordance with ASTM A674 or AWWA C105/A21.5.
- E. Install valves in accordance with Section 220523 "General-Duty Valves for Plumbing Piping."
- F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- G. Install domestic water piping level without pitch and plumb.
- H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- K. Install piping to permit valve servicing.

- L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- P. Install pressure gauges on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gauges in Section 220500 "Common Work Results for Plumbing."
- Q. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123.21 "Inline, Domestic Water Pumps."
- R. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 220500 "Common Work Results for Plumbing."
- S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

- E. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings in accordance with ASTM B828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.
- G. Extruded-Tee Connections: Form tee in copper tube in accordance with ASTM F2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- H. Joint Construction for Grooved-End Copper Tubing: Make joints in accordance with AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.
- I. Joint Construction for Grooved-End, Ductile-Iron Piping: Make joints in accordance with AWWA C606. Cut round-bottom grooves in ends of pipe at gasket-seat dimension required for specified (flexible or rigid) joint. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.
- J. Joint Construction for Grooved-End Steel Piping: Make joints in accordance with AWWA C606. Square cut groove ends of pipe as specified. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.
- K. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts in accordance with ASME B31.9.
- L. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 INSTALLATION OF TRANSITION FITTINGS

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

3.5 INSTALLATION OF DIELECTRIC FITTINGS

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
- D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices specified in Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- C. Install hangers for copper and ductile iron piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting.
- E. Support vertical runs of copper and ductile iron pipe to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 PIPING CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
 - 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system in accordance with either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after installation and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
- e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vacuum breakers.
2. Backflow preventers.
3. Temperature-actuated, water mixing valves.
4. Strainers for domestic water piping.
5. Hose bibbs.
6. Drain valves.
7. Water-hammer arresters.

B. Related Requirements:

1. Section 220500 "Common Work Results for Plumbing."
2. Section 224700 "Drinking Fountains and Water Coolers."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.

1. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Test and inspection reports.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Standard: ASSE 1001.
2. Size: NPS 1/4 to NPS 3, as required to match connected piping.
3. Body: Bronze.
4. Inlet and Outlet Connections: Threaded.
5. Finish: Rough bronze.

- B. Hose-Connection Vacuum Breakers:

1. Standard: ASSE 1011.
2. Body: Bronze, nonremovable, with manual drain.
3. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
4. Finish: Rough bronze.

2.4 BACKFLOW PREVENTERS (RPZ-1)

- A. Reduced-Pressure-Principle Backflow Preventers:

1. Watts LF909-FS-3
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 12 psig maximum, through middle third of flow range.
5. Size: 3 NPS.
6. Design Flow Rate: 110 gpm.
7. Selected Unit Flow Range Limits: 0-400 gpm.
8. Pressure Loss at Design Flow Rate: 8-17.5 for NPS 3.
9. Body: Cast copper silicon alloy for NPS 3.
10. End Connections: Flanged for NPS 3.
11. Configuration: Designed for horizontal, straight-through flow.

12. Accessories:

- a. Valves NPS 3: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
- b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

2.5 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Primary, Thermostatic, Water Mixing Valves (MV-1):

1. Lawler 802 or equal.
2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig minimum unless otherwise indicated.
4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 120 deg F.
9. Tempered-Water Design Flow Rate: 22 gpm.
10. Selected Valve Flow Rate at 45-psig (310-kPa) Pressure Drop: 60 gpm.
11. Pressure Drop at Design Flow Rate: 3 psig.
12. Valve Finish: Rough bronze.
13. Piping Finish: Copper.

2.6 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller.
3. End Connections: Threaded for NPS 2 and smaller.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.020 inch.
6. Drain: Hose-end drain valve.

2.7 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.

6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.8 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Watts SG-Series or equal.
2. Standard: PDI-WH 201.
3. Type: 0 Piston.
4. Size: Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

- A. Backflow Preventers: Install in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
1. Locate backflow preventers in same room as connected equipment or system.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 3. Do not install bypass piping around backflow preventers.
- B. Water Regulators: Install with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gauges on inlet and outlet.
- C. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.
- D. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.
1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- E. Y-Pattern Strainers: For water, install on supply side of each water pressure-reducing valve and pump.
- F. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

3.2 PIPING CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

3.4 IDENTIFICATION

- A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Vacuum breakers.
 - 2. Backflow preventers.
 - 3. Water pressure-reducing valves.
 - 4. Balancing valves.
 - 5. Temperature-actuated, water mixing valves.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.
- D. Adjust each pressure vacuum breaker, reduced-pressure-principle backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Test each pressure vacuum breaker, reduced-pressure-principle backflow preventer, according to authorities having jurisdiction and the device's reference standard.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 221119

SECTION 221123.21 – INLINE, DOMESTIC-WATER PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. In-line, sealless centrifugal pumps.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Detail pumps and adjacent equipment, drawn to scale and coordinated with each other, using input from installers of the items involved.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. UL Compliance: UL 778 for motor-operated water pumps.
- C. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

2.2 IN-LINE, SEALLESS CENTRIFUGAL PUMPS (DP-1)

- A. Armstrong Astro 2 or equal
- B. Description: Factory-assembled and -tested, in-line, close-coupled, canned-motor, sealless, overhung-impeller centrifugal pumps.

C. Capacities and Characteristics:

1. Capacity: 5 gpm.
2. Total Dynamic Head: 15 feet.
3. Inlet and Outlet Size: 1-1/4 NPS.
4. Pump Speed: 2800 rpm.
5. Pump Control: Thermostat.
6. Motor Horsepower: 200 Watts.
7. Electrical Characteristics:
 - a. Volts: 120 V.
 - b. Phase: Single phase.
 - c. Hertz: 60 Hz.
 - d. Full-Load Amperes: 1.72 A.

