FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591

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SECTION I: NOTICE TO BIDDERS

SECTION I: NOTICE TO BIDDERS

FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591

For the purposes of this project (the "Project") the Fashion Institute of Technology and its auxiliary dormitory organization, the F.I.T. Student Housing Corporation, shall hereinafter be collectively referred to as "FIT" unless otherwise distinguished herein. Neither the Fashion Institute of Technology nor F.I.T. Student Housing Corporation will be responsible for receipt of any Bid which does not comply with the instructions as set forth further in this document.

FIT is <u>ONLY</u> accepting electronic scanned bids for the subject project. You must email your bid to <u>purchasingbids@fitnyc.edu</u> in PDF format and it should include all the requested documents (See Attachment A – Bid Checklist) including a scanned image of your bid security (Certified Check of 2 percent or Bid Bond of 10 percent of your total bid price), we'll also need you to mail us the original copy of the bid security to have on file. The bid security must either be mailed to 227 W 27th Street, New York, NY 10001 or dropped off at 333 7th Avenue (16th Floor), New York, NY 10001. Bids must be received by **March 25, 2024, on or before 12:00 P.M**. All bidders will be notified of the bid results within the hour. Bid results are not official until each package has been fully reviewed.

ATTACHMENT A - BID CHECKLIST

FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591

Bidder shall meet the following requirements and submit necessary information <u>with the Bid</u>. Failure to comply with these requirements shall be grounds for rejection of your Bid.

Did you attend the mandatory site inspection?
Did you include all required documentation? (As per Bidder Requirements – i.e., proof of being in business, permits, licenses, certifications, etc.)
Did you include the Form of Bid? (See Section VIII.)
Did you include the Non-Collusive Bidding Certification? (See Section IX.)
Did you complete in full the Bid Analysis Form, (See Attachment C)
Did you sign for each Addendum to this project, if any were published? (It is the contractor's esponsibility to check FIT's "Current Bid Opportunities" webpage for addendums prior to ubmitting their bid.) <u>http://www.fitnyc.edu/about/administration/finance/purchasing/current-bids.php</u>
Did you complete the Contractor Reference Sheet? Do not list FIT as your projects of similar size and scope. (See Attachment B)
Can you provide the required levels of insurance coverage? See: General Conditions – Article 15
Did you include the Bid Security?
Can the bidder provide references to at least three (3) different prior contracts that have been completed within the past five (5) years that are similar in size and scope to the project indicated for this Contract?
Did you provide proof of years in business/date of incorporation?
Sub-contracting percentage shall not exceed 50% of the project cost.
Did you include an audited or reviewed financial report for the last two (2) years with your bid?

ATTACHMENT B - CONTRACTOR REFERENCE SHEET FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591

FIT requests a minimum of three references for <u>completed</u> projects of similar size and scope. Please complete the following information for each reference: (**Do not list FIT as your projects of similar size and scope.**)

Contact Name/Title:			
Company Name/Address:			
Phone Number:			
Project Name:			
Project Start/End Date:			
For FIT Use Only – Reference Response	ses		
Quality of Work:	Site Maintenance:		
Scheduling: Cooperation:	Safety Standards:		
	Report Submittals:	Pay	ments:
Other Relevant Factors:			
Overall Performance Rating: Excellent	Satisfactory	Marginal	_Unsatisfactory
Contact Name/Title:			
Company Name/Address:			
Phone Number:			
Project Name:			
Project Cost:			
Project Start/End Date:			
For FIT Use Only – Reference Response	ses		
Ouality of Work:	Site Maintenance:		
Quality of Work:	Safety Standards:		
Permits:	Report Submittals:	Pay	ments:
Other Relevant Factors:	1	y	
Overall Performance Rating: Excellent	Satisfactory	Marginal	_Unsatisfactory
Contact Name/Title:			
Company Name/Address:			
Phone Number:			
Project Name:			
Project Cost:			
Project Start/End Date:			
For FIT Use Only - Reference Response	ses		
Quality of Work:	Site Maintenance:		
Scheduling: Cooperation:	Safety Standards:		
Quality of Work: Scheduling: Permits:	Report Submittals:	Pay	ments:
Other Relevant Factors:			
Overall Performance Rating: Excellent	Satisfactory	Marginal	Unsatisfactory
FIT			
Interviewer:	Signature:		Date:

SECTION II: BID TERMS AND CONDITIONS

SECTION II. BID TERMS AND CONDITIONS

SPECIFICATIONS FOR FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591

I. <u>INTRODUCTION</u>

The Fashion Institute of Technology, a community college of art and design, business and technology of the State University of New York, currently has an enrollment of approximately 10,000 full and part-time students. Located in the Chelsea area of Manhattan, FIT's facilities are composed of a twelve-building complex containing administrative/academic offices, classrooms, computer labs, and studios. There are three (3) residence halls located on West 27th Street that currently house approximately 1,250 students and one (1) residence hall located at 406 West 31st Street that houses approximately 1,100 students. F.I.T. Student Housing Corporation is a separate, not-for-profit corporation that was established pursuant to the laws of the State of New York to own and operate these residence halls for the benefit of the College and its students. For purposes of this project all references to FIT shall be recognized to refer to the Fashion Institute of Technology (hereafter, "FIT" or the "College") and the F.I.T. Student Housing Corporation together, unless specifically designated otherwise. The successful responsive and responsible bidder (hereinafter "Contractor") shall be required to enter into a contract with FIT based on the Contract Documents, (including Notice to Bidders, Bid Terms and Conditions, Contract Terms and Conditions, General Requirements, General Conditions, Labor & Material Payment Bond, Performance Bond, Form of Bid, Non-Collusive Bidding Certification, Substitution Form Request, Contract, Affirmative Action Form, Change Order, Form, Contractor's Trade Payment Breakdown, Safety EHS Plan, Prevailing Wage Schedule, Specifications, and Drawings), attached hereto and incorporated herein.

II. <u>SUMMARY OF SCOPE OF WORK</u>

The Work of the Project is defined by the immediately following Project Description herein below and by the Contract Documents.

<u>Project Description but not limited to</u>: Provide labor, materials, tests, tools and equipment to complete the installation of a new fire pump and remove the existing one. Provide new electrical work and fire alarm as shown on plans to allow full operation of the new fire pump. Contractor may begin survey and procurement of materials immediately following award.

The installation of all equipment in accordance with the Manufacturer's Installation/Operation & Maintenance Manuals & Instructions shall be followed.

III. BIDDER REOUIREMENTS

Bidder shall meet the following requirements and submit necessary information with the <u>Bid</u>. Failure to comply with these requirements shall be grounds for rejection of your Bid. FIT reserves the right to reject bids with incomplete information or bid security, or contain conditions not specified in the Bid Terms and Condition herein, or which are presented on a different form other than that provided to bidders. FIT reserves the right to determine whether a Bidder has substantially met all the Bid requirements and to ask for additional information prior to making such a determination.

A. Bidder shall have been primarily a fire protection contractor in the fire protection business for a minimum of five (5) years as of the Bid Opening Date. Proof shall be submitted <u>with the Bid</u>.

B. Bidder shall have satisfactorily performed work of the size, scope and nature to be performed under this Contract, as evidenced by references from at least three (3) different successfully <u>completed</u> contracts in an installation similar to those indicated for this Contract in the past five (5) years. Bidder shall include for each reference: project location, dollar value of contract; initiation and completion date, name, title, address and telephone number of contact person. References cannot be members of FIT staff or FIT consultants.

C. <u>Bidder shall attend the mandatory pre-bid meeting and site inspection. Failure</u> to comply with this requirement shall be grounds for rejection of the Bid.

- D. Bidder is responsible for all necessary field measurements, all necessary data on the existing conditions and verification of all quantities and dimensions listed in the Project Specifications and Drawings, if applicable.
- E. By submitting a Bid, Bidder agrees that s/he has examined the Contract Documents, visited the site, noted all conditions and limitations affecting the Work, and fully understands the nature of the Work. Bidder is required to inform FIT in writing immediately of any instance where changed conditions are encountered.
- F. Bidder shall submit documentation of financial viability, including balance sheets and profit and loss statement for the prior two (2) years, with the Bid.
- G. Bidder, upon request, shall submit copies of current licenses and certifications applicable to the work, including, but not limited to, licenses issued by the Commissioner of Buildings of the City of New York. Proof of the following certificates will also be required: 10 Hour OSHA Outreach Training Program; Asbestos Awareness Training, FDNY Certificate of Fitness, with the Bid.

IV. APPROVAL OF SUBCONTRACTORS

Subcontracting shall be permitted <u>not to exceed 50%</u> of the work of the Project as determined by FIT. The ratio of the contractors and subcontractors work must be included with your bid submission. All subcontractors are required to gain prior written approval by FIT's Facilities Director. The Fire Protection Contractor will be the Prime Contractor (hereinafter "Contractor) and shall not be permitted to Subcontract the following types of Services:

- There are no subcontracting restrictions for this project

The Contractor will require that the terms of this Contract apply to the sub-contractors and shall cause all sub-contractors to comply with the terms of this contract.

V. <u>BID SECURITY</u>

Failure to provide Bid Security in the prescribed manner shall result in the rejection of the Bid.

Bidder shall provide Bid Security in the form of either a bid deposit or a bid bond, at Bidders option. The bid deposit shall be in the form of a certified check made payable to "Fashion Institute of Technology" in an amount no less than two percent (2%) of the total bid price. The bid bond shall be in an amount no less than ten percent (10%) of the total bid price.

VI. <u>PRE-BID SITE INSPECTION AND OUESTIONS</u>

A mandatory Pre-Bid Site Inspection for prospective Bidders will be held on March 8, 2024 at 10:00 A.M. at the Fashion Institute of Technology, Feldman Building "C Building" Lobby, located at 27th Street (between 7th and 8th Avenues). Failure to attend shall be grounds for rejection of your Bid. Please also bring a business card.

Bidder shall examine the Bid documents carefully. Before bidding, Bidder shall make any requests for interpretation of Bid documents or clarification of any ambiguity therein that should have been detected by a reasonably prudent Bidder. Questions shall be submitted in writing to the attention of Purchasing Department via email: <u>purchasingbids@fitnyc.edu</u>, no later than **March 15, 2024 on or before 3:00 P.M**. Answers shall be provided in the form of and Addendum and be posted on the FIT purchasing department website. Reference Bid number **C1591.**

VII. <u>BID DESIGNATION</u>

- A. FIT is <u>ONLY</u> accepting electronic scanned bids for the subject project. You must email your bid to <u>purchasingbids@fitnyc.edu</u> in PDF format and it should include all the requested documents (See Attachment A Bid Checklist) including a scanned image of your bid security (Certified Check of 2 percent or Bid Bond of 10 percent of your total bid price), we'll also need you to mail us the original copy of the bid security to have on file. The bid security must either be mailed to 227 W 27th Street, New York, NY 10001 or dropped off at 333 7th Avenue (16th Floor), New York, NY 10001. Bids must be received by March 25, 2024, on or before 12:00 P.M. All bidders will be notified of the bid results within the hour. Bid results are not official until each package has been fully reviewed.
- B. Bids received late will not be considered.

VIII. PREPARATION OF THE BIDS

- A. Bids must be submitted on the forms supplied by FIT in the Bidder's full legal name or the Bidder's full legal name plus a registered assumed name. All blank spaces for bid prices must be filled in, using both words and figures, words to take precedence over figures. <u>Conditional bids shall not be accepted.</u> Bids shall not contain any recapitulation of the Work to be done. Bidder exclusions shall be grounds for bid rejection. Do not modify the bid forms supplied by FIT
- B. Bids that are illegible or that contain omission, alterations, additions or items not called for in the bidding documents may be rejected as not responsive. Any bid which modifies, limits, or restricts all or any part of such bid, other than as expressly provided for in the Notice to Bidders, Bid Terms and Conditions, and Contract Terms and Conditions, may be rejected as not responsive.
- C. FIT may reject any bid not prepared and submitted in accordance with the provisions of the Notice to Bidders, Bid Terms and Conditions, and Contract Terms and Conditions. Neither FIT nor the FIT Student Housing Corporation will be responsible for receipt of any Bid which does not comply with these instructions. Only those Bids emailed to the FIT Purchasing Dept. inbox (purchasingbids@fitnyc.edu) on or before March 25, 2024, on or before 12:00 PM will be considered.
- D. Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized postponement thereof and any bid received after such time and date shall not be considered.
- E. No Bidder may withdraw a bid within ninety (90) days after the actual date of the opening thereof.

IX. <u>AWARD OF CONTRACT</u>

- A. The award of the Contract shall be made to the Bidder submitting the lowest responsible bid if, in the opinion of FIT, the bid is responsive to the bid solicitation, and such Bidder is responsible and qualified to perform the work involved in the sole discretion of FIT. The lowest bidder will be considered the contractor with the lowest bid for the base bid. In case FIT will decide to include the 'alternate' in the scope of work, the lowest bidder will be considered the contractor with the lowest total of the base bid plus the alternate bid.
- B. FIT reserves the right to reject any bid or all bids, to waive any informalities or irregularities or omissions in any bid received.
- C. During the term of the Contract, the Contractor shall promptly notify FIT of any change in the ownership of the Contractor. Failure to notify FIT may result in termination of the Contract.
- D. FIT reserves the right, exercisable in its sole discretion, to cancel and withdraw from the Project at any time in advance of the award.
- E. Prior to the opening of the bids, Bidder shall promptly notify FIT of Change in ownership of the Bidder. Failure to notify with this bid shall be grounds for rejection of the Bid.

X. DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful Bidder, upon failure or refusal to execute and deliver the Contract and bond required within ten (10) days after such Bidder has received notice of the acceptance of such bid, shall forfeit to FIT as damages for such failure or refusal, the security deposited with the Bid or the sum of the difference between the total bid of the successful Bidder and the total bid of the Bidder submitting the next lowest bid, whichever sum shall be higher.

XI. <u>PREVAILING WAGE</u>

This contract is subject to New York State Labor Law 220, Article 8 Prevailing Wage Schedules. The Contractor shall submit with, each invoice, certified payrolls for all labor. Submission of a Certified Payroll with invoice in full compliance with labor laws is a condition of payment.