D. Pump Construction:

1. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge type with motor and impeller on common shaft and designed for installation with pump and motor shaft horizontal.
2. Minimum Working Pressure: 150 psig.
3. Maximum Continuous Operating Temperature: 230 deg F.
4. Casing: Cast iron, with threaded or companion-flange connections.
5. Impeller: Noryl.
6. Motor: Three speed.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220500 "Common Work Results for Plumbing."
 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.4 CONTROLS

- A. Thermostats: Electric; adjustable for control of hot-water circulation pump.
 1. Type: Water-immersion temperature sensor, for installation in piping.
 2. Range: 65 to 200 deg F.
 3. Enclosure: NEMA 250, Type 4X.
 4. Operation of Pump: On or off.
 5. Transformer: Provide if required.
 6. Power Requirement: 120 V ac.
 7. Settings: Start pump at 110 deg F and stop pump at 120 deg F.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with HI 1.4.
- B. Mount pumps in orientation complying with manufacturer's written instructions.
- C. Install continuous-thread hanger rods and vibration isolation of size required to support pump weight.
 - 1. Comply with requirements for vibration isolation devices specified in Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment." Fabricate brackets or supports as required.
 - 2. Comply with requirements for hangers and supports specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- D. Install thermostats in hot-water return piping.
- E. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment" for identification of pumps.
- F. Engage a factory-authorized service representative to perform Perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Check piping connections for tightness.
 - 3. Clean strainers on suction piping.
 - 4. Set thermostats for automatic starting and stopping operation of pumps.
 - 5. Perform the following startup checks for each pump before starting:
 - a. Verify bearing lubrication.
 - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
 - c. Verify that pump is rotating in the correct direction.
 - 6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
 - 7. Start motor.
 - 8. Open discharge valve slowly.
 - 9. Adjust temperature settings on thermostats.
 - 10. Adjust timer settings.

3.2 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

- B. Where installing piping adjacent to inline, domestic-water pumps, allow space for service and maintenance.
- C. Connect domestic-water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.
 - 1. Install flexible connectors adjacent to pumps in suction and discharge piping of the following pumps:
 - a. Horizontally mounted, in-line, close-coupled centrifugal pumps.
 - b. Comply with requirements for flexible connectors specified in Section 221116 "Domestic Water Piping."
- D. Install shutoff valve and strainer on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for strainers specified in Section 221119 "Domestic Water Piping Specialties." Comply with requirements for valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."
 - 1. Install pressure gauge and snubber at suction of each pump and pressure gauge and snubber at discharge of each pump. Install at integral pressure-gauge tappings where provided or install pressure-gauge connectors in suction and discharge piping around pumps. Comply with requirements for pressure gauges and snubbers specified in Section 220500 "Common Work Results for Plumbing."

3.3 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring between temperature controllers and devices.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency:
 - 1. Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
- C. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Inline, domestic-water pump will be considered defective if it does not pass tests and inspections.

- E. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust inline, domestic-water pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust initial temperature set points.
- C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION 221123.21

SECTION 221316 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. PVC pipe and fittings.
4. Specialty pipe fittings.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and elevations, or Building Information Model (BIM) drawn to scale, showing items described in this Section and coordinated with all building trades.
- B. Field quality-control reports.

1.4 WARRANTY

- A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:
 1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 PIPING MATERIALS

- A. Piping materials to bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark.
 - 2. ASTM A74, service and extra-heavy cast iron.
- B. Gaskets: ASTM C564, rubber.
- C. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark.
 - 2. ASTM A888 or CISPI 301.
- B. CISPI, Hubless-Piping Couplings:
 - 1. Standards: ASTM C1277 and CISPI 310.
 - 2. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.
- C. Heavy-Duty, Hubless-Piping Couplings:
 - 1. Standards: ASTM C1277 and ASTM C1540.
 - 2. Description: Stainless steel shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

2.5 PVC PIPE AND FITTINGS

- A. Comply with NSF 14 for plastic piping components. Include "NSF-dwv" marking for plastic drain, waste, and vent piping and "NSF-sewer" marking for plastic sewer piping.
- B. Solid-Wall PVC Pipe: ASTM D2665 drain, waste, and vent.
- C. Cellular-Core PVC Pipe: ASTM F891, Schedule 40.
- D. PVC Socket Fittings: ASTM D2665, made in accordance with ASTM D3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- E. Adhesive Primer: ASTM F656.
- F. Solvent Cement: ASTM D2564.

2.6 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C1173.
 - b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. End Connections: Same size as and compatible with pipes to be joined.
 - d. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C564, rubber.
 - 2) For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926 PVC.
 - 3) For Dissimilar Pipes: ASTM D5926 PVC or other material compatible with pipe materials being joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.

- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 - 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 - 2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 - 3. Do not change direction of flow more than 90 degrees.
 - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.
- K. Lay buried building waste piping beginning at low point of each system.
 - 1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 - 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 - 3. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; One percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
 - 3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- N. Install aboveground PVC piping in accordance with ASTM D2665.
- O. Plumbing Specialties:
 - 1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
 - a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
 - b. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
 - P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 - Q. Install sleeves for piping penetrations of walls, ceilings, and floors.
 1. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
 - R. Install sleeve seals for piping penetrations of concrete walls and slabs.
 1. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
 - S. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 1. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."
- 3.3 JOINT CONSTRUCTION
- A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 - B. Hub-and-Spigot, Cast-Iron Soil Piping Caulked Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.
 - C. Hubless, Cast-Iron Soil Piping Coupled Joints:
 1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
 - D. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:
 1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. PVC Piping: Join in accordance with ASTM D2855 and ASTM D2665 appendixes.
 - E. Joint Restraints and Sway Bracing:
 1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:
 - a. Provide axial restraint for pipe and fittings 5 inches and larger, upstream and downstream of all changes in direction, branches, and changes in diameter greater than two pipe sizes.

- b. Provide rigid sway bracing for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction 45 degrees and greater.
- c. Provide rigid sway bracing for pipe and fittings 5 inches and larger, upstream and downstream of all changes in direction and branch openings.

3.4 INSTALLATION OF SPECIALTY PIPE FITTING

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Waste Drainage Piping: Unshielded, nonpressure transition couplings.

3.5 INSTALLATION OF VALVES

- #### A. General valve installation requirements for general-duty valve installation are specified in Section 220523 "General-Duty Valves for Plumbing Piping."

3.6 INSTALLATION OF HANGERS AND SUPPORTS

- #### A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment"

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42 clamps.
6. Install individual, straight, horizontal piping runs:
 - a. 100 Ft. (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Ft. (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Ft. (30 m) if Indicated: MSS Type 49, spring cushion rolls.
7. Multiple, Straight, Horizontal Piping Runs 100 Ft. (30 m) or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52 spring hangers.

- #### B. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

- #### C. Install hangers for PVC piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

- #### D. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.

- #### E. Support vertical runs of cast-iron soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

- F. Support vertical runs of PVC piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
 - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Equipment: Connect waste piping as indicated.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections in accordance with the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.8 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
 - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.
 - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
 - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
 - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.
- E. Repair damage to adjacent materials caused by waste and vent piping installation.

3.11 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller are to be any of the following:
 - 1. Service Class cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings[and hubless, single-stack aerator fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- C. Aboveground, soil and waste piping NPS 5 and larger are to be any of the following:
 - 1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings and hubless, single-stack aerator fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- D. Aboveground, vent piping NPS 4 and smaller is to be any of the following:
 - 1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- E. Aboveground, vent piping NPS 5 and larger is to be any of the following:
 - 1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- F. Underground, soil, waste, and vent piping NPS 4 and smaller are to be any of the following:
 - 1. Extra-heavy cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; heavy-duty cast-iron hubless-piping couplings; and coupled joints.
 - 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- G. Underground, soil and waste piping NPS 5 and larger are to be any of the following:

1. Extra-heavy, cast-iron soil piping; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; coupled joints.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Miscellaneous sanitary drainage piping specialties.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Show fabrication and installation details for frost-resistant vent terminals.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

- A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

A. Cast-Iron Exposed Cleanouts:

1. Standard: ASME A112.36.2M.
2. Size: Same as connected drainage piping.

3. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
4. Closure: Countersunk, brass plug.
5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Exposed Floor Cleanouts:

1. Standard: ASME A112.36.2M for adjustable housing cleanout.
2. Size: Same as connected branch.
3. Type: Adjustable housing.
4. Body or Ferrule: Cast iron.
5. Closure: Brass plug with straight threads and gasket.
6. Adjustable Housing Material: Cast iron with threads.
7. Frame and Cover Material and Finish: Polished bronze.
8. Frame and Cover Shape: Round.
9. Top-Loading Classification: Heavy Duty.
10. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Standard: ASME A112.36.2M. Include wall access.
2. Size: Same as connected drainage piping.
3. Body: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
4. Closure Plug:
 - a. Brass.
 - b. Countersunk head.
 - c. Drilled and threaded for cover attachment screw.
 - d. Size: Same as or not more than one size smaller than cleanout size.
5. Wall Access, Cover Plate: Round, deep, chrome-plated bronze cover plate with screw.
6. Wall Access, Frame and Cover: Round, nickel-bronze wall-installation frame and cover.

2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Floor-Drain, Inline Trap oil:

1. Everprime or equivalent.
2. Description: Inline floor drain trap seal, forming an oil barrier to slow trap evaporation while not impeding flow from drain.
3. Material: White mineral oil.

B. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inches above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

C. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

D. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Assemble open drain fittings and install with top of hub 1 inch above floor.
- E. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- F. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- G. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.
- H. Install vent caps on each vent pipe passing through roof.
- I. Install wood-blocking reinforcement for wall-mounting-type specialties.
- J. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
 - 1. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 221319.13 - SANITARY DRAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Floor drains.

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene styrene.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene.
- D. PE: Polyethylene.
- E. PP: Polypropylene.
- F. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DRAIN ASSEMBLIES

- A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary piping specialty components.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains>:

1. Zurn Z415B or similar
2. Standard: ASME A112.6.3 with backwater valve.
3. Pattern: Floor drain.
4. Body Material: Gray iron.

5. Anchor Flange: Required.
6. Outlet: Bottom.
7. Backwater Valve: Drain-outlet type
8. Top or Strainer Material: Bronze.
9. Top of Body and Strainer Finish: Polished bronze.
10. Top Shape: Round.
11. Trap Material: Cast iron.
12. Trap Pattern: Standard P-trap.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 1. Position floor drains for easy access and maintenance.
 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
 3. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
 - a. Maintain integrity of waterproof membranes where penetrated.

3.2 CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Comply with requirements in Section 221319 "Sanitary Waste Piping Specialties" for backwater valves, air admittance devices and miscellaneous sanitary drainage piping specialties.
- C. Install piping adjacent to equipment to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319.13

SECTION 221414 - STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. Specialty pipe fittings.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings: For controlled-flow roof drainage system. Include calculations, plans, sections, elevations, and details.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and elevations, or Building Information Model (BIM) drawn to scale, showing items described in this Section and coordinated with all building trades.
- B. Field Quality-Control Reports: Inspection reports signed by authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A. Provide materials bearing label, stamp, or other markings of specified testing agency.

1.5 WARRANTY

- A. Listed manufacturers to provide labeling and warranty of their respective products

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation are to be capable of withstanding the following minimum working pressure unless otherwise indicated:
 1. Storm Drainage Piping: 10-foot head of water.

2.2 PIPING MATERIALS

- A. Piping materials to bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark and NSF certification mark.
 - 2. Standard: ASTM A74.
 - 3. Class: Service weight cast iron.
- B. Gaskets: ASTM C564, rubber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark and NSF certification mark.
 - 2. Standards: ASTM A888 and CISPI 301.
- B. Standard, Hubless-Piping Couplings:
 - 1. Marked with CISPI collective trademark [**and NSF certification mark**].
 - 2. Standards: ASTM C1277 and CISPI 310.
 - 3. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.
- C. Heavy-Duty, Hubless-Piping Couplings:
 - 1. Standard: ASTM C1277 or ASTM C1540.
 - 2. Description: Stainless steel shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.
- D. Cast-Iron, Hubless-Piping Couplings:
 - 1. Standard: ASTM A1056.
 - 2. Description: Two-piece ASTM A48/A48M, cast-iron housing; stainless steel bolts and nuts; and ASTM C564, rubber sleeve with integral, center pipe stop.