Contractor and its subcontractors shall pay at least the prevailing wage rate and pay or provided the prevailing supplements in accordance with the Labor Law.

A copy of the prevailing wage schedule, for New York County, can be found at the New York State Department of Labor website. (PRC# 2024000704)

www.labor.ny.gov

Bidder must also comply with all applicable federal, state, and local laws rules, regulations, requirements, and codes, including but not limited to, the statues regulations, laws, rules and requirements specifically referenced in the documents annexed hereto.

XII. <u>M/WBE AND SDVOB</u>

FIT encourages minority and women business enterprise participation in this project by contractors, subcontractors and suppliers, and all bidders are expected to cooperate with that commitment. Also, bidders are encouraged to use Service-Disabled Veteran-Owned Businesses (SDVOB). A directory of New York State Certified Minority and Women's Business Enterprises is available from: Empire State Development Corporation, Minority and Women's Business Development Division at: <u>http://www.esd.ny.gov/mwbe.html</u> to assist potential bidders in locating sources of M/WBE subcontractors and reaching these goals. SDVOBs can be readily identified on the directory of certified businesses at: <u>https://online.ogs.ny.gov/SDVOB/search</u>."

XIII. MISCELLANEOUS

- A. FIT reserves the right to request clarifications from bidders for purposes of assuring a full understanding of responsiveness and further reserves the right to permit revisions from all bidders who might be, in FIT's sole discretion determined to be viable bidders for contract award, prior to the award.
- B. FIT reserves the right to reject separable portions of any offer, to negotiate terms and conditions consistent with the bid, and to make an award for any or all remaining portions.
- C. FIT reserves the right to eliminate mandatory requirements unmet by all bidders.
- D. Any additional vendor terms which are attached or referenced with a submission shall not be considered part of the bid or proposal, but shall be deemed included for informational purposes only.
- E. Unless otherwise specifically stated in the Bid Terms and Conditions, all specifications and requirements constitute minimum requirements. All bids must meet or exceed stated specifications and requirements.
- F. FIT reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the Bid and whose bid is considered to best serve FIT's interest. In determining the responsiveness and responsibility of the bidder, FIT may consider the following factors, including but not limited to: the ability, capacity, and skill of the bidder to perform as required; whether the bidder can perform promptly, or within the time specified without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the bidder; the quality of past performance by the bidder; the previous and existing compliance by the bidder with relevant laws and regulations; the sufficiency of the bidder's financial resources; the availability, quality, and adaptability of the bidder to provide future maintenance, service, and parts.

SECTION III: CONTRACT TERMS AND CONDITIONS

SECTION III. CONTRACT TERMS AND CONDITIONS

I. <u>COMPLIANCE REQUIREMENTS</u>

All work hereunder, including but not limited to material and installations, shall be in compliance with the Contract Documents including both specifications and drawings, as well as all applicable state and local building codes (such as the New York City Building Code) and the rules, regulations of governmental agencies and utility companies having jurisdiction over the work.

The following additional notes shall be considered as part of the officially filed drawings:

NONE

THE WORK:

Unless modified by the Contract Documents, the work of each section of the specifications shall include all labor, materials, testing, tools and equipment necessary and reasonably incidental to the replacement of the existing fire pump with a new fire pump in the sub-cellar of the Pomerantz Center.

WORKMANSHIP:

All work shall be performed by persons skilled in the work. Work shall be installed true to dimension, plumb and level with neat, accurate cutting and fitting of all materials in accordance with recognized standards of workmanship.

ON-SITE VERIFICATION:

The Contractor shall verify all dimensions and site conditions prior to commencing the work. Dimensions may not be scaled from drawings. Should there be a discrepancy, Contractor is to notify FIT Facilities Director and Architect immediately for clarification.

COORDINATION OF THE WORK:

The Contractor shall be responsible for the coordination of the work and the means and methods of construction and provide FIT with the resume of Contractor's project manager ("Project Manager"). FIT's Facilities Director shall approve the Project Manager and reserves the right to request a replacement Project Manager upon reasonable notice.

WORK HOURS:

Regular work hours are from **7:00 am to 5:00 pm** unless otherwise specified in the Contract Documents. Contractor will have reasonable access to the site in order to complete the work in the given time frame. Contractor shall comply with FIT's additional work rules related to such extended access. All labor costs required to meet this deadline are the sole responsibility of the Contractor and shall be included in the contract price. FIT reserves the right to put the work on hold for any reason as many as three (3) occasions during the course of construction for a total duration of not more than 20 workdays.

PERFORMANCE AND PAYMENT BONDS

In addition to the insurance and bond requirements specified in the General Conditions, Performance and Payment Bonds shall be required for the Work of this Contract.

- A. Simultaneously with the delivery of the executed Contract, Contractor shall furnish to FIT and maintain, at its own cost and expense a Performance Bond in an amount at least equal to one hundred percent (100%) of the contract price as security for faithful performance of the Contract and also a Labor and Material Payment Bond in an amount at least equal to one hundred percent (100%) of the Contract price for the payment of all persons performing labor on the project under the contract or furnishing materials in connection with the Contract. The surety on such bonds shall be a surety company rated B+ or better by A.M. Best Company, shall be licensed to do business in the State of New York, and shall hold a certificate of authority as an acceptable surety on federal bonds or otherwise satisfactory to FIT.
- B. Attorneys-in-fact who sign said bonds on behalf of a surety must affix to each bond a certified and effectively dated copy of their power of appointment.

CONFLICTS, ERRORS AND OMISSIONS:

- 1. The Contract Documents and typical details apply throughout the work unless noted otherwise.
- 2. In the event that certain features of the work are not fully shown on the drawings, Contractor must obtain clarification from the FIT Facilities Director and Architect through the use of an AIA Standard RFI form (copies can be obtained from the Architect) before proceeding with the work.
- 3. In the event of conflicts with the drawings and/or specifications, the Contractor must promptly notify the FIT Facilities Director and Architect. The Architect will determine which shall govern.

MANUFACTURER'S PRODUCTS AND FABRICATIONS:

- 1. All manufacturers and fabricators printed warnings for handling of their products must be strictly observed.
- 2. All products and materials must be provided and installed in strict accordance with the recommendations of the manufacturer. In the event of conflict between the drawings or the specifications and the manufacturer's recommendations, Contractor must notify FIT Facilities Director and Architect to obtain clarification before proceeding with the work.
- 3. Contractor must verify all materials and manufactured items to be in conformance with applicable codes and regulations.

DELIVERY AND STORAGE OF MATERIALS:

- 1. All materials shall be new and delivered to the site in original, unbroken containers.
- 2. All materials shall be inspected by the Contractor at time of delivery and Contractor shall reject material evidencing damage or other defects.
- 3. Contractor shall provide secure and environmentally compatible storage facilities for all materials in accordance with the recommendations of the manufacturer.

PROJECT SCHEDULE:

- 1. Contractor shall attend a Project Initiation Conference, prior to the commencement of work at the site. Attending this Conference on behalf of the Contractor shall be a representative of FIT and the Project Manager assigned to the project. Contractor shall submit at this Conference a detailed timeline indicating the important milestones of the project and establishing an estimated date of substantial completion in accordance with Contract Documents. He/she shall also present all submittals required by the Contract Documents, such as Insurance Certificates, product tear sheets (not at the initial conference), copy of the General Liability insurance policy (amended to reflect required additional insureds), etc. Project access, storage locations, required crew size and other relevant issues shall also be addressed at this Conference.
- 2. Time is of the essence. Contractor shall be required to commence work of the Pomerantz Center new fire pump installation within five (5) working days of receipt of a Notice to Proceed from FIT. The shop drawings process and ordering need to proceed first. Work shall commence on or about April 1, 2024. The project shall be Substantially Completed no later than October 31, 2024. The contractor must be demobilized and leave the job site on the ending date of work period. Only close- out, administrative tasks may continue beyond the closing date. Unless otherwise specified, the work is to be performed solely between the hours of 7:00 A.M. to 5:00 P.M., Monday through Friday, legal and union holidays excluded. All labor costs encountered to meet this deadline are the sole responsibility of the Contractor and shall be included in the Bid Price. FIT reserves the right, at no financial liability associated with the same, to put the Project work on hold for any reason on as many as three (3) occasions during the course of the construction for a total duration of not more than 20 workdays.
- 3. On Monday of each week during the construction period, the Contractor shall email to FIT's Facility Director (or such other individual as FIT may designate at its sole discretion) a written report outlining the work completed during the preceding week and the work planned for the upcoming week. Included will be any unforeseen or anticipated problems regarding implementation of the work, in addition to Change Order requests, submission data, etc. Daily reports **MUST** be submitted to the CM and or the Facilities Department Designee.
- 4. Job meetings will be held at the site on dates to be determined by Architect and FIT. These meetings shall be attended by an officer of the Contractor, the Project Manager,

FIT's representative, and the Architect. The purpose of these meetings will be to review the status of the project, discuss any potential changes to the project scope, and resolve any problems relating to successful completion of the work.

5. Owner's meetings will be held weekly via zoom and in person when needed. The dates to be determined by the Architect and FIT. These meetings shall be attended by the Contractors Project Manager, FIT, and the Architect. The purpose of these meetings is to keep the Owners informed of the process and to discuss any issues relating to the successful completion of the work.

PAYMENT:

In accordance with, and in addition to, the payment requirements of the Contract Documents, the Contractor shall provide sufficient and appropriate documentation for all invoices to FIT including submittal of invoices for actual cost of materials, labor rates, and certified payrolls. Filing of such payrolls shall comply with the New York State Labor Law and is a condition precedent to payment. FIT reserves the right to request additional information and/or documentation at any time.

Contractor is required to submit Monthly Contractor's Compliance Form (as attached in Section XII. Affirmative Action Form) with each Payment Requisition.

Contractor is required to submit a Certificate of Monthly Payment/Lien Waiver signed by each Sub-contractor with each Payment Requisition.

Contractor is required to submit Waste Management Form with each Payment Requisition.

LABOR HARMONY:

- A. Contractor is advised that he/she must maintain labor harmony throughout the duration of the Contract. All labor disputes, slowdowns, strikes and/or sympathy actions will be the sole responsibility of the Contractor to resolve in order to maintain harmony.
- B. All costs, delays and scheduling impacts associated with any labor dispute that arises from such action or inaction will be borne by the Contractor.
- C. Contractor will also be responsible for all costs, damages and scheduling impacts which affect and disrupt any other workers on site as well as FIT employees.
- D. It will be the Contractor's responsibility to resolve all labor disputes immediately.

Contractor is further advised that FIT has a large union presence on the campus. All work performed by the Contractor must provide the required labor harmony to perform work without labor incident or dispute which can delay, obstruct or effect the work and project schedule, or interfere with FIT's ability to operate.

II. <u>GENERAL NOTES</u>

In accordance with, and in addition to, the requirements of the Contract Documents:

- 1. All work listed on the construction notes and shown or implied on all drawings shall be supplied and installed by the Contractor unless otherwise noted on drawings and/or in specifications.
- 2. Contractor to determine coordination of trades.
- 3. Contractor shall verify all dimensions and conditions shown on drawings and shall notify FIT Facilities Director and Architect of any discrepancies, omissions, and/or conflicts before proceeding with the work.
- 4. Contractor must comply with the rules and regulations of agencies having jurisdiction and shall conform to all construction and safety codes, statutes and ordinances. All fees, taxes, permits and applications to be obtained through governmental agencies shall be the responsibility of the Contractor.
- 5. Contractor shall comply with the rules and regulations of the building as to hours of availability of loading docks and elevators for the purposes of delivery, waste removal and other needs related to the work. Coordination with FIT Facilities Department is required for the handling materials, movement in and out of building, equipment and debris to avoid conflict and interference with normal building operations.
- 6. All drawings and construction notes are complementary and what is called for by any will be binding as if called for by all.
- 7. Contractor shall maintain a current and complete set of construction documents on the construction site during all phases of construction.
- 8. Do not scale drawings; dimensions shown govern. Larger scale drawings shall govern over smaller scale.
- 9. Contractor shall maintain a current and complete set of shop drawings on the construction site
- 10. Contractor shall maintain a current and complete RFI (Request for Information) log on the construction site.
- 11. Contractor shall submit for approval, prior to commencing work, a list of all subcontractors to FIT's Facilities Director, with the name, address and phone number of the principal contact of each sub-contractor. In addition, he will file with the owner the emergency numbers available for 24-hour contact.

- 12. All work shall be performed by skilled and qualified workmen in accordance with the best practices of the trades involved and in compliance with building regulations and/or governmental laws, statutes or ordinances.
- 13. All materials shall be new, unused and of professional quality, unless otherwise noted, installed as per manufacturer's recommendations and instructions.
- 14. For purposes of the Specifications and Drawings sections in the Contract, the use of the words "Supplied By" or "Provided" in connection with any item specified is intended to mean that such item shall be furnished, installed and connected where so required.
- 15. All approvals of submittals shall be for design intent only. Contractor shall be responsible for quantities, dimensions and compliance with Contract Documents and for information pertaining to fabrication processes or techniques of first-class construction and for coordination with other trades.
- 16. All work shall be erected and installed plumb, level, square, true and in proper alignment.
- 17. Contractor shall be responsible for cutting, patching and restoration required for this work.
- 18. If, during the course of construction, Contractor believes materials that might contain asbestos may be disturbed during performance of the work, Contractor shall immediately notify FIT of the area(s) of concern, and stop work if that area would be disturbed by the continuing work.
- 19. All correspondence to FIT shall be directed to the attention of the FIT Facilities Director with a copy of the same forwarded to the Architect.
- 20. Contractor shall at all times keep the premises free of accumulation of waste materials and rubbish; premises to be broom swept clean daily. At the completion of the work, Contractor shall leave the job site free of construction debris and materials, and "broom clean" including thorough cleaning of toilets, bathrooms, electrical closets, stairwells, and all areas of work or staging, etc.
- 21. Contractor shall provide all necessary protection against dirt and damage within the premises, as well as public areas, and shall be responsible for keeping these areas clean and free of materials at all times.
- 22. Contractor shall verify location of existing utilities and coordinate with location shown on drawings.
- 23. During construction, security and fire exit doors must remain unobstructed at all times.
- 24. Contractor shall take every precaution to properly protect all existing construction to remain. Contractor shall be responsible for all damaged areas to be returned to original condition.