2.5 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.
3. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C1173.
 - b. Description: Elastomeric sleeve, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C564 rubber.
 - 2) For Dissimilar Pipes: ASTM D5926 PVC or other material compatible with pipe materials being joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
- B. Install piping as indicated unless deviations from layout are approved on coordination drawings.
- C. Install piping in concealed locations.
 1. Piping installed in equipment rooms, service areas, and where indicated may be exposed.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.

- K. Make changes in direction for piping using appropriate branches, bends, and long-sweep bends.
1. Do not change direction of flow more than 90 degrees.
 2. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of drainage piping in direction of flow is prohibited.
- L. Lay buried building piping beginning at low point of each system.
1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- M. Install piping at the following minimum slopes unless otherwise indicated.
1. Building Storm Drain: 1/4 inch per foot downward in direction of flow for piping NPS 3 and smaller; 1/8 inch per foot downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Storm Drainage Piping: 1/4 inch per foot downward in direction of flow.
- N. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Ch IV, "Installation of Cast Iron Soil Pipe and Fittings."
- O. Install engineered controlled-flow drain specialties and storm drainage piping in locations indicated.
- P. Plumbing Specialties:
1. Install cleanouts in storm drainage gravity-flow piping in accessible locations.
 - a. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.
 - b. Comply with requirements for cleanouts specified in Section 221423 "Storm Drainage Piping Specialties."
 2. Install drains in storm drainage gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221423 "Storm Drainage Piping Specialties."
- Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."

3.3 JOINT CONSTRUCTION

- A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Hubless, Cast-Iron Soil Piping Coupled Joints: Join in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1.
1. Cut threads full and clean using sharp dies.
 2. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
 - c. Do not use pipe sections that have cracked or open welds.
- D. Grooved Joints: Cut groove ends of pipe in accordance with AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fittings. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.
- E. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.
- F. Joint Restraints and Sway Bracing:
1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:
 - a. Provide axial restraint for pipe and fittings 5 inches and larger, upstream and downstream of all changes in direction, branches, and changes in diameter greater than two pipe sizes.
 - b. Provide rigid sway bracing for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction 45 degrees and greater.
 - c. Provide rigid sway bracing for pipe and fittings 5 inches and larger, upstream and downstream of all changes in direction and branch openings.

3.4 INSTALLATION OF SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Drainage Piping: Unshielded, nonpressure transition couplings.

B. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric unions.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric `.
4. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install pipe hangers for horizontal piping in corrosive environments.
3. Install pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m) if Indicated: MSS Type 49, spring cushion rolls.
7. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install hangers for cast-iron piping with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical cast-iron piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent, but as a minimum at base and at each floor.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

- C. Connect storm drainage piping to roof drains and storm drainage specialties.
 - 1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections in accordance with the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

- A. Identify exposed storm drainage piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test storm drainage piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.

3. Test Procedure:
 - a. Test storm drainage piping on completion of roughing-in.
 - b. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
 - c. From 15 minutes before inspection starts until completion of inspection, water level must not drop.
 - d. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.

3.10 PROTECTION

- A. Protect piping and drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of day and when work stops.
- C. Repair damage to adjacent materials caused by storm drainage piping installation.

3.11 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground storm drainage piping NPS 6 and smaller is to be any of the following:
 1. Service weight, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.
 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- C. Aboveground, storm drainage piping NPS 8 and larger is to be any of the following:
 1. Service weight, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.
 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- D. Underground storm drainage piping NPS 6 and smaller is to be any of the following:
 1. Service weight, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.

3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- E. Underground, storm drainage piping NPS 8 and larger is to be any of the following:
1. Service weight, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.
 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

END OF SECTION 221414

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General-purpose roof drains.
2. Deck roof drains
3. Miscellaneous storm drainage piping specialties.
4. Cleanouts.

1.2 ACTION SUBMITTALS

A. Product Data:

1. General-purpose roof drains.
2. Deck roof drains.
3. Miscellaneous storm drainage piping specialties.
4. Cleanouts.

1.3 QUALITY ASSURANCE

- A. Provide drainage piping specialties are to bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 GENERAL-PURPOSE ROOF DRAINS

A. Cast-Iron Roof Drains.

1. Cast-Iron, Main and Overflow Roof Drains:(RD-1).
 - a. Zurn Z164
 - b. Standard: ASME A112.6.4.
 - c. Body Material: Cast iron.
 - d. Dimension of Body: Nominal 12-inch diameter.
 - e. Dome Material: Cast iron.
 - f. Combination flashing ring and gravel stop.
 - g. Main Outlet: Bottom.
 - h. Overflow Outlet: Bottom
 - i. Outlet Type: No-hub, Inside caulk or Threaded.
 - j. Options:

- 1) Extension collars.
- 2) Underdeck clamp.
- 3) Expansion joint.
- 4) Sump receiver plate.
- 5) Perforated Gravel Guard: Stainless steel.
- 6) Water Dam: 2 inches high for Overflow.

2.2 DECK ROOF DRAINS

A. Cast-Iron Deck Roof Drains.

1. Cast-Iron, Deck Roof Drains:(RD-2).
 - a. Zurn Z107 or equal.
 - b. Standard: ASME A112.6.4.
 - c. Body Material: Cast iron.
 - d. Overall Dimension of Frame and Grate: Nominal 12 to 14 inches round.
 - e. Grate Material: Cast iron.
 - f. Outlet: Bottom.
 - g. Outlet Type: No-hub, Inside caulk, or Threaded.
 - h. Options:
 - 1) Clamping device.
 - 2) Adjustable extension assembly.

2.3 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

A. Metal Downspout Nozzles:

1. Description: Nozzle with wall flange and mounting holes to cover rough opening and serve as anchor.
2. Size: Same as connected downspout.
3. Material: Cast bronze or nickel bronze nozzle and flange.
4. Piping Connection Type: Threaded, No-hub or slip on.