- 25. Contractor shall schedule construction, in such a manner so as not to disturb areas outside of the area under construction during normal operating hours. The Contractor shall coordinate with FIT Facilities Director minimum of 24 hours prior to any disruption of services to those areas not under construction even if such a disruption occurs during or after normal operating hours.
- 26. Contractor shall staff the project with a Project Manager with at least 5 years' experience in this type of project scope, with similar complexity and schedule requirements.
- 27. The acceptance of shop drawings containing deviations not specifically brought to the attention of FIT, or containing errors or omissions of any sort, shall not relieve Contractor of the responsibility for executing the Work in accordance with the Contract Documents and Contract Terms and Condition.

III. <u>DEMOLITION NOTES</u>

In accordance with, and in addition to, the requirements of the Contract Documents. It shall be Contractor's responsibility to perform the following:

- 1. Prior to commencement of selective removals and demolition work, inspect the areas in which the work will be performed.
- 2. Any asbestos contaminated material will be removed by FIT's certified asbestos abatement contractor prior to the work of this contract.
- 3. Provide temporary barricades and other forms of protection required to protect all FIT personnel, inclusive of its faculty, staff and students as well as the general public from injury due to selective removals and demolition work.
- 4. Remove and dispose of exposed bolts, supports, brackets, cleats, grounds, and other items, that are no longer required for the purpose for which they were originally installed.
- 5. Where existing work is required to be removed and replaced but found to be defective in any way, it shall be reported to the FIT Facilities Director and Architect before it is disturbed.
- 6. All existing work damaged or lost as a result of performing the required new work, shall be patched, repaired or replaced with new, and finished to match the existing work, or as the individual case requires at the Contractor's expense.
- 7. Perform cutting, drilling and removals in a manner which will prevent damage to construction which is to remain.
- 8. Promptly repair any and all damages to all property and finishes caused by the removals and demolition work; to FIT's satisfaction and at no extra cost to FIT.

- 9. Cut, patch, paint and finish existing walls, ceiling and/or floor disturbed to match existing.
- 10. Perform patching around items penetrating existing construction in a manner that will maintain the water and fire resistive capability of existing construction. Should either of these be compromised, it is the responsibility of the Contractor to repair prior to completion.
- 11. Remove debris, rubbish and other materials resulting from the removals and demolitions from the building immediately; transport and legally dispose of materials off-site. Disposal method shall be in accordance with city, state and federal statues regulations, and ordinances.
- 12. Work of this section shall conform to all requirements of the New York City Building Code and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, Safety, Health and Anti-Pollution regulations.
- 13. Any existing lead-based paint areas of the building where the contractor and its subcontractors are required to work shall be mitigated prior to beginning work. Such mitigation may include FIT directing the contractor to take necessary precautions and wear protective gear to work in the vicinity of the lead paint. The contractor will not be responsible for delays caused by the mitigation activities or any associated cost.
- 14. Work is to conform to OSHA requirements.

IV. ADDITIONAL CONTRACTOR'S RESPONSIBILITIES

In accordance with, and in addition to, the requirements of the Contract Documents:

- 1. Contractor shall coordinate all work with FIT Facilities Department and Director.
- 2. Contractor to provide daily crew manpower log/count to FIT.
- 3. Contractor shall perform work in a neat workmanlike manner in accordance with accepted industry standards.
- 4. FIT Facilities Department shall notify Contractor before commencing work which floors are accessible by Contractor.
- 5. Contractor shall mask all signs, window frames, door frames, etc. when painting around them.
- 6. Contractor shall use Benjamin Moore, Regal Paint, or approved equal.
- 7. <u>Employee Identification and Building Access</u>: All Managers and their crew must wear at all times company identification. All Managers and their crew must sign in and out, upon entering and leaving the facility, at the FIT front security desk.

- 8. After Bid opening, FIT will evaluate and review submissions and notify the lowest Bidder, who is deemed most responsive and responsible. Within five (5) business days of such written notification, such Bidder shall submit the following information. Failure to comply with these requirements in whole or part shall constitute grounds for rejection of the Bid. FIT reserves the right to determine whether a Bidder has substantially met these requirements and to ask for additional information. Documentation of the following:
 - a. Health and safety training program and procedures for employees and onsite EHS Coordinator.
 - b. Copies of current licenses and certifications applicable to the Work, including but not limited to licenses issued by the Fire Department of New York, Department of Buildings of the City of New York, must be provided to FIT Facilities.
- 9. Contractor shall complete the attached Outline for Preparing Work-Specific Environment, Health and Safety Plan ("EHS Plan") which will be reviewed and approved by FIT's EHS Compliance Director prior to commencement of work. Contractor shall include the costs of completing the EHS Plan in the Bid price. Proof of the 10 Hour OSHA Outreach Training Program for Construction certificate will be required.
- 10. Contractor shall provide as described in the FIT Safety EHS Plan, legible copies of SDS sheets and estimates of anticipated amounts of chemicals Contractor intends to store on site to the FIT's Director of EHS Compliance for review and approval at least ten (10) days before Contractor allows on-site storage.
- 11. Contractor shall ensure that legible copies of all SDS are available at the location of chemical storage and available for review at all times. Contractor shall take all necessary precautions necessary to prevent vapors, fumes, or dust from leaving the work area. This includes but is not limited to the construction of negatively ventilated containments as controls.
- 12. Contractor shall provide as described in the FIT Safety EHS Plan a written statement of the types of project waste disposed, including the amounts and the name of the waste disposal facility for each type of waste disposed. Contractor shall provide the statement with each Payment Application. Contractor shall provide a separate copy of the statement to FIT's Director of EHS Compliance.
- 13. Contractor may not store Hazardous Waste on site at any time. Contractor may not generate or accumulate Hazardous Waste on site without the written approval of FIT's Director of EHS Compliance. Contractor shall obtain FIT's Director of EHS Compliance approval at least ten (10) days before the Contractor generates or accumulates Hazardous Waste on site beginning with demolition work.

- 14. Off-site shipments of Universal or Hazardous Waste. The Contractor may not allow the off-site removal of Universal or Hazardous Waste without the written approval of the FIT Director of EHS Compliance. Contractor will ensure that the FIT Director of EHS Compliance alone signs any shipping papers for the off-site removal of Universal or Hazardous Waste.
- 15. Contractor's personnel must report daily to the FIT Security area in the Lobby of Building "C" before entering FIT's site. All Contractor's personnel must obtain temporary FIT identification that shall be displayed at all times while on the FIT site. While on FIT property, all Contractor's personnel shall be subject to all FIT campus policies and procedures, including, but not limited to, prohibitions related to tobacco, drug, and alcohol use, and policies and procedures regarding appropriate and civil conduct. Contractor's personnel shall not fraternize with FIT students and employees beyond what is necessary to complete their work or any assigned Projects. FIT policies may be found at https://www.fitnyc.edu/policies/. FIT reserves the right, in its sole determination, to eject from the campus, any Contractor personnel violating such policies, in addition to any other rights and remedies.

V. <u>PERMITS</u>

Contractor shall be responsible for obtaining all required Permits and paying all costs and fees associated therewith. New York City Department of Buildings (DOB) Work Permit will be required for this project. Contractor will also be required to perform the following functions as it relates to this project:

- A. Contractor shall submit to FIT and Engineer appropriate Workman's Compensation and New York State Disability insurance certificates for use in securing the required Work Permits to be posted at the site. The Contractor shall provide FIT's Facility Director with the appropriate insurance tracking numbers assigned to their firm by the NYC Department of Buildings.
- B. The Contractor shall submit to FIT and Engineer a copy of all Licenses as issued by the NYC Department of Buildings.
- C. Permits for the work shall be posted by the Contractor in a conspicuous location at the site at all times. No work shall begin until the necessary DOB work permits have been obtained by the Contractor.
- D. The Contractor shall be responsible for obtaining any other governmental permits and approvals required to undertake the work, and shall pay any and all fees associated therewith, including but not limited to fees to the MTA/DOT for setting up a crane, if applicable.

VI. <u>PROJECT MANAGER</u>

- 1. The Contractor shall provide the services of an experienced Project Manager, who shall be in continual responsible charge of the work and shall have a valid Certificate of Fitness by the New York City Department of Buildings.
- 2. The Project Manager shall be on site at all times, shall speak fluent English, shall maintain on the site a complete set of these specifications (including any addenda and/or change orders, as well as all project drawings and all applicable manufacturers' instruction sheets), and shall have full authorization to make all field changes as directed by FIT's Facility Director and Architect.
- 3. The Project Manager shall be required to maintain a daily log at the site indicating the following:

-the date

-the number of workers at the site on said date

-the specific portions and locations of the Work completed on said date

- 4. The Project Manager (or another authorized representative of the Contractor) shall telephone FIT's Facility Director at least once daily throughout the construction period, to report on the day's activities and the work planned for the following day.
- 5. The name of the Project Manager shall be submitted to FIT's Facility Director prior to initiation of the project. This Manager shall remain in charge of the project for its entire length, at FIT's discretion, unless said Manager no longer remains in the employ of the Contractor. In such case, a capable and experienced replacement shall be immediately assigned subject to approval by FIT's Facilities Director.
- 6. No telephone service is available at the site for use by the Contractor; therefore, the Contractor shall equip the Project Manager with a cellular telephone at the site for the duration of the Project. The Contractor shall provide FIT and Architect with the appropriate contact numbers at the initiation of the Project.

VII. <u>SUBMISSIONS AND SUBSTITUTIONS</u>

- 1. All submissions called for in the Contract Documents shall be submitted at least twenty (20) working days prior to proposed initiation of any related work.
- 2. FIT and FIT's Architect and Engineer will review and accept or take other appropriate action regarding Contractor submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for

conformance with information given and the design concept expressed in the Contract Documents. FIT's review of all shop drawings submitted by the Contractor shall be for concept only and does not remove the Contractor's responsibility for insuring that all specific details of the installation shall be performed in such a way so as to achieve satisfactory results. Acceptance by FIT, the Architect & Engineer of Contractor submittals does not relieve the Contractor from responsibility for errors which may exist in the submitted data.

- 3. Where the phrase "or approved equal" or "equal as approved by FIT" occurs in the Contract Documents, the Contractor may not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically approved by FIT and the Architect.
- 4. Any proposed substitute products or procedures are to be submitted to FIT's assigned Architect/Engineer for prior approval with any proposed price adjustments to the contract within fourteen (14) days of the signing of the agreement between FIT and the Contractor, so that FIT, the Architect and Engineer are permitted adequate time for review.

VIII. <u>PROGRESS PAYMENTS</u>

- 1. All submissions called for in the Contract Documents shall be submitted at least twenty (20) working days prior to proposed initiation of any related work.
- 2. Progress payments will be made to the Contractor based solely on actual work completed. Furthermore, payment will not be made for the purchase of materials, nor for their transfer onto the site, nor for any costs associated with mobilization.
- 3. Payment requests shall be submitted to FIT's Facilities Director on AIA Documents G702 and G703.
- 4. Payments will be authorized based upon FIT's field visits and review of work. All FIT's decisions regarding progress payments shall be final.
- 5. The values quoted on the bid form shall constitute the Schedule of Values for AIA Document G703. Additional breakdown of the bid form shall be provided on the Schedule of Values and will be used for progress payments.
- 6. No progress payments will be processed without submission by the Contractor of properly executed Affidavit of Payment and Release of Liens (AIA Documents G706 and G706A or equivalent forms as may be requested by FIT), up-to-date weekly written reports and timeline in bar chart form, and all submittals, certificates, permits, etc. required pursuant to the terms of the contract.
- 7. A 10% retainage shall be deducted from all progress payments made by FIT.

- 8. Payment requests shall be submitted to FIT not more than once per month.
- 9. Contractor shall provide sufficient and appropriate documentation for all invoices to FIT including submittal of invoices for actual cost of materials, labor rates and certified payrolls. Filing of such payrolls shall comply with the Labor Law and is a condition precedent to payment. FIT reserves the right to request additional information at any time. Contractor required to submit Monthly Contractor's Compliance Form with each Payment Requisition.
- 10. Contractor required to submit a Certificate of Monthly Payment signed by each Sub- contractor with each Payment Requisition.
- 11. Contractor shall be required to submit a detailed Trade Payment Breakdown.

IX. SITE VISITS BY ARCHITECT/ENGINEER

- 1. Failure by Architect/Engineer to detect and/or notify the Contractor of any aspect of the Contractor's actions or materials that are not in conformance with the Contract Documents shall not remove the Contractor's responsibility to adhere to the Contract Documents in all instances, including but not limited to the Contractor's responsibility to expeditiously correct and/or replace all defective work.
- 2. Architect/Engineer will be the final judge as to whether the work is satisfactorily performed and shall have the authority to order that any work deemed unacceptable or not in conformance with the Contract Documents be redone by the Contractor at no cost to FIT.
- 3. Architect/Engineer shall have no responsibility for the presence, discovery, identification, handling, removal or disposal of, or exposure of persons to hazardous materials in any form at the Project site.

X. <u>CHANGE ORDERS</u>

- 1. FIT may order changes in the work of any quantity and without invalidating the Agreement so long as the Contract Sum and/or Contract Time of Completion are adjusted accordingly. All such changes in the work shall be authorized by written Change Order. All Change Orders shall be reviewed by Architect and Engineer and authorized by a representative of FIT.
- 2. No work shall be performed by the Contractor unless it is specifically included in the Contract Scope of Work or authorized in advance by a bulletin issued by the Architect which will serve as the backup paperwork for a change order. The contractor needs to submit a Change Order. All work to

proceed prior to approval of change orders. Change Orders will be negotiated fairly in separate meetings. All written Change Orders are to be signed by all parties.

- 3. Any sums to be paid to Contractor as a result of any Change Order or any sums to be credited to FIT as a result of any Change Order shall be computed by one of the following methods:
 - (1) As agreed upon between the parties to the contract in writing prior to commencement of the work required by the Change Order, or;
 - (2) By Unit Prices detailed in the Contract Documents or subsequently agreed upon.

XI. <u>GUARANTEES</u>

- 1. All work on this project shall be guaranteed by the Contractor for a period of not less than one (1) year, or longer where covered by manufacturer warranty. Warranty to start on the day of the final signoff by FIT.
- 2. If within the guarantee period any of the work is found to be defective or not in conformance with the Contract Documents, the Contractor shall correct it promptly at his own expense after receipt of written notice from FIT.

XII. <u>FINAL PAYMENT</u>

- 1. Final payment (retainage) shall be released to the Contractor thirty (30) days after the project has been signed off by FIT and Architect/Engineer and the Contractor has satisfied all requirements of the Contract Documents.
- 2. In addition to any other requirements of the Contract Documents final payment shall not become due until the Contractor has delivered to FIT and Architect a fully executed 1-year guarantee for all work performed under this project, as well as a complete release of all liens arising out of this Contract, or receipts in full covering all labor, materials, equipment, applicable finance charges, and fines for which a lien could be filed. If such lien remains unsatisfied after payments are made, the Contractor shall refund to FIT all money that FIT may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.
- 3. A Performance Bond and a Labor & Material Payment Bond, a copy of the "Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706)" and "Consent of Surety to Final Payment (AIA Document G707)" shall be submitted by the Contractor prior to the release of final payment.

- 4. One (1) set each of record drawings (measuring 24 inches by 36 inches) indicating the "As- Built" manner of installation of all work, shall be submitted to FIT and Engineer prior to the release of final payment.
- 5. Once the project has reached substantial completion, FIT and Architect will prepare a "Certificate of Substantial Completion". This certificate must be signed by all parties (Engineer, FIT and Contractor), to acknowledge the date the project has reached substantial completion, and confirm agreement on a final punch-list of work to be performed. The Contractor shall be responsible for completing all punch-list items prior to release of final payment.

XIII. SUPPLEMENTAL CONDITIONS

Project Schedule. Contractor shall complete all work as specified within the time period specified in the Contract Documents, inclusive of rain days, but excluding any shutdowns authorized by FIT.

XIV. <u>PREVENTIVE MAINTENANCE SCHEDULE</u>

Prior to final payment, the contractor shall provide a recommended maintenance schedule from the manufacturer for quarterly, semi-annual and yearly requirements, including part numbers where applicable, upon completion of the job.

BID ANALYSIS FORM FOLLOWS

ATTACHMENT C – BID ANALYSIS FORM

FASHION INSTITUTE OF TECHNOLOGY POMERANTZ CENTER FIRE PUMP REPLACEMENT INVITATION FOR BID NUMBER C1591 NYS PREVAILING WAGE SCHEDULE PRC # 2024000704

BID BREAKDOWN

Line	Description	Total Labor Cost	Total Materials, Tools & Equipment	Line Total
1	DEMOLITION	\$	\$	\$
2	FIRE PROTECTION	\$	\$	\$
3	PLUMBING	\$	\$	\$
4	ELECTRICAL	\$	\$	\$
5	FIRE ALARM	\$	\$	\$
6	GENERAL REQUIREMENTS	\$	\$	\$
7	GENERAL CONDITIONS	\$	\$	\$

TOTAL BID PRICE (1-7)

\$_____\$

Add Alternate # 1- Installation of switchboard

As stated in Section IV of the front-end documents: Subcontracting shall be permitted **not to exceed 50%** of the work of the project. Please provide the ratio of the contractors and subcontractors work that will be used on this project.

Contractor _____%, Subcontractor(s) _____%

For Bidding Purposes: the following sections pricing should cover the following items:

General Requirements: permits & licenses; project meetings; administrative overhead for submissions and shop drawings; progress photos; temporary facilities & controls; storage & protection of materials; project closeout; and project record documents.

General Conditions: supervision of work; all testing; coordination drawings; safety programs; insurance and performance & payment bonds.

The undersigned, having carefully examined all Contract Documents, including Notice to Bidders, Bid Terms and Conditions, Contract Terms and Conditions, General Requirements, General Conditions, Labor & Material Payment Bond, Performance Bond, Form of Bid, Non-Collusive Bidding Certification, Substitution Form Request, Contract, Affirmative Action Form, Change Order, Form, Contractor's Trade Payment Breakdown, Safety EHS Plan, Prevailing Wage Schedule, Specifications, and Drawings and having examined the existing conditions by on-site visit(s), hereby submits this Bid Analysis, covering all labor, materials, equipment, tools, machinery, licensing, insurance, taxes, and fees required to perform the specified work at the above-referenced site, in accordance with the Contract Documents. No exclusions & no exceptions.

Company Name and Address of Bidder:

Signature of Bidder	Date	
Printed Name and Title of Representative:		
Telephone #:		
Email Address:		
EIN#:		

IMPORTANT:

This bid analysis form is the <u>only</u> pricing format acceptable. Bidders <u>must</u> submit pricing using this form. <u>FIT will not accept bid responses on any other form.</u>

NOTE:

FIT will not sign any bidder generated contract, agreement or scope of work. FIT Bid and Terms and Conditions apply. Bidder requirement for FIT to sign any document will be grounds for rejection. Bidder inclusion of any conditions, clarifications, exceptions or changes which are not in compliance with FIT Bid and Terms and Conditions will be grounds for rejection.

SECTION IV. GENERAL REQUIREMENTS

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01010 -- SUMMARY OF THE WORK

.01 - Work Under The Contract

The Work shall be as described in the Contract Documents.

.02 - Work by Others

Should any other contractor be engaged by the Owner to perform work on the Site or in areas adjoining or adjacent to the Site, the Contractor and such other contractor shall coordinate the work of the Contractor and such other contractor.

.03 - Items Not Included

The following items shown on the drawings are not included in the Work:

- A. Items indicated "By Others".
- B. Items indicated "N.I.C." (Not in Contract)
- C. Existing construction not indicated or specified to be removed, replaced or altered.

.04 - Openings and Chases

- A. The Contractor shall build openings, including but not limited to channels, chases and flues as required to complete the Work as set forth in the Contract and as directed by the Owner before any work is installed.
- B. After the installation and completion of any work for which openings, including but not limited to, channels, chases and flues, have been provided for the Contractor, the Contractor shall build in, over, around and finish all such openings as required to complete the Work.
- C. If a contractor fails to furnish drawings and information required in connection with such openings before the General Construction Contractor performs any Work affected thereby, said contractor who so fails to furnish such drawings and information shall bear the cost of all cutting and refinishing including that part of the General Construction Contractor's Work affected.
- D. The Contractor shall Furnish and Install all sleeves, inserts, hangers and supports required for the execution of the Work.
- E. Specific instructions shall be obtained from the Owner or the Owner's Representative before cutting beams or other structural members, arches or lintels.
- F. The Contractor shall not endanger the Work and shall not cut or alter the Work unless prior approval and instructions are received from the Owner or the Owner's Representative.

.05 - Surveys and Layout

- A. If, for any reason, stakes, batter boards or monuments are disturbed, it shall be the responsibility of the Contractor to reestablish them.
- B. The Owner or the Owner's Representative may order construction work suspended at any time when location of monuments, stakes, bench marks and other layout markings established by the Contractor are not adequate to permit checking the Work.
- C. The Contractor shall Provide and shall maintain axis lines on each floor and shall establish and shall maintain grade marks 4' 0" above the finished floor on each floor level.
- D. The Contractor shall Furnish such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the Work.

.06 - Scheduling

- A. The Contractor shall deliver to the Owner schedules and forms in accordance with the Contract.
- B. The Owner or the Owner's Representative may require the Contractor to modify schedules which the Contractor has submitted either before or after such schedules are approved so that:
 - 1. The Work shall not be delayed.
 - 2. Changes in the Work are reflected in the schedules of the Contractor.

.07 - Contractor Use of Premises

While performing the Work, the Contractor shall take every precaution against injuries to persons and damage to property.

01080 -- PERMITS AND COMPLIANCE

.01 - Permits and Licenses

The Contractor shall obtain, maintain and pay for all permits and licenses necessary for the execution of the Work and for the use of such Work when completed.

Prior to final payment the Contractor shall deliver to the Owner's Representative all permits and certificates of approval issued by any agency having jurisdiction.

.02 - Compliance

The Contractor shall give all notices, pay all fees and comply with all laws, rules and regulations applicable to the Work.

.03 - Additional Compliance

The Contractor, Subcontractors, and the employees of the Contractor and Subcontractors, shall comply with all regulations governing conduct, access to the premises, operation of equipment and systems and conduct while in or near the premises and shall perform the Work in such a manner as not to unreasonably interrupt or interfere with the conduct of business of the Institution.

.04 - Royalties and Patents

It is the sole responsibility of the Contractor to determine what, if any, patents are applicable to the Project. The Contractor shall pay all royalties and/or license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and save the Owner, Architect, Engineer, Environmental Consultant and Construction Manager harmless from loss, including attorney's fees, on account thereof.

01200 -- PROJECT MEETINGS

.01 - Project meetings shall be held to accomplish the following:

- A. Coordinate the Work.
- B. Establish a sound working procedure and relationship between all contractors, the Owner and the Owner's Representative.
- C. Review requisitions, proposals and change orders.
- D. Review the progress of the Work, review quality of work in place and review approval required by the Work and review delivery of materials.
- E. Expedite the Work to completion within the scheduled time limit.
- F. Review progress payments.

.02 - Initial Job Meeting (Orientation Meeting)

The Owner or the Owner's Representative shall call an initial job meeting which the Contractor shall attend. This meeting shall be called prior to the start of construction.

.03 - Job Progress Meetings

A. Job progress meetings shall be scheduled by the Owner or the Owner's Representative during the course of construction. The Contractor or the Contractor's duly authorized representative and such Subcontractors as required by the Contractor or the Owner or the Owner's Representative shall be present at all job progress meetings. The Contractors and Subcontractors shall answer questions on progress, workmanship, approvals required, delivery of material and other subjects concerning the Work. The purpose of such meetings is to coordinate the efforts of all concerned so that the Work proceeds without delay to completion as required by the Contract.

B. The Owner or the Owner's Representative may require any schedule to be modified so that changes in the Work, delays or acceleration of any segment of the Work shall be reflected in such schedule. The Contractor shall cooperate with the Owner or the Owner's Representative in providing data for such changes in or modifications of schedules.

01300 -- SUBMITTALS

.01 - Schedules & Records

- A. Within the time set forth in the Contract, the Contractor is required to complete and submit to the Owner or the Owner's Representative the following forms:
 - 1. Submit construction progress schedule to the Owner or the Owner's Representative no later than thirty (30) calendar days after receipt by the Contractor of notice to proceed.
 - 2. Submit names and addresses of all Subcontractors to the Owner or the Owner's Representative within thirty (30) calendar days of approval of the construction progress schedule.
 - 3. Submit to the Owner or the Owner's Representative the date on which the Contractor proposes to award each subcontract a minimum of ten (10) days prior to such proposed award.
 - 4. Submit Shop Drawings and material sample schedule to the Owner or the Owner's Representative no later than thirty (30) days after approval of the construction progress schedule. Such schedule shall include the date of all Shop Drawings, samples and materials shall be submitted and the date approval is required.
 - 5. Submit to the Owner or the Owner's Representative on a form approved by the Owner, a schedule of anticipated monthly requisition amounts. Such schedule shall be submitted from time to time as directed by the Owner, the first such submission being required to be made by the Contractor within ten (10) days of receipt by the Contractor of a written order to proceed issued by the Owner. The amounts employed in preparing such schedules in no way shall be binding upon the Owner.
- B. Sample forms shall be provided by the Owner or the Owner's Representative for the above mentioned schedules and records.

01311 – PROJECT ANALYSIS

.01 - Project Control and Progress Meetings

- A. The Contractor shall attend all scheduling meetings as directed by the Owner or the Owner's Representative.
- B. In addition to the Owner or the Owner's Representative and the Contractor's Superintendent and Scheduling Coordinator, such meetings shall also be attended by representatives of such subcontractors as the Contractor, the Owner or the Owner's Representative may deem advisable. The agenda for such meetings shall include the progress and current status of the Work, proposed solutions for problem areas and a review of schedules for future Work in order to meet the Contractor's objectives and his obligations under the Contract. Consideration shall be given to establishing actual start dates, actual completion dates, planned starts and finishes, quantities installed, man hours worked, as well as other data relevant to the performance of the Contract.
- C. At least one week before each meeting described in subsection .01A of this Division 01311, the Contractor shall furnish progress data in the form required by the Owner or the Owner's Representative as follows:
 - 1. The status of all activities as of date determined by the Owner or the Owner's Representative.
 - 2. A list of actual start and completion dates for all activities.
 - 3. Projected durations of completion of those activities in progress.
 - 4. Relevant data of submittals in progress including equipment releases and equipment in fabrication.
 - 5. All other information which in the discretion of the Owner or its Representative, may be required to complete the Project Schedule Update.

.02 – Payment

The Contractor's Payment Breakdown and Monthly Requisition as called for by Section 17.01 of the General Conditions of the Contract shall be the basis by which the Contractor is to be paid.

.03 - Time of Completion

It is the sole responsibility of the Contractor to complete the Work within the time of completion required by the Contract.

01340 -- SHOP DRAWINGS AND SAMPLES

.01 - Contractor Submittal

- A. The Contractor shall submit the Shop Drawings and samples required by the Architect and the Contractor shall adhere to all submittal and scheduling requirements for Shop Drawings and samples. After examination of such Shop Drawings and samples by the Architect and the return of such items by the Architect to the Contractor, the Contractor shall make corrections indicated and shall furnish to the Architect the required number of corrected copies of Shop Drawings or samples.
- B. Shop Drawings shall be accompanied by a letter of transmittal to the Owner or the Owner's Representative requesting approval and date approval is desired.
- C. Each Shop Drawings and letter of transmittal shall be identified with the following information:
 - 1. Project title
 - 2. Contract name
 - 3. Date of the drawing, including dates of any revisions
 - 4. Name of Contractor, name of Subcontractor, material supplier and manufacturer, as applicable
 - 5. Name of person or firm preparing Shop Drawings
 - 6. Contract drawing numbers and specifications, section division and paragraph numbers used as references in preparing Shop Drawings, and titles of items to which the Shop Drawing refers.
- D. Shop Drawings shall show the design, dimensions, connections and other details necessary to insure that the Shop Drawings accurately interpret the Contract Documents and shall also show adjoining Work in such Detail as required to provide proper connections with said adjoining Work. Where adjoining connected Work requires Shop Drawings, such Shop Drawings shall be submitted to the Owner or the Owner's Representative for approval at the same time so that connections can be checked.
- E. The Contractor shall verify all field measurements. Measurements available prior to submittal of Shop Drawings shall be shown and so noted on the Shop Drawings. Measurements not available prior to submission of Shop Drawings shall be noted on the Shop Drawings as not available and such measurements shall be obtained prior to fabrication.