2.4 CLEANOUTS

A. Cast-Iron Cleanouts.

1. Cast-Iron Exposed Cleanouts:
 - a. Standard: ASME A112.36.2M.
 - b. Size: Same as connected branch.
 - c. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or No-hub, cast-iron soil pipe test tee as required to match connected piping.
 - d. Closure: Countersunk, brass plug.
 - e. Closure Plug Size: Same as, or not more than, one size smaller than cleanout size.

2. Cast-Iron Wall Cleanouts:
 - a. Standard: ASME A112.36.2M. Include wall access.
 - b. Size: Same as connected drainage piping.
 - c. Body: Hub-and-spigot, cast-iron soil pipe T-branch or No-hub, cast-iron soil pipe test tee as required to match connected piping.
 - d. Closure Plug:
 - 1) Material: Brass.
 - 2) Head: Countersunk.
 - 3) Drilled and threaded for cover attachment screw.
 - 4) Size: Same as, or not more than, one size smaller than cleanout size.
 - e. Wall-Access Cover Plate: Round, deep, chrome-plated bronze cover plate with screw.
3. Cast-Iron Test Tees:
 - a. Standard: ASME A112.36.2M and ASTM A74, ASTM A888, or CISPI 301.
 - b. Size: Same as connected drainage piping.
 - c. Body Material: Hub-and-spigot, cast-iron soil-pipe T-branch or no-hub, cast-iron soil-pipe test tee as required to match connected piping.
 - d. Closure Plug: Countersunk, brass.
 - e. Closure Plug Size: Same as, or not more than, one size smaller than cleanout size.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install roof drains in accordance with roof membrane manufacturer's written installation instructions at low points of roof areas.
 1. Install flashing collar or flange of roof drain to maintain integrity of waterproof membranes where penetrated.
 2. Install expansion joints, if indicated, in roof drain outlets.
 3. Position roof drains for easy access and maintenance.
- B. Install downspout nozzles at exposed bottom of conductors where they spill onto grade.
- C. Install cleanouts in aboveground piping and building drain piping in accordance with the following instructions unless otherwise indicated:
 1. Use cleanouts the same size as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
 3. Locate cleanouts at minimum intervals of 50 ft. for piping NPS 4 and smaller and 100 ft. for larger piping.
 4. Locate cleanouts at base of each vertical storm piping conductor.

- D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- F. Install test tees in vertical conductors and near floor.
- G. Install wall cleanouts in vertical conductors. Install access door in wall if indicated.

3.2 CONNECTIONS

- A. Comply with requirements for piping specified in Section 221414 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.3 INSTALLATION OF FLASHING

- A. Fabricate flashing from single piece of metal unless large pans, sumps, or other drainage shapes are required.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.

3.4 CLEANING

- A. Clean piping specialties during installation and remove dirt and debris as work progresses.

3.5 PROTECTION

- A. Protect piping specialties during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day and when work stops.

END OF SECTION 221423

SECTION 221429 - SUMP PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sump pumps - pedestal.

1.2 ACTION SUBMITTALS

A. Product data.

B. Product Data Submittals:

1. Construction details, material descriptions, dimensions of individual components and profiles.
2. Rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

C. Shop Drawings:

1. Plans, elevations, sections, and mounting details.
2. Details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Indicate actual installed items by marking submittals with an arrow or box.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with manufacturer's written instructions for handling.

1.5 WARRANTY

- A. Manufacturer Warranty: Manufacturer and Installer agree to repair or replace sump pumps that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 3 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.
- B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

2.2 SUMP PUMPS - PEDESTAL

A. Sump Pumps - Pedestal: (SP-1)

1. Description: Factory-assembled and -tested, automatic-operation, freestanding, sump-pump unit.
2. Pump Type: Wet-pit-volute, single-stage, separately coupled, overhung-impeller centrifugal sump pump, configured as a pedestal pump. Sump pump to be as defined in HI 14.1-14.2 and HI 14.3.
3. Pump Casing: Corrosion-resistant material, with strainer inlet; design that permits flow into impeller; and vertical discharge for piping connection.
4. Impeller: Aluminum, brass, or plastic.
5. Motor: With built-in overload protection and mounted vertically on sump-pump column.
6. Power Cord: Three-conductor waterproof cable of length required, but not less than 72 inches, with grounding plug and cable-sealing assembly for connection at pump.
7. Capacities and Characteristics:
 - a. Capacity: 44 gpm.
 - b. Total Dynamic Head: 5 feet
 - c. Discharge Size: 1-1/2 NPS.
 - d. Electrical Characteristics:
 - 1) Motor Horsepower: 1/3 hp.
 - 2) Volts: 115 V ac.
 - 3) Phases: Single.
 - 4) Hertz: 60.
8. Control: Float switch.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220500 "Common Work Results for Plumbing."
 - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pump Installation Standards: Comply with HI 14.4 for installation of sump pumps.
- B. Equipment Mounting:
 - 1. Comply with requirements for vibration isolation devices specified in Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 221414 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to equipment, allow space for service and maintenance.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's written instructions.

3.4 ADJUSTING

- A. Adjust pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust control set points.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain controls and pumps.

END OF SECTION 221429

SECTION 223300 - ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Commercial, electric, storage, domestic-water heaters.
 - 2. Domestic-water heater accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Equipment room drawing or BIM model, drawn to scale and coordinated with all building trades.
- B. Product Certificates: For each type of commercial, electric, domestic-water heater.
- C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Periods: From date of Substantial Completion.
 - a. Commercial, Electric, Storage, Domestic-Water Heaters:
 - 1) Storage Tank: Three years.
 - 2) Controls and Other Components: Three years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.
- B. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.
- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

2.2 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS

- A. Commercial, Electric, Storage, Domestic-Water Heaters:
 - 1. A.O. Smith DSE-40A or equal.
 - 2. Standard: UL 1453.
 - 3. Storage-Tank Construction: ASME-code, steel vertical arrangement.
 - a. Tappings: Factory fabricated of materials compatible with tank and piping connections. Attach tappings to tank before testing.
 - 1) NPS 2 and Smaller: Threaded ends in accordance with ASME B1.20.1.
 - b. Pressure Rating: 150 psig.
 - c. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending lining material into tappings.
 - 4. Factory-Installed, Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Drain Valve: Corrosion-resistant metal with hose-end connection.