- F. The Contractor shall submit manufacturer's drawings and specifications when necessary to fully explain apparatus or equipment required by the Work. These manufacturer's drawings and specifications shall be treated as Shop Drawings. Manufacturer's catalog numbers alone are not acceptable as sufficient information for compliance with this requirement.
- G. Samples shall be accompanied by a letter of transmittal to the Owner or the Owner's Representative requesting approval, and date approval is desired.
- H. Each sample shall be labeled with the following information:
 - 1. Project title
 - 2. Contract name
 - 3. Date of submission
 - 4. Name and quality of the material
 - 5. Name of Contractor, name of Subcontractor, material supplier and manufacturer, as applicable
 - 6. Contract drawing numbers and specification section, division and paragraph numbers used as reference in preparing samples.
- I. Samples shall be of sufficient size and number to show the quality, type, color, finish and texture of the material required to be furnished by the Contractor pursuant to the Contract.

.02 - Contractor Review

The Contractor shall review, verify and determine all field measurements, field construction criteria, materials, catalog numbers and similar data, shall coordinate each Shop Drawing and sample with the requirements of the Contract and shall determine whether or not such Shop Drawings are in conformity with the provisions of the Contract before submitting the Shop Drawings to the Architect for approval.

.03 - Contractor Responsibility

The Architect's approval of Shop Drawings and samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract. The Contractor shall be responsible for the accuracy of the Shop Drawings and samples and for the conformity of Shop Drawings and samples with the Contract unless the Contractor has notified the Architect of the deviation in writing at the time of submission and has received from the Architect written approval of the specified deviations. The Architect's approval shall not relieve the Contractor of responsibility for errors or omissions in the Shop Drawings or samples.

.04 - Commencement of Work

No portion of the Work shall be commenced until required Shop Drawings or samples are approved by the Architect.

01380 -- PROGRESS PHOTOGRAPHS

.01 - Contractor Submission

- A. The Contractor shall furnish to the Owner, progress photographs of the Work as follows: three (3) 8" x 10" glossy prints of each of the following views:
 - 1. Two (2) different views of the area in which the building or buildings are to be located, taken before excavation starts.
 - 2. Two (2) different views for each building when footings are in place and forms completed.
 - 3. Four (4) different views for each building when foundations are completed.
 - 4. Four (4) different views for each building when exterior wall is fifty per cent (50%) completed.
 - 5. Four (4) different views for each building when the structure is ready for roofing.
 - 6. Four (4) different exterior views in color for each building at completion.
 - 7. Six (6) interior views in color for each building as directed upon completion.
- B. A title identifying the view shown by each photograph and date taken shall appear on the back of each print.

01500 -- TEMPORARY FACILITIES AND CONTROLS

.01 - Requirements

The Contractor shall Provide the temporary facilities and controls as hereinafter specified and as required by law.

.02 - Temporary Lighting and Electric Service

The Contractor shall Provide and maintain all temporary lighting and power required in connection with the Contractor's operations from the commencement of the Work until the completion of each structure or for such other time as

directed by the Owner or the Owner's Representative. When the use of such temporary lighting and power is no longer required, all temporary wiring and equipment shall be completely removed by the Contractor. The Contractor shall make the necessary application to the lighting company and pay for all charges, costs and expenses incidental to the installation and maintenance of temporary lighting and power as required in connection with the Contractor's operations, and the Contractor shall pay for all power used. The minimum temporary lighting to be provided is at the rate of one-quarter watt per square foot and is to be maintained in each room and changed as required when interior walls are being erected. The required temporary lighting must be maintained for twenty-four (24) hours a day and seven (7) days a week at all stair levels and in all corridors below ground; in all other spaces temporary lighting is to be maintained only during working hours. All temporary wiring and equipment shall be in conformity with the National Electric Code. Three-phase temporary power circuits shall be installed as required to operate construction equipment of the various trades and to Install and test equipment such as pumps and elevators. The Contractor shall Install and maintain temporary or permanent service for the permanently installed building equipment such as sump pumps, boilers, boiler controls, fans, pumps, so that such equipment may be operated when required and so ordered by the Owner or the Owner's Representative for drainage or for temporary heat.

.03 - Material Hoists

- A. General
 - 1. Material hoists shall be operated by diesel, gasoline or steam engines and shall be complete with all equipment necessary for operation. Such hoists shall run from grade to roof, shall be installed immediately following the structural framing, centering or form work, and centering or form work unless otherwise approved by the Owner or the Owner's Representative. Electrically operated hoists shall not be used except as otherwise allowed by the Contract.
 - 2. Material hoists shall meet any and all requirements of law, rule or regulation.
 - 3. Hoist cars shall be of required size and design for the hoisting of all normal size building materials.
- B. The Contractor shall:
 - 1. Furnish, install, maintain and operate at the Contractor's expense, all hoisting equipment required for the Work.
 - 2. Furnish all labor required for the Work.

.04 - Temporary Use of Permanent Elevator as Equipment Material Hoist

- A. The Contractor shall:
 - 1. Use the temporary hoists until a building is completed, or until the Contractor may, with the Owner's permission, use the equipment of one (1) elevator in a building for temporary service after the permanent elevator equipment and the permanent electric service have been installed.
 - 2. If the Contractor elects to use such permanent elevator equipment, the Contractor shall:
 - a. Provide adequate protection for such equipment and shall operate such equipment within a capacity not to exceed that allowed by law, rule or regulation.
 - b. Provide for the maintenance of the elevator equipment as approved by the Owner or the Owner's Representative.
 - c. Leave such equipment in perfect condition.
- B. The permanent elevator equipment shall be ready for use when required by the Work and shall permit any use approved by the Owner or the Owner's Representative.

.05- Temporary Enclosures

The Contractor shall:

- A. Provide, install and maintain any temporary weather resistant enclosures for all openings in exterior walls and roof that are not enclosed.
- B. After building is enclosed, maintain proper temperatures required by the Contract.

.06 - Temporary Fence Enclosures

The Contractor shall Provide, Install and maintain any temporary fence enclosures required by the Contract.

.07 - Maintenance of Permanent Roadways

The Contractor shall immediately remove dirt and debris which may collect on permanent roadways due to the Work.

.08 – Traffic Control

- A. Routes to and from the location of the Work shall be as indicated in the Contract or as directed by the Owner or the Owner's Representative.
- B. Parking areas for the use of those engaged in the Work shall be as indicated in the Contract or as directed by the Owner or the Owner's Representative.

.09 - Fire Prevention Control

The Contractor Shall:

- A. Provide private unlisted telephone service reserved for fire calls at a location or locations approved by the Owner or the Owner's Representative. Such service shall be in addition to any other telephone service. The Contractor shall pay all costs thereof until completion and acceptance of the Work or as otherwise directed by the Owner or the Owner's Representative.
- B. Comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to the Work and, particularly, in connection with any cutting or welding performed as part of the Work.

.10 - Pollution Control

The Contractor shall:

- A. Comply with all laws, rules and regulations governing pollution control, including but not limited to those of the Department of Environmental Conservation of the State of New York.
- B. Take all necessary precautions including, but not limited to digging and maintaining settling basins and dams; diverting streams, and taking all other actions that may be necessary to prevent silt, and waste of any kind from being deposited, silting and reduction of quality of streams below the construction area and downstream properties as a result of the Work.
- C. Refrain from the disposal of volatile fluid wastes into storm or sanitary sewer systems, approved sewage disposal systems or any waterway.
- D. Refrain from burning trash or waste materials.

.11 - Temporary Field Office

- A. The Contractor may Provide a temporary office structure, for the Contractor's use during the course of the Work.
 - 1. The Contractor must receive prior written approval from the Owner or the Owner's Representative for such temporary office structure in relation to location, type of structure, and included facilities.
 - 2. All toilet and sink facilities in any such office structure shall be connected to an approved sewage disposal system.
 - 3. The Contractor shall remove the temporary office structure from the Site and shall repair the Site and finish the area as directed by the Owner or the Owner's Representative.
- B. The Contractor shall:
 - 1. Provide a temporary office structure completely separate from any other office structures at a location approved by the Owner or the Owner's Representative until the Work is completed and is accepted.
 - 2. Provide such office structure for the exclusive use of the Owner.
 - 3. Bear all costs in relation to the furnishing, construction and removal of such office structure.
 - 4. Repair and refinish the area as directed by the Owner or the Owner's Representative.
 - 5. Construct such office structure and furnish such office structure as required by the Contract.
 - 6. Maintain such office structure in a sanitary condition and in proper repair, properly heat the structure, furnish the fuel and furnish all utilities and pay all utility charges.
 - 7. Install a telephone for the sole use of the Owner or the Owner's Representative and pay all service and local toll charges incurred as a result of the use of such telephone service.
- C. With the prior written approval of the Owner or the Owner's Representative any other Contractor may erect a substantial office structure at the Site for the use of such Contractor in relation to the Work.
 - 1. All toilet and sink facilities in any such office structure shall be connected to an approved sewage disposal system.

- 2. Such Contractor shall remove the temporary office structure from the Site and shall repair the Site and finish the area as directed by the Owner or the Owner's Representative.
- D. When adequate space is available in a building, the Contractor may transfer such office to available space with the prior written permission of the Owner or the Owner's Representative.
- E. Trailers providing comparable facilities may be accepted at the discretion of the Owner or the Owner's Representative.

.12 - Rubbish Removal

- A. The Contractor shall:
 - 1. Keep the Work free from rubbish at all times.
 - 2. Clean all enclosed structures daily.
 - 3. Remove rubbish from the Site at least once a week.
- B. The Contractor shall conform with the following:
 - 1. Burning of rubbish shall not be permitted.
 - 2. All rubbish shall be lowered by way of chutes, taken down by hoists, or lowered in receptacles. Under no circumstances shall any rubbish be dropped or thrown from one (1) level to another inside or outside any building.

.13 - Discontinuance, Changes and Removal

The Contractor shall:

- A. Discontinue all temporary services required by the Contract when so directed by the Owner or the Owner's Representative. The discontinuance of any such temporary service prior to the completion of the Work shall not render the Owner liable for any additional cost entailed thereby.
- B. Remove and relocate such temporary facilities as directed by the Owner or the Owner's Representative without additional cost to the Owner, and shall restore the Site and the work to a condition satisfactory to the Owner.

.14 - Project Identification

A. No signs or advertisements shall be displayed on the site except as required by the Contract.

B. The Contractor shall Furnish, erect and maintain the Site, the exact location thereof to be designated by the Owner or the Owner's Representative, a construction sign, in the form provided by the Contract.

.15 - Moisture and Condensation Control

The Contractor shall provide for ventilation of all structures until Physical Completion and acceptance of the Work and shall control such ventilation to avoid excessive rates of drying of construction materials, including but not limited to concrete and to plaster, and to prevent condensation on sensitive surfaces.

.16 - Protective Services

The Contractor shall provide security services required by the Contract.

01600 -- MATERIAL AND EQUIPMENT

.01 - Storage and Protection

- A. Materials stored on the Site shall be neatly piled and protected, and shall be stored in an orderly fashion in locations that shall not interfere with the progress of the Work or with the daily functioning of the Institution.
- B. Should it become necessary during the course of the Work to move materials or equipment stored on the Site, the Contractor, at the direction of the Owner or the Owner's Representative, shall move such material or equipment.

01700 -- PROJECT CLOSE OUT

.01 - Final Cleanup

- A. The Contractor shall leave the Work ready for use and occupancy without the need of further cleaning of any kind.
- B. The Contractor shall remove all tools, appliances, projects signs, material and equipment from the premises as soon as possible upon completion of the Work.
- C. The Work is to be turned over to the Owner in new condition, in proper repair and in perfect adjustment.

.02 - Required Close Out Documentation

A. Prior to final payment the Owner shall receive the following documents as required by the Contract:

- 1. The Contractor's general guarantee.
- 2. Specific guarantees, material, equipment and other items of work.
- 3. All certificates obtained in connection with the Work.
- 4. All final photographs of the Work.
- B. The Owner shall also receive from the Contractor prior to final payment:
 - 1. A complete listing of all Subcontractors, business addresses and items supplied by each such Subcontractor.
 - 2. A listing of manufacturer's of major materials, equipment and systems installed in the Work.
 - 3. A copy of all test data taken in connection with the Work.
 - 4. Three (3) copies of all operation and maintenance manuals.
 - 5. All keys, tools, screens, spare construction material, finishing material and equipment required to be furnish to the Owner as part of the Work.

.03 - Orientation Instruction

Prior to final payment appropriate maintenance personnel of the Owner shall be oriented and instructed by the Contractor in the operation of all systems and equipment as required by the Contract.

.04 - Project Close Out Inspections

- A. When the Work has reached such a point of completion that the building or buildings, equipment or apparatus or any part thereof required by the Owner for occupancy or use can be so occupied and used for the purpose intended, the Owner or the Owner's Representative shall make a detailed inspection of the Work to insure that all requirements of the Contract have been met and that the Work is complete and is acceptable.
- B. A copy of the report of the inspection shall be furnished to the Contractor as the inspection progresses so that the Contractor may proceed without delay with any part of the Work found to be incomplete or defective.
- C. When the items appearing on the report of inspection have been completed or corrected, the Contractor shall so advise the Owner and the Owner's Representative. After receipt of the notification, the Owner or the Owner's Representative shall inform the Contractor of the date and time of final inspection. A copy of the report of the final inspection containing all

remaining contract exceptions, omissions and incompletions shall be furnished to the Contractor.

D. After receipt of notification of completion and all remaining contract exceptions, omissions and incompletions from the Contractor, the Owner and the Owner's Representative shall make an inspection to verify completion of the exception items appearing on the report of final inspection.

01720 -- PROJECT RECORD DOCUMENTS

.01 - Project Record Drawings

- A. The purpose of the project drawings is to record the actual location of the Work in place including but not limited to underground lines, concealed piping within buildings, concealed valves and control equipment, and to record changes in the Work.
- B. In addition to the sets of contract drawings that are required by the Contractor on the Site to perform the Work, the Contractor shall maintain, at the Site, one (1) copy of all drawings, specifications and addenda that are part of the Contract as awarded. Each of these documents should be clearly marked "Project Record Copy", maintained in a clean and neat condition available at all times for inspection by the Owner or the Owner's Representative, and shall not be used for any other purpose during the progress of the Work.
- C. Project Record Requirements
 - 1. The Contractor shall mark-up the "Project Record Copy" to show:
 - (a) Approved changes in the Work.
 - (b) Location of underground Work and concealed Work.
 - (c) Details not shown in the original Contract Documents.
 - (d) Any relocation of Work.
 - (e) All changed in dimensions.
 - (f) All access doors.
 - (g) Location of all plumbing, heating, ventilating, air conditioning or electrical assemblies.
 - 2. Such information shall include, but shall not be limited to:

- (a) Footing depth in relation to finished grade elevations.
- (b) Any change in floor elevations.
- (c) Any structural changes.
- (d) Any substitutions.
- (e) Elevations and locations of all underground utilities, services, or structures referenced to permanent above-ground structures or monuments.
- (f) Designation of all utilities as to the size and use of such utilities.
- (g) All invert elevations of manholes.
- (h) The location of all utilities, services and appurtenances concealed in building structures that have been installed different from that required by the Contract.
- (i) Any approved change order.
- D. The Contractor shall keep the Project Record Documents up-to-date from day to day as the Work progresses. Appropriate documents are to be updated promptly and accurately; no Work is to be permanently concealed until all required information has been recorded.
- E. The project record drawings are to be submitted by the Contractor to the Owner or the Owner's Representative when all the Work is completed and is approved by the Owner and the Owner's Representative before the Contractor may request final payment.

01740 -- WARRANTIES, GUARANTEES, AND BONDS

See the Contract Documents for details.

SECTION V. GENERAL CONDITIONS

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ARTICLE 1 -- DEFINITIONS

<u>Section 1.01 - The following terms as used in the Contract Documents shall be defined</u> <u>as follows:</u>

Beneficial Occupancy - The use, occupancy or operation by the Owner of the Work, or any part thereof, as evidenced by a notification of Beneficial Occupancy executed by the Owner.

Construction Completion - Acceptance by the Owner of the Work as evidenced by a Notification of Construction Completion executed by the Architect.

Construction Manager - A person, persons, firm, partnership or corporation, regularly engaged in the management of construction projects, and so designated by the Owner.

Consultant - A person, persons, firm, partnership or corporation providing Architectural, Engineering or other professional services, and so designated by the Owner.

Contract - The agreement between the Owner and the Contractor consisting of the Contract Documents including all amendments and supplements thereto.

Contract Documents - The Contract, Notice to Bidders, Bid Checklist, Bid Terms and Conditions, Contractor Reference Sheet, Contract Terms and Conditions, Bid Analysis Form, Affirmative Action Form, Change Order Form, Contractors Trade Payment Breakdown, Safety EHS Plan, Prevailing Wage Schedule, Information for Bidders, Form of Bid, General Conditions, General Requirements, Bonds, Drawings, Specifications, Addenda, Change Orders and any supplementary data together with all provisions of law deemed to be inserted in the Contract or incorporated by reference.

Contractor - A person, persons, firm, partnership or corporation with whom the Contract is entered into by the Owner to perform the Work.

Extra Work - Any work in addition to the Work initially required to be performed by the Contractor pursuant to the Contract.

Furnish - To deliver to the site ready for installation.

Install - To unload at the delivery point at the Site and perform every operation necessary to establish secure mounting and correct operation at the proper location.

Owner – The Fashion Institute of Technology and/or its auxiliary corporations, as applicable.

Owner's Representative - A person, persons, firm, partnership or corporation so designated by the Owner.

Project - Work at the Site(s) carried out pursuant to one or more sets of Contract Documents.

Provide - To Furnish and Install complete in place and ready for operation and use.

Shop Drawings - Diagrams, fabrication drawings, illustration, schedules, test data, performance charts, cuts brochures and other data which are submitted by the Contractor to the Architect and illustrate any portion of the Work. These drawings and data are reviewed and acted upon by the architect.

Site - The area within the Contract limit, as indicated by the Contract.

Subcontract - An agreement between the Contractor and Subcontractor for work on the Site.

Subcontractor - A person, persons, firm, partnership or corporation under contract with the Contractor, or under contract with any subcontractor, to provide labor and material at the Site.

Substantial Completion - Stage of construction at which the Architect determines there is a minimal amount of the Work to be completed, or Work to be corrected.

Work - The performance of all obligations imposed upon the Contractor by the Contract.

ARTICLE 2 -- CONTRACT DOCUMENTS

Section 2.01 - Captions

The table of contents, titles, captions, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect the interpretation of the provisions to which they refer.

Section 2.02 - Conflicting Conditions

Should any provision in any of the Contract Documents be in conflict or inconsistent with any of the General Conditions or Supplements thereto, the General Conditions or Supplements thereto shall govern.

Section 2.03 - Notice and Service Thereof

Any notice to the Contractor from the Owner relative to any part of the Contract shall be in writing and service considered complete when said notice is mailed to the Contractor at the last address given by the Contractor, or when delivered in person to said Contractor or the Contractor's authorized representative.

Section 2.04 - Nomenclature

Materials, equipment or other Work described in words which have a generally accepted technical or trade meaning shall be interpreted as having said meaning in connection with the Contract.

Section 2.05 - 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 determined to 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.

ARTICLE 3 -- INTERPRETATION OF CONTRACT DOCUMENTS

Section 3.01 – Owner/Architect

- A. The Owner's representative/Architect shall give all orders and directions contemplated under the Contract relative to the execution of the Work. The Architect shall determine the amount, quality, acceptability of the Work and shall decide all questions which may arise in relation to said Work. The Owner's estimates and decisions shall be final except as otherwise expressly provided. In the event that any question arises between the Owner and Contractor concerning the Contract, the decision of the Owner shall be a condition precedent to the right of the Contract to receive any money or payment under the Contract.
- B. Any differences or conflicts concerning performance which may arise between the Contractor and other contractors performing Work for the Owner shall be adjusted and determined by the Owner's representative.
- C. The Owner may act through a representative designated by the Owner.

Section 3.02 - Meaning and Intent of Contract Documents

The meaning and intent of all Contract Documents shall be as interpreted by the Architect.

Section 3.03 - Order of Preference

- A. Figured dimensions shall take precedence over scaled dimensions. Larger scale drawings shall take precedence over smaller scale drawings. Latest addenda shall take precedence over previous addenda and earlier dated drawings and specifications.
- B. Should a conflict occur in or between or among any parts of the Contract Documents that are entitled to equal preference, the better quality or greater quantity of material, of the more specific compared to the general, shall govern, unless the Architect/Owner's representative directs otherwise.
- C. Drawings and specifications are complementary. Anything shown on the drawings and not mentioned in the specifications, or mentioned in the specifications and not shown on the drawings, shall have the same effect as if shown or mentioned in both.

ARTICLE 4 -- MATERIALS AND LABOR

Section 4.01 - Contractor's Obligations

- A. The Contractor shall, in a good workmanlike manner, perform all the Work required by the Contract Documents within the time specified in the Contract.
- B. The Contractor shall Furnish, erect, maintain, and remove such construction plant and such temporary Work as may be required for the performance of its work. The Contractor shall be responsible for the safety, efficiency and adequacy of the Contractor's plant, appliances and methods, and for damage which may result from failure or improper construction, maintenance or operation of said plant, appliances and methods. The Contractor shall comply with all terms of the Contract, and shall, carry on and complete the entire Work to the satisfaction of the Owner.
- C. Any labor, materials or means whose employment or utilization during the course of this Contract may tend to or in any way cause or result in strike, work stoppages, delays, suspension of Work or similar troubles by workmen employed by the Contractor, its subcontractors or material suppliers, or by any of the trades working in or about the buildings and premises where Work is being performed under this Contract, or by other contractors, their subcontractors or material suppliers pursuant to other contracts shall not be allowed. Any violation by the Contractor of this requirement may in the sole judgment of the Owner be considered as proper and sufficient cause for declaring the Contractor to be in default, and for the Owner to take action against the Contractor as set forth in the General Conditions Article entitled "Termination" or such other action as the Owner may deem proper.

Section 4.02 - Contractor's Title to Materials

- A. No materials or supplies for the Work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by any other party. The Contractor warrants that the Contractor has full, good and clear title to all materials and supplies used by the Contractor in the Work, or resold to the Owner pursuant to the Contract free from all liens, claims or encumbrances.
- B. All materials, equipment and articles which become the property of the Owner shall be new unless specifically stated otherwise.

Section 4.03 - "Or Equal" Clause

- A. Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturers' or vendors' names, trade names, catalogue number or make, said identification is intended to establish a standard. Any material, article or equipment of other manufacturers and vendors which performs satisfactorily the duties imposed by the general design may be considered equally acceptable provided that, in the opinion of the Architect/Engineer, the material, article or equipment so proposed is of equal quality, substance and function and the Contractor shall not Provide, Furnish or Install any said proposed material, article or equipment without the prior written approval of the Architect/Engineer. The burden of proof and all costs related thereto concerning the "or equal" nature of the substitute item, whether approved or disapproved, shall be borne by the Contractor.
- B. Where the Architect/Engineer, pursuant to the provisions of this Section, approves a product proposed by the Contractor and said proposed product requires a revision of the Work covered by this Contract, or the Work covered by other contracts, all changes to the Work of all contracts, revision or redesign, and all new drawings and details required therefore shall be provided by the Contractor at the cost of the Contractor and shall be subject to the approval of the Consultant.
- C. No substitution will be permitted which may result in a delay to the Project.

Section 4.04 - Quality, Quantity and Labeling

- A. The Contractor shall Furnish materials and equipment of the quality and quantity specified in the Contract.
- B. When materials are specified to conform to any standard, the materials delivered to the Site shall bear manufacturer's labels stating that the materials meet said standards.

- C. The above requirements shall not restrict or affect the Owner's right to test materials as provided in the Contract.
- D. The Contractor shall develop and implement quality control plans to assure itself and the Owner that all Work performed by the Contractor and its Subcontractors complies fully with all Contract requirements, and shall submit the plans to the Owner as required by the Contract. See Submittals Section of the General Requirements. The Contractor's quality control plans shall be independent of any testing or inspection performed by or on behalf of the Owner.

ARTICLE 5 -- CONTRACTOR

Section 5.01 - Supervision by Contractor

- A. The Contractor shall provide full-time competent supervision for the duration of the Contract; during the course of on-site work the Contractor shall provide a full-time on-site superintendent who shall have full authority to act for the Contractor at all times. The Superintendent shall be able to read, write and speak English fluently, as well as communicate with the workers.
- B. If at any time the supervisory staff is not satisfactory to the Owner, the Contractor shall, if directed by the Owner, immediately replace such supervisory staff with other staff satisfactory to the Owner.
- C. The Contractor shall remove from the Work any employee of the Contractor or of any Subcontractor when so directed by the Owner.

Section 5.02 - Representations of Contractor

The Contractor represents and warrants:

- A. That it is financially solvent and is experienced in and competent to perform the Work, and has the staff, equipment, subcontractors and suppliers available to complete the Work within the time specified for the Contract price.
- B. That it is familiar with all Federal, State or other laws, ordinances, orders, rules and regulations that may in any way affect the Work.
- C. That any temporary and permanent Work required by the Contract can be satisfactorily constructed, and that said construction will not injure any person or damage any property.
- D. That it has carefully examined the Contract and the Site of the Work and that, from the Contractor's own investigations and through the bid process and requirements is satisfied as to the nature and materials likely to be encountered, the character of equipment and other facilities needed

for the performance of the Work, the general and local conditions and all other materials or items which may affect the Work.

E. That it is satisfied that the Work can be performed and completed as required in the Contract, and warrants that it has not been influenced by any oral statement or promise of the Owner or the Consultant.

SECTION 5.03 – COPIES OF CONTRACT DOCUMENTS FOR CONTRACTORS

- A. The Owner shall furnish to the Contractor, without charge, up to five (5) copies of Contract Documents.
- B. Any sets in excess of the number mentioned above may be furnished to the Contractor at the cost of reproduction and mailing or delivery.

SECTION 5.04 - MEETINGS

The Contractor shall attend all meetings as directed by the Owner or the Owner's Representative.

SECTION 5.05 – RELATED WORK

To ascertain the relationship of its work to all Work required by the Contract Documents, the Contractor shall examine the Contract Documents for Work of its Contract and any related work of other contracts.

SECTION 5.06 – ERRORS OR DISCREPANCIES

The Contractor shall examine the Contract thoroughly before commencing the Work and report in writing any errors or discrepancies to the Owner or the Owner's Representative within five (5) days of discovery.

ARTICLE 6 -- SITE CONDITIONS

SECTION 6.01 – SUBSURFACE OR SITE CONDITIONS FOUND DIFFERENT

A. The Contractor acknowledges that the Contract amount set forth in its bid includes such provisions which the Contractor deems proper for all Site conditions the Contractor could reasonably anticipate encountering as indicated in the Contract or from the Contractor's inspection and examination of the Site prior to submission of bids.