- c. Insulation: Comply with ASHRAE/IES 90.1.
- d. Jacket: Steel with enameled finish or high-impact composite material.
- e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
- f. Temperature Control: Adjustable thermostat.
- g. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
- h. Relief Valves: ASME rated and stamped for combination temperature-and-pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select one relief valve with sensing element that extends into storage tank.

B. Capacity and Characteristics:

1. Capacity: 40 gal.
2. Recovery: 50 gph at 100 deg F temperature rise.
3. Temperature Setting: 140 deg F.
4. Power Demand: 12.3 kilowatts.
5. Heating Elements:
 - a. Number of Elements: One.
 - b. Kilowatts Each Element: 12.3 kilowatts.
 - c. Number of Stages: One.
6. Electrical Characteristics:
 - a. Volts: 277 V.
 - b. Phases: Single.
 - c. Hertz: 60 Hz.
 - d. Full-Load Amperes: 44.4 A.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Expansion Tanks:

1. Description: Steel pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
2. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.
3. Capacity and Characteristics:
 - a. Working-Pressure Rating: 150 psig.

- b. Capacity Acceptable: 2 gal. minimum.

- B. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads.
- C. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.
- D. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than working-pressure rating of domestic-water heater.
- E. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.
- F. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

2.4 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, in accordance with ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

- A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete."
 - 1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
 - 2. Maintain manufacturer's recommended clearances.
 - 3. Arrange units so controls and devices that require servicing are accessible.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 7. Install anchor bolts to elevations required for proper attachment to supported equipment.
 8. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend domestic-water heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."
- E. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220500 "Common Work Results for Plumbing."
- F. Install thermometers on inlet and outlet piping of residential, solar, electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220500 "Common Work Results for Plumbing."
- G. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 220523 "General-Duty Valves for Plumbing Piping" and comply with requirements for thermometers specified in Section 220500 "Common Work Results for Plumbing."
- H. Fill electric, domestic-water heaters with water.
- I. Charge domestic-water expansion tanks with air to required system pressure.
- J. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water to contain less than 0.25 percent of lead by weight.
- K. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.2 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
- C. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, electric, domestic-water heaters. Training to be a minimum of one hour(s).

END OF SECTION 223300

SECTION 224200 - COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Commercial lavatories.
2. Commercial sinks.
3. Commercial urinals.
4. Commercial water closets.
5. Flushometer valves.
6. Toilet seats.
7. Fixture carriers.

1.2 ACTION SUBMITTALS

A. Product data.

B. Shop Drawings:

1. Plans, elevations, sections, and mounting details.
2. Details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories and/or counter-mounted sinks.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Lavatory faucets, sink faucets, shower valves, and wash fountain spray heads and faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ),

and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 COMMERCIAL LAVATORIES

A. Lavatories:

- 1. Lavatory – Provided by General Contractor

B. Lavatory Faucets, Automatically Operated:

- 1. Sloan SF-2400-4-PLG-BDM-CP-0.5gpm-MLM-IR-FCT
- 2. Standards: ASME A112.18.1/CSA B125.1 and UL 1951.
- 3. Operation Type: Hardwired electronic sensor operated, below deck manual mixing.
- 4. 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.
- 5. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
- 6. Body Type: Single hole.
- 7. Body Material: Commercial, solid-brass, or die-cast housing with brazed copper and brass waterway.
- 8. Finish: Polished chrome.
- 9. Maximum Flow Rate: 0.5 gpm.
- 10. Mounting Type: Deck, concealed.
- 11. Spout: Rigid.
- 12. Spout Outlet: Aerator.

C. Lavatory Supply Fittings:

- 1. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.
- 2. Standard: ASME A112.18.1/CSA B125.1.
- 3. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless steel wall flange.
- 4. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- 5. Operation: Wheel handle.
- 6. Risers:
 - a. NPS 1/2.
 - b. ASME A112.18.6/CSA B125.6, braided or corrugated stainless steel, flexible hose riser.

D. Lavatory Waste Fittings:

1. Standard: ASME A112.18.2/CSA B125.2.
2. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.
3. Trap:
 - a. Size: NPS 1-1/4.
 - b. Material:
 - 1) Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall and chrome-plated, brass or steel wall flange.

2.3 COMMERCIAL SINKS

A. Service Sinks, Floor Mounted:

1. Service Sinks, Floor Mounted - Terrazzo <Insert drawing designation>:
 - a. Acorn Engineering TSC-24-SSC or equal.
 - b. Source Limitations: Obtain sinks from single source from single manufacturer.
 - c. Fixture:
 - 1) Material: Marble chips cast in portland cement to produce a compressive strength of not less than 3000 psi, seven days after casting.
 - 2) Shape: Square.
 - 3) Nominal Size: 24 by 24 inches.
 - 4) Height: 12 inches.
 - 5) Tiling Flange: On three sides.
 - 6) Drain: Grid with NPS 3 outlet.
 - d. Mounting: On floor and flush to wall.

B. Sink Faucets, Manually Operated:

1. Sink Faucets, Manually Operated - Service Sink:
 - a. Chicago 897-RCF or equal.
 - b. Source Limitations: Obtain sink faucets from single source from single manufacturer.
 - c. Description: Wall/back mounted, brass body, with integral service stops, checks, spout with bucket/pail hook, 3/4-inch hose thread end, integral vacuum breaker, inlets 8 inches o.c., and two-handle mixing.
 - d. Faucet:
 - 1) Standards:
 - a) ASME A112.18.1/CSA B125.1.
 - b) NSF 61 and NSF 372.
 - c) ICC A117.1.
 - d) ASSE 1001 (VB).
 - 2) Finish: Rough chrome plated.