SECTION 6.02 – VERIFYING DIMENSIONS AND CONDITIONS

- A. The Contractor shall take all measurements and verify all dimensions and conditions at the Site before proceeding with the Work. If said dimensions or conditions are found to be in conflict with the Contract, the Contractor immediately shall refer said conflict to the Architect in writing. The Contractor shall comply with any revised Contract Documents.
- B. During the progress of Work, the Contractor shall verify all field measurements prior to fabrication of building components or equipment and proceed with the fabrication to meet field conditions.
- C. The Contractor shall consult all Contract Documents to determine exact location of all Work and verify spatial relationships of all Work. Any question concerning said location or spatial relationships may be submitted in a manner approved by the Architect.
- D. Special locations for equipment, pipelines, ductwork and other such items of Work, where not dimensioned on plans, shall be determined in consultation with other affected contractors.
- E. The Contractor shall be responsible for the proper fitting of the Work in place.

SECTION 6.03 - SURVEYS

Unless otherwise expressly provided in the Contract, the Owner shall furnish the Contractor all surveys of the property necessary for the Work, but the Contractor shall lay out the Work.

ARTICLE 7 -- INSPECTION AND ACCEPTANCE

SECTION 7.01 – ACCESS TO THE WORK

The Owner, the Owner's Representative, and the architect shall at all times have access to the Work and the Contractor shall provide proper facilities for said access.

SECTION 7.02 – NOTICE FOR TESTING

If the Contract Documents, the Owner's instructions, laws, rules, ordinances or regulations require that any Work be inspected or tested, the Contractor shall give the Architect and/or Owner's representative a minimum of three (3) work days written notice of readiness of the Work for inspection or testing and the date fixed for said inspections or testing.

SECTION 7.03 – REEXAMINATION OF WORK

Reexamination of any part of the Work may be ordered by the Owner, and if so ordered, the Work must be uncovered by the Contractor. If said Work is found to be in accordance with the Contract, the Owner shall pay the cost of reexamination. If said Work is not found to be in accordance with the Contract, the Contract, the Contract shall pay the cost of reexamination and replacement.

SECTION 7.04 – INSPECTION OF WORK

All Work, all materials whether or not incorporated in the Work, all processes of manufacture and all methods of construction shall be, at all times and places, subject to the inspection of the Owner or the Owner's Representative or the architect, and the Architect shall be the final judge of the quality and suitability of the Work, materials, processes of manufacture and methods of construction for the purposes for which said Work, materials, processes of manufacture and methods of construction are used. Any Work not approved by the Architect shall be reconstructed, made good, replaced or corrected immediately by the Contractor including all Work of other contractors destroyed or damaged by said removal or replacement. Rejected material shall be removed immediately from the Site. Acceptance of material and workmanship by the Owner shall not relieve the Contractor from the Contractor's obligation to replace all Work which is not in compliance with the Contract.

SECTION 7.05 – DEFECTIVE OR DAMAGED WORK

If, in the opinion of the Owner, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the Work damaged or not performed in accordance with the Contract, the compensation to be paid to the Contractor shall be reduced by an amount which, in the judgment of the Owner, shall be deemed to be equitable.

SECTION 7.06 - TESTING

All materials and equipment used in the Work shall be subject to inspection and testing in accordance with accepted standards to establish conformance with specifications and suitability for uses intended, unless otherwise specified in the Contract. If any Work shall be covered or concealed without the approval or consent of the Architect, said Work shall, if required by the Architect, be uncovered for examination. Any inspection by the Architect or by a testing laboratory on behalf of the Owner does not relieve the Contractor of the responsibility to maintain quality control of materials, equipment and installation to conform to the requirements of the Contract. If any test results are below specified minimums, the Architect may order additional testing. The cost of said additional testing, any additional professional services required, and any other expenses incurred by the Owner as a result of said additional testing shall be at the Contractor's expense. The Owner may deduct such costs from moneys due the Contractor.

SECTION 7.07 - ACCEPTANCE

No previous inspection shall relieve the Contractor of the obligation to perform the Work in accordance with the Contract. No payment, either partial or full, by the Owner to the Contractor shall excuse any failure by the Contractor to comply fully with the Contract Documents. The Contractor shall remedy all defects and deficiencies, paying the cost of any damage to other Work resulting therefrom.

ARTICLE 8 -- CHANGES IN THE WORK

SECTION 8.01 - CHANGES

A. Without invalidating the Contract, the Owner/Architect may order Extra Work or make changes by altering, adding to, or deducting from the Work, the Contract consideration being adjusted accordingly. No claims for Extra Work shall be allowed unless such Extra Work is ordered in writing by the Owner/Architect. No changes in the Work shall be made unless such Work is ordered in writing by the Owner/Architect or Owner's Representative. If the time for completion is affected by this change, the revised time for completion shall be included in the change order. The Owner may order the Contractor to perform the Extra Work and proceed under the Dispute Article.

- B. The amount by which the Contract consideration is to be increased or decreased by any change order may be determined by the Owner by one or more of the following methods:
 - 1. By applying the applicable unit price or prices contained in the Contract.
 - 2. By estimating the fair and reasonable cost of the Extra Work:
 - a. Labor, including all wages, required wage supplements and insurance required by law, paid to employees below the rank of superintendent directly employed at the Site. Wages are the prevailing rate of wages defined in the Contract Documents and supplemental updates.
 - b. Premiums or taxes paid by the Contractor for worker's compensation insurance, unemployment insurance, FICA tax and other payroll taxes as required by law, net of actual and anticipated refunds and rebates.
 - c. Materials
 - d. Equipment, excluding hand tools, which in the judgment of the Owner, would have been or will be employed in the Work. It is the duty of the Contractor to utilize either rented or self-owned equipment that is of a nature and size appropriate for the Work to be performed. The Owner reserves the right to determine reasonable and appropriate equipment sizing, and at the Owner's discretion, to adjust the costs allowed to reflect a smaller or less elaborate piece of equipment more suitable for performance of the Extra Work.
 - 3. By determining the actual cost of the Extra Work in the same manner as in Article 8, Section 8.01, Subsection B. 2. except that the actual costs of the Contractor shall be used in lieu of estimated costs.
- C. The Owner shall have the option of determining by which method the Contractor shall proceed with said Extra Work. Wages are the prevailing rate of wages defined in the Contract Documents and supplemental updates. The Contractor shall submit a signed and notarized Labor Rate Worksheet(s) to the Owner to be used to determine hourly rates for various classifications of workers. The Contractor agrees to provide documentation verifying costs and calculations at the Owner's request.

- D. Regardless of the method used by the Owner in determining the value of a change order, the Contractor shall, within the time-frame given by the Owner, submit to the Owner or Owner's Representative a detailed breakdown of the Contractor's estimate of the value of the omitted or Extra Work.
- E. Unless otherwise specifically provided for in a change order, the compensation specified therein for Extra Work includes full payment for the Extra Work covered thereby, and the Contractor waives all rights to any other compensation for said Extra Work, damage or expense.
- F. The Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost and when requested by the Owner shall give the Owner access to all accounts and records relating thereto, including records of subcontractors and material suppliers.
- G. Increased bonding costs for the Work which may result from Owner issued Changes in the Work will be addressed by the Owner at the completion of the Project Work upon submission of satisfactory proof of Contractor's increased cost.
- H. Increased contractual liability insurance premium costs which may result from changes in the Work will be addressed by the Owner at the completion of the Work upon submission of satisfactory proof of Contractor's increased cost.

SECTION 8.02 – OVERHEAD AND PROFIT ALLOWANCE

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A. See Example A for changes in the Work performed directly by the Contractor, whether a base cost is arrived at by estimated cost or actual cost method; add to base cost a sum equal to twenty percent. See Exceptions - Paragraphs "D" and "E".

Example A:	
Contractor base cost	\$1,000
20% overhead and profit	200
Total	\$1,200

B. See Example B for changes in the Work performed by a Subcontractor under contract with the Contractor, where estimated or actual cost is Ten Thousand Dollars (\$10,000.00) or less; add to the base cost a sum equal to twenty percent of cost, for the benefit of the Subcontractor. For the benefit of the Contractor; add an additional sum equal to ten percent of the Subcontractor's base cost.

Example B:	
Subcontractor base cost	\$1,000
20% Subcontractor overhead and profit	<u>200</u>
Subcontractor Total	\$1,200
10% Contractor overhead and profit on base cost	<u>100</u>
Total	\$1,300

C. See Example C for changes in the Work performed by a Subcontractor, under contract with the Contractor, which exceeds a base cost of Ten Thousand Dollars (\$10,000) in estimated or actual cost; add to the base cost a sum equal to twenty percent of cost for the benefit of the Subcontractor. For the benefit of the Contractor; add an additional sum equal to ten percent of the first Ten Thousand Dollars (\$10,000) of the Subcontractor's base cost, plus five percent of the next Ninety Thousand Dollars (\$90,000) of the Subcontractor's base cost, plus three percent of any sum in excess of One Hundred Thousand Dollars (\$100,000) of the Subcontractor's base cost.

Example C:

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Subcontractor base cost	\$200,000
20% Subcontractor overhead and profit	40,000
Subcontractor Total	\$240,000
10% Contractor overhead and profit on first \$10,000 base cost	1,000
5% on next \$90,000 base cost	4,500
3% on base cost over \$100,000	<u>3,000</u>
Total	\$248,500

D. See Example D for overhead and profit on major equipment such as: switchgear, transformers, air handling units, boilers, etc. For extra equipment purchases by the Contractor or Subcontractors which exceeds a base cost of Ten Thousand dollars (\$10,000) in estimated or actual cost; add to the base cost for the benefit of the Contractor a sum equal to ten percent of the first Ten Thousand dollars (\$10,000) of the vendor's base cost plus five percent of the next Ninety Thousand dollars (\$90,000) of the vendor's base cost, plus three percent of any sum in excess of One Hundred Thousand dollars (\$100,000) of the vendor's base cost. If the equipment is supplied by the Subcontractor, the Contractor is entitled to a maximum of ten (10) percent of the first Ten Thousand dollars (\$10,000) of the base cost.

Example D:

Vendor base cost	\$200,000
10% Contractor or Subcontractor overhead and profit on first \$10,000 base cost	1,000
5% on next \$90,000 base cost	4,500
3% on base cost over \$100,000	3,000
Contractor or Subcontractor Total	\$208,500
10% Contractor overhead and profit on first \$10,000 base cost when equipment	
is supplied by the Subcontractor, no other mark-up allowed	<u>1,000</u>
Total	\$209,500

E. See Example E for overhead and profit on a material only Change Order. For increased material purchases by the Contractor or Subcontractors which exceed a base cost of Ten Thousand dollars (\$10,000) in estimated or actual costs; add to the base cost for the benefit of the Contractor a sum equal to ten percent of the first Ten Thousand dollars (\$10,000) of the supplier's cost plus five percent of the next Ninety Thousand dollars (\$90,000) of the supplier's cost, plus three percent of any sum in excess of One Hundred Thousand dollars (\$100,000) of the supplier's cost. If the material is supplied by the Subcontractor, the Contractor is entitled to a maximum of ten (10) percent of the first Ten Thousand dollars (\$10,000) of the base cost.

Example E:

Material cost (net difference between original contract and revised)	\$200,000
10% Contractor or Subcontractor overhead and profit on first \$10,000 base cost	1,000
5% on next \$90,000 base cost	4,500
3% on base cost over \$100,000	3,000
Contractor or Subcontractor Total	\$208,500
10% Contractor overhead and profit on first \$10,000 base cost when material	
is supplied by the Subcontractor, no other mark-up allowed	1,000
Total	\$209,500

F. Other than the overhead and profit described in General Conditions Section 7.02A, no further overhead and profit will be allowed for changes to the Work performed by a Subcontractor under Subcontract with the Contactor or for major equipment or material supplier determined to be an affiliate of or controlled by the Contractor. An affiliate is considered any firm or entity in which the Contractor or any individual listed on the Contractor's NYS Vendor Responsibility Questionnaire either owns 5% or more of the shares of, or is one of the five largest shareholders, a director, officer, member, partner or proprietor of said Subcontractor, major equipment or material supplier; a controlled firm is any firm or entity which, in the opinion of the Owner, is controlled by the Contractor or any individual listed on the Contractor's NYS Vendor Responsibility Questionnaire.

1. The Owner, in its sole and exclusive discretion, will determine if a firm or entity is an affiliate of or controlled by the Contractor.

G. No overhead and profit shall be paid for changes in the Work performed by a Subcontractor not under Subcontract with the Contractor. No overhead and profit shall be paid on the premium portion of overtime pay. Where the changes in the Work involve both an increase and a reduction in similar or related Work, the overhead and profit allowance shall be applied only to the cost of the increase that exceeds the cost of the reduction.

SECTION 8.02A – DEDUCT CHANGE ORDER

The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a decrease in the Contract amount shall be as determined by the Owner. The credit shall include the overhead and profit allocable to the deleted or changed Work unless the Owner, in its sole and exclusive discretion, determines otherwise.

SECTION 8.03 – FORM OF CHANGE ORDERS

All Change Orders shall be processed, executed and approved on AIA document G701, which is included herein and made part of the Contract Documents. No alteration to this form shall be acceptable to the Owner and no payment for Extra Work shall be due the Contractor unless it executes a Change Order on said form.

ARTICLE 9 -- TIME OF COMPLETION

SECTION 9.01 – TIME OF COMPLETION

- A. The Work shall be commenced at the time stated in the Owner's written notice to proceed, and shall be completed no later than the time of completion specified in the Contract Documents. Notwithstanding anything to the contrary, a schedule submitted by the Contractor showing a time of completion earlier than that specified in the Contract shall not entitle the Contractor to any additional compensation in the event the earlier time of completion is not realized.
- B. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the time for completion of the Work, as specified in the Contract Documents, is an essential and material condition of the Contract.
- C. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as shall insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the Work described herein is a reasonable time for completion of the same.
- D. If the Contractor shall neglect, fail or refuse to complete the Work within the time specified, or any proper extension thereof granted by the Owner, the Contractor agrees to pay to the Owner for loss of beneficial use of the structure an amount specified in the Contract, not as a penalty, but as liquidated damages, for each and every calendar day that the Contractor is in default. Default shall include abandonment of the Work by the Contractor.
- E. Said amount of liquidated damages is agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would sustain for loss of beneficial use of the structure in the event of delay in completion, and said amount is agreed to be the amount of damages sustained by the Owner and said amount may be retained from time to time by the Owner.