- 3) Handles: Lever.
- 4) Cartridges: One-fourth turn compression.
- 5) Brace: Adjustable top brace.
- 6) Vacuum Breaker: Required for hose outlet.
- 7) Spout Outlet: Hose thread.

C. Sink Supply Fittings:

1. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.
2. Standard: ASME A112.18.1/CSA B125.1.
3. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless steel wall flange.
4. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
5. Operation: Wheel handle.
6. Risers:
 - a. NPS 1/2.
 - b. Rigid-copper pipe.

D. Sink Waste Fittings:

1. Standard: ASME A112.18.2/CSA B125.2.
2. Drain: Grid type with NPS 3 offset and straight tailpiece.
3. Trap:
 - a. Size: NPS 3.

E. Grout:

1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
2. Characteristics: Nonshrink; recommended for interior and exterior applications.
3. Design Mix: 5000 psi, 28-day compressive strength.
4. Packaging: Premixed and factory packaged.

2.4 COMMERCIAL URINALS

A. Urinals, Wall Hung:

1. Urinals, Wall Hung - Back Outlet:
 - a. American Standard 6590.001EC or equal.
 - b. Fixture:
 - 1) Standards:
 - a) ASME A112.19.2/CSA B45.1.
 - 2) Material: Vitreous china.

- 3) Strainer or Trapway: Manufacturer's standard strainer with integral trap.
 - 4) Water Consumption: 0.5 gpf.
 - 5) Spud Size and Location: NPS 3/4 top.
 - 6) Outlet Size and Location: NPS 2; back.
 - 7) Color: White.
- c. Flushometer Valve:
- 1) Flushometer Valves, Manually Operated - Diaphragm, Lever Handle:
 - 2) Sloan Royal 186 or equal.
 - 3) Source Limitations: Obtain flushometer valve from single source from single manufacturer.
 - 4) Standard: ASSE 1037/ASME 112.1037/CSA B125.37.
 - 5) Minimum Pressure Rating: 125 psig.
 - 6) Features: Include integral check stop and backflow-prevention device.
 - 7) Material: Brass body with corrosion-resistant components.
 - 8) Style: Exposed.
 - 9) Flushometer-Valve Finish: Chrome-plated.
 - 10) Handle Finish: Chrome plated.
 - 11) Consumption: 0.5 gal. per flush.
 - 12) Minimum Inlet: NPS 3/4.
 - 13) Minimum Outlet: NPS 3/4.
- d. Strap on Automatic over the handle automatic flush
- 1) Sloan EBV-200-A
 - 2) Battery powered
 - 3) Provide one for each urinal Flushometer Valve
- e. Waste Fitting:
- 1) Standard: ASME A112.18.2/CSA B125.2 for coupling.
 - 2) Size: NPS 2.
- f. Support: Urinal carrier, Zurn Z1222 or equal, with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture.
- g. Urinal Mounting Height: Per Architectural drawings.

2.5 COMMERCIAL WATER CLOSETS

A. Water Closets, Wall Mounted:

1. Water Closets, Wall Mounted - Top Spud:

- a. American Standard 3351.101 or equal.
- b. Source Limitations: Obtain water closets from single source from single manufacturer.
- c. Standard: ASME A112.19.2/CSA B45.1.
- d. Bowl:
 - 1) Material: Vitreous china.

- 2) Type: Siphon jet.
- 3) Style: Flushometer valve.
- 4) Mounting Height: Refer to Architectural drawings.
- 5) Rim Contour: Elongated.
- 6) Water Consumption: 1.28 gal. per flush.
- 7) Spud Size and Location: NPS 1-1/2; top.
- 8) Color: White.

e. Flushometer Valve:

- 1) Flushometer Valves, Manually Operated - Diaphragm, Lever Handle:
- 2) Sloan Royal 111-1.28 or equal.
- 3) Source Limitations: Obtain flushometer valve from single source from single manufacturer.
- 4) Standard: ASSE 1037/ASME 112.1037/CSA B125.37.
- 5) Minimum Pressure Rating: 125 psig.
- 6) Features: Include integral check stop and backflow-prevention device.
- 7) Material: Brass body with corrosion-resistant components.
- 8) Style: Exposed.
- 9) Flushometer-Valve Finish: Chrome-plated.
- 10) Handle Finish: Chrome plated.
- 11) Consumption: 1.28 gal. per flush.
- 12) Minimum Inlet: NPS 1.
- 13) Minimum Outlet: NPS 1-1/2.

f. Strap on Automatic over the handle automatic flush

- 1) Sloan EBV-200-A
- 2) Battery powered
- 3) Provide one for each water closet Flushometer Valve

g. Toilet Seats:

- 1) Beneke 527-SS
- 2) Source Limitations: Obtain toilet seat from single source from single manufacturer.
- 3) Standard: IAPMO/ANSI Z124.5.
- 4) Material: Plastic.
- 5) Type: Commercial (Heavy duty).
- 6) Shape: Elongated rim, open front.
- 7) Hinge: Self-sustaining, check.
- 8) Hinge Material: Noncorroding metal.
- 9) Seat Cover: Not required.
- 10) Color: White.
- 11) Surface Treatment: Not required.

2.6 FIXTURE CARRIERS

A. Fixture Carriers - Urinal:

1. Zurn Z1222 pr equal.
2. Source Limitations: Obtain urinal carriers from single source from single manufacturer.
3. Standard: ASME A112.6.1M.
4. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings, gaskets, and feet; bolts and hardware matching fixture.

B. Fixture Carriers - Water Closet Single:

1. Zurn Z1201-N4
2. Source Limitations: Obtain water closet carriers from single source from single manufacturer.
3. Standard: ASME A112.6.1M.
4. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings, gaskets, and feet; bolts and hardware matching fixture.

C. Fixture Carriers - Water Closet Back to Back:

1. Zurn Z1203-ND4 or equal.
2. Source Limitations: Obtain water closet carriers from single source from single manufacturer.
3. Standard: ASME A112.6.1M.
4. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings, gaskets, and feet; bolts and hardware matching fixture.

PART 3 - EXECUTION

3.1 INSTALLATION OF COMMERCIAL PLUMBING FIXTURES

A. Lavatory Installation:

1. Install water-supply piping with stop on each supply to each lavatory faucet. Install stops in locations that are accessible for ease of operation.
2. Install trap and waste piping on each drain outlet of each lavatory to be connected to sanitary drainage system.
3. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
4. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

B. Sink Installation:

1. Install sinks level and plumb in accordance with roughing-in drawings.
2. Install supports, affixed to building substrate, for wall-mounted sinks.

3. Set floor-mounted sinks in leveling bed of cement grout.
4. Install water-supply piping with stop on each supply to each sink faucet.
 - a. Exception: Use ball or gate valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523 "General Duty Valves for Plumbing Piping."
 - b. Install stops/valves in locations that are accessible for ease of operation.
5. Install trap and waste piping on each drain outlet of each sink to be connected to sanitary drainage system.
6. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
7. Seal joints between sinks, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
8. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

C. Urinal Installation:

1. Install urinals level and plumb in accordance with roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste-fitting seals and attached to supports.
3. Install accessible, wall-mounted urinals at mounting height in accordance with ICC A117.1.
4. Install supports, affixed to building substrate, for wall-hung urinals.
5. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
6. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.
7. Measure support height installation from finished floor, not structural floor.
8. Install flushometer-valve, water-supply fitting on each supply to each urinal.
9. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
10. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
11. Install actuators in locations easily reachable for people with disabilities.
12. Install new batteries in battery-powered, electronic-sensor mechanisms.
13. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Install deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
14. Seal joints between urinals, walls, and floors using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to urinal color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

D. Water Closet Installation:

1. Install water closets level and plumb in accordance with roughing-in drawings.
2. Install accessible, wall-mounted water closets at mounting height in accordance with ICC A117.1.
3. Use carrier supports with waste-fitting assembly and seal.

4. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals, and affix to building substrate.
5. Measure support height installation from finished floor, not structural floor.
6. Install flushometer-valve, water-supply fitting on each supply to each water closet.
7. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
8. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
9. Install actuators in locations easily reachable for people with disabilities.
10. Install new batteries in battery-powered, electronic-sensor mechanisms.
11. Install toilet seats on water closets.
12. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Install deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
13. Seal joints between water closets, walls, and floors using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to water-closet color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.2 INSTALLATION OF PIPING CONNECTIONS

- A. Connect plumbing fixtures with water supplies and soil, waste, and vent piping. Use size fittings required to match plumbing fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil, waste, and vent piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Install protective-shielding pipe covers and enclosures on exposed supplies and waste piping of accessible plumbing fixtures. Comply with requirements in Section 220719 "Plumbing Piping Insulation."
- E. Where installing piping adjacent to water closets and urinals, allow space for service and maintenance.

3.3 INSTALLATION OF ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 INSTALLATION OF CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.5 CLEANING AND PROTECTION

- A. After completing installation of plumbing fixtures, inspect and repair damages finishes. Replace any fixtures unable to be repaired to the satisfaction of the Owner.
- B. Clean plumbing fixtures and associated faucets, valves, flushometer valves, and fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed plumbing fixtures and associated faucets, valves, flushometer valves, and fittings.
- D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224200

SECTION 224700 - DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Drinking fountains.
 - 2. Water coolers.
 - 3. Bottle filling stations.
 - 4. Fixture carriers.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings:
 - 1. Plans, elevations, sections, and mounting details.
 - 2. Details of fixture assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Diagrams for power wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include servicing and adjustment of electronic-sensor fixtures.

1.4 WARRANTY

- A. Manufacturer Warranty: Manufacturer and Installer agree to repair or replace drinking fountains and bottle filling stations that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Standards:

1. Drinking fountains, water coolers, bottle filling stations, and remote water coolers intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of the authority having jurisdiction, and with NSF 61 or NSF 372, or be certified in compliance with NSF 61 or NSF 372 by an ANSI-accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 DRINKING FOUNTAINS

A. Drinking Fountains - Semi-Recessed, Wall Mounted, Stainless Steel:(DF-1)

1. Elkay EZWS-EDFPBM117K or equal.
2. Source Limitations: Obtain semi-recessed, wall-mounted, stainless steel drinking fountains from single source from single manufacturer.
3. Standards:
 - a. NSF 61.
 - b. NSF 372.
 - c. ASME A112.19.3/CSA B45.4.
4. Receptor Shape: Concave with projecting bowl.
5. Bubbler: two, with adjustable stream regulator, located on deck.
6. Maximum Water Flow: 0.5 gpm.
7. Control: Push button.
8. Drain: Grid type with NPS 1-1/2 tailpiece.
9. Supply: NPS 3/8 with shutoff valve.
10. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/2 brass P-trap.
11. Filter: One or more water filters with capacity sized for unit peak flow rate.
 - a. Standards:
 - 1) NSF 42.
 - 2) NSF 53.
12. Support: Manufacturer-provided support frame for attaching to substrate.
13. Drinking Fountain Mounting Height: Accessible in accordance with ICC A117.1.
14. Bottle Filler: One, with activation sensor.

2.3 FIXTURE CARRIERS

A. Fixture Carriers:

1. Elkay MFWS200 or equal.
2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.
- B. Examine walls and floors for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install fixtures level and plumb in accordance with roughing-in drawings. For fixtures indicated for juveniles, install at height required by authorities having jurisdiction.
- B. Install recessed drinking fountains and bottle filling stations secured to wood blocking in wall construction.
- C. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.
- D. Install mounting frames, affixed to building construction, and attach recessed water coolers and bottle filling stations to mounting frames.
- E. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- F. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- G. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
- H. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 PIPING CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

- C. Install ball shutoff valve on water supply to each fixture. Install valve upstream from filter for drinking fountain, and bottle filling station. Comply with valve requirements specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplates to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.5 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.
- B. Adjust electronic-sensor settings.

3.6 CLEANING

- A. After installing fixtures, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean fixtures, on completion of installation, in accordance with manufacturer's written instructions.
- C. Provide protective covering for installed fixtures.
- D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224700