- F. It is further agreed that time is of the essence for each and every portion of the Work. In any instance in which additional time is allowed for the completion of any Work, the new time of completion established by said extension shall be of the essence. The Contractor shall not be charged with liquidated damages or any excess cost if the Owner determines that the Contractor is without fault and that the delay in completion of the Work is due:
 - 1. to an unforeseeable cause beyond the control and without the fault of, or negligence of the Contractor, and approved by the Owner, including, but not limited to, acts of God or of public enemy, acts of the Owner, fires, epidemics, quarantine, restrictions, strikes, freight embargoes and unusually severe weather; and
 - 2. to any delays of Subcontractors or suppliers occasioned by any of the causes specified in Subsections 1. of this paragraph.

The Contractor shall, within ten (10) days from the beginning of any such delay, notify the Owner, in writing, of the causes of the delay.

- G. The time for completion can be extended only by Change Order approved by the Owner and may be extended for:
 - 1. all of the Work, or
 - 2. only that portion of the Work altered by the Change Order.
- H. The foregoing liquidated damages are intended to compensate the Owner only for the loss of beneficial use of the structure. In addition, the Contractor shall be liable to the Owner for whatever actual damages (other than actual loss of beneficial use) the Owner may incur as a result of any actions or inactions of the Contractor or its Subcontractors including, without limitation, interest expense and carrying costs, liabilities to other Contractors working on the project or other third parties, job extension costs and other losses incurred by the Owner. The provisions of this paragraph are for the exclusive use of the Owner, and shall not accrue to other contractors or third parties.

ARTICLE 10 -- TERMINATION OR SUSPENSION

SECTION 10.01 – TERMINATION FOR CAUSE

In the event that any provision of the Contract is violated by the Contractor or by any Subcontractor, the Owner may serve written notice upon the Contractor and upon the Contractor's surety, if any, of the Owner's intention to terminate the Contract; such notice shall contain the reasons for the intention to terminate the Contract upon a date specified by the Owner. If the violation or delay shall not cease or arrangements satisfactory to the Owner shall not be made, the Contract shall terminate upon the date so specified by the Owner. In the event of any such termination, the Owner may take over the Work and prosecute same to completion by Contract or otherwise for the account and at the expense of the Contractor, and the Contractor and Contractor's surety shall be liable to the Owner for all costs occasioned the Owner thereby. In the event of such termination the Owner may take possession of and may utilize such materials, appliances and plant as may be on the Site and necessary or useful in completing the Work.

SECTION 10.02 – TERMINATION FOR CONVENIENCE OF OWNER

The Owner, at any time, may terminate the Contract in whole or in part. Any such termination shall be effected by delivering to the Contractor a notice of termination specifying the extent to which performance of Work under the Contract is terminated and the date upon which the termination becomes effective. Upon receipt of the notice of termination, the Contractor shall act promptly to minimize the expenses resulting from the termination. The Owner shall pay the Contractor for Work of the Contract performed by the Contractor and accepted by the Owner for the period extending from the date of the last approved Application for Payment up to the effective date of the termination, including retainage. In no event shall the Contract or be entitled to compensation in excess of the total consideration of the Contract. In the event of such termination the Owner may take over the Work and prosecute the Contract to completion and may take possession of and may utilize such materials, appliances, and equipment as may be on the Site and necessary or useful in completing the Work.

SECTION 10.03 – OWNER'S RIGHT TO DO WORK

The Owner may, after notice to the Contractor, without terminating the Contract and without prejudice to any other right or remedy the Owner may have, perform or have performed by others all of the Work or any part thereof and may deduct the cost thereof from any moneys due or to become due the Contractor.

SECTION 10.04 – SUSPENSION OF WORK

- A. The Owner may order the Contractor in writing to suspend, delay or interrupt performance of all or any part of the Work for a reasonable period of time as the Owner may determine. The order shall contain the reason or reasons for issuance which may include but shall not be limited to the following: latent field conditions, substantial program revisions, acquisition of rights of way or real property, financial crisis, labor disputes, civil unrest or acts of God.
- B. Upon receipt of a suspension order, the Contractor shall, as soon as practicable, cease performance of the Work as ordered and take immediate affirmative measures to protect such Work from loss or damage.
- C. The Contractor specifically agrees that such suspension, interruption or delay of the performance of the Work pursuant to this Article shall not increase the cost of performance of the Work of this Contract.
- D. Time for completion of the Work may be extended to such time as the Owner determines shall compensate for the time lost by the suspension, interruption or delay, such determination to be set forth in writing.

ARTICLE 11 -- DISPUTES

SECTION 11.01 – CLAIMS FOR EXTRA WORK

- A. If the Contractor claims that any Work which the Contractor has been ordered to perform will be Extra Work, or that any action or omission of the Owner is contrary to the terms and provisions of the Contract and will require the Contractor to perform Extra Work the Contractor shall:
 - 1. Promptly comply with said order.
 - 2. File with the Owner and the architect within fifteen (15) working days after being ordered to perform the Work claimed by the Contractor to be Extra Work or within fifteen (15) working days after commencing performance of the Work, whichever date shall be earlier, or within fifteen (15) working days after the said action or omission on the part of the Owner occurred, a written notice of the basis of the Contractor's claim, including estimated cost, and request for a determination thereof.

- 3. Proceed diligently, pending and subsequent to the determination of the Owner with respect to any said disputed matter, with the performance of the Work in accordance with all instructions of the Owner.
- B. No claim for Extra Work shall be allowed unless the same was done pursuant to a written order of the Owner. The Contractor's failure to comply with any or all parts of this Article shall be deemed to be:
 - 1. a conclusive and binding determination on the part of the Contractor that said order, Work, action or omission does not involve Extra Work and is not contrary to the terms and provisions of the Contract,
 - 2. a waiver by the Contractor of all claims for additional compensation or damages as a result of said order, Work, action or omission.
- C. The value of claims for Extra Work, if allowed, shall be determined by the methods described in the Contract.

SECTION 11.02 – CLAIMS FOR DELAY

No claims for increased costs, charges, expenses or damages of any kind shall be made by the Contractor against the Owner for any delays or hindrances from any cause whatsoever; provided that the Owner, in the Owner's discretion, may compensate the Contractor for any said delays by extending the time for completion of the Work as specified in the Contract.

SECTION 11.03 – FINALITY OF DECISIONS

- A Any decision or determination of the Architect, Owner or the Owner's Representative shall be final, binding and conclusive on the Contractor unless the Contractor shall, within ten (10) working days after said decision, make and deliver to the Owner a verified written statement of the Contractor's contention that said decision is contrary to a provision of the Contract. The Owner shall determine the validity of the Contractor's contention. Pending the decision of the Owner, the Contractor shall proceed in accordance with the original decision.
- B. Wherever it is required in the Contract that an application must be made to the Owner or a determination made by the Owner, the decision of the Owner on said application or the determination of the Owner under the Contract shall be final, conclusive and binding upon the Contractor unless the Contractor, within ten (10) working days after receiving notice of the Owner's decision or determination, files a written statement with the Owner that the Contractor reserves the Contractor's rights in connection with the matters covered by said decision or determination.

ARTICLE 12 -- SUBCONTRACTS

SECTION 12.01 – SUBCONTRACTING

- A. The Contractor may utilize the services of Subcontractors subject to the bid terms and conditions.
- B. The Contractor shall submit to the Owner, in writing, the name of each proposed Subcontractor as required by the Contract or earlier when requested. The Owner reserves the right to disapprove any proposed Subcontractor. Such disapproval shall not result in additional cost to the Owner.
- C. The Contractor shall be fully responsible for the Work, acts and omissions of Subcontractors, and of persons either directly or indirectly employed by Subcontractors.
- D. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors.
- E. The Contractor's use of Subcontractors shall not diminish the Contractor's obligation to complete the Work in accordance with the Contract Documents. The Contractor shall control and coordinate the work of Subcontractors.
- F. Nothing contained in the Contract or any subcontract shall create any contractual relationship between Subcontractors and the Owner.

ARTICLE 13 -- CONTRACT COORDINATION AND COOPERATION

SECTION 13.01 – COOPERATION WITH OTHER CONTRACTORS

- A During the progress of the Work, other contractors may be engaged in performing work. The Contractor shall coordinate the Contractor's Work with the work of said other contractors in such a manner as the Owner may direct.
- B. If the Owner shall determine that the Contractor is failing to coordinate the Work with the work of other contractors as the Owner has directed:
 - 1. the Owner shall have the right to withhold any payments due under the Contract until the Owner's directions are complied with by the Contractor; and
 - 2. the Contractor shall assume the defense and pay on behalf of the Owner any and all claims or judgments or damages and from any costs or damages to which the Owner may be subjected or which the Owner may suffer or incur by reason of the Contractor's failure to promptly comply with the Owner's directions.
- C. If the Contractor notifies the Owner, in writing, that another contractor on the Site is failing to coordinate the work of said contractor with the Work, the Owner shall investigate the charge. If the Owner finds it to be true, the Owner shall promptly issue such directions to the other contractor with respect thereto as the situation may require. The Owner shall not be liable for any damages suffered by the Contractor by reason of the other contractor's failure to promptly comply with the directions so issued by the Owner, or by reason of another contractor's default in performance.
- D. Should the Contractor sustain any damage through any act or omission of any other contractor having a contract with the Owner or through any act or omission of any Subcontractor of said other contractor, the Contractor shall have no claim against the Owner for said damage.
- E. Should any other contractor having or which shall have a contract with the Owner sustain damage through any act or omission of the Contractor or through any act or omission of a Subcontractor, the Contractor shall reimburse said other contractor for all said damages and shall indemnify and hold the Owner harmless from all said claims.

F. The Owner cannot guarantee the responsibility, efficiency, unimpeded operations or performance of any Contractor. The Contractor acknowledges these conditions and shall bear the risk of all delays including, but not limited to, delays caused by the presence or operations of other contractors and delays attendant upon any construction schedule approved by the Owner and the Owner shall not incur any liability by reason of any delay.

SECTION 13.02 – SEPARATE CONTRACTS

- A. The Owner may award other contracts, work under which may proceed simultaneously with the execution of the Work. The Contractor shall coordinate the Contractor's operations with those of other contractors as directed by the Owner. Cooperation shall be required in the arrangements for access, the storage of material and in the detailed execution of the Work.
- B. The Contractor shall keep informed of the progress and workmanship of other contractors and any Subcontractors and shall notify the Owner in writing immediately of lack of progress or defective workmanship on the part of other contractors or subcontractors, where said delay or defective workmanship may interfere with the Contractor's operations.
- C. Failure of a Contractor to keep so informed and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by the Contractor of said progress and workmanship as being satisfactory for proper coordination with the Work.
- D. Where the Contractor shall perform Work in close proximity to work of other contractors or subcontractors, or where there is evidence that Work of the Contractor may interfere with work of other contractors or subcontractors, the Contractor shall assist in arranging space conditions to make satisfactory adjustment for the performance of said work and the Work. If the Contractor performs work in a manner which causes interference with the work of other contractors or subcontractors, the Contractor shall make changes necessary to correct the condition.

SECTION 13.03 – COORDINATED COMPOSITE DRAWINGS

The Contractor shall prepare coordinated composite scale reproducible drawings and sections, on reproducible paper, clearly showing how the Work of the Contractor is to be performed in relation to work of other contractors or subcontractors.

ARTICLE 14 -- PROTECTION OF RIGHTS, PERSONS AND PROPERTY

SECTION 14.01 – ACCIDENT PREVENTION

The Contractor shall, at all times, take every precaution against injuries to persons or damage to property and for the safety of persons on or about the Site or engaged in the performance of the Work.

SECTION 14.02 – SAFETY PROGRAMS

The Contractor shall be responsible for the initiation, maintenance and supervision of safety precautions and programs in connection with the Work.

SECTION 14.03 – PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall, at all times, guard the Owner's property from injury or loss in connection with the Work. The Contractor shall, at all times, guard and protect the Contractor's Work, and adjacent property. The Contractor shall replace or make good any said loss or injury unless said loss or injury is caused directly by the Owner.
- B. The Contractor shall have full responsibility to protect and maintain all materials and supplies on and off site in proper condition and forthwith repair, replace and make good any damage thereto until construction completion. The Contractor shall maintain an inventory of all materials and supplies for the Project that are delivered to the Site or approved for off-site storage facilities.
- C. The Contractor shall report any loss, theft, burglary, vandalism or damage of materials or installed work to the Owner by phone and fax as soon as it is discovered. If vandalism, theft, or burglary are suspected as the cause of the loss, the Contractor shall notify site security personnel and the municipal police. The Contractor shall also protect the place of the loss until released from protection by the Owner or the Owner's Representative. The Contractor shall insure that no potential evidence relating to the loss is removed from the place of the loss.

SECTION 14.04 – ADJOINING PROPERTY

The Contractor shall protect all adjoining property and shall repair or replace any said property damaged or destroyed during the progress of the Work.

SECTION 14.05 – RISKS ASSUMED BY THE CONTRACTOR

- A. The Contractor solely assumes the following distinct and several risks whether said risks arise from acts or omissions, whether supervisory or otherwise, of the Owner, of any Subcontractor, of third persons or from any other cause, including unforeseen obstacles and difficulties which may be encountered in the execution of the Work, whether said risks are within or beyond the control of the Contractor and whether said risks involve any legal duty, primary or otherwise, imposed upon the Owner, excepting only risks which arise from faulty designs as shown by the plans and specifications or from the negligence of the Owner or the Owner's members, officers, representatives or employees that caused the loss, damage or injuries hereinafter set forth:
 - 1. The risk of loss or damage, includes direct or indirect damage or loss, of whatever nature to the Work or to any plant, equipment, tools, materials or property furnished, used, installed or received by the Owner, the Construction Manager, the Contractor or any Subcontractor, material or workmen performing services or furnishing materials for the Work. The Contractor shall bear said risk of loss or damage until construction completion or until completion or removal of said plant, equipment, tools, materials or property from the Site and the vicinity thereof, whichever event occurs last. In the event of said loss or damage, the Contractor immediately shall repair, replace or make good any said loss or damage.
 - 2. The risk of claims, just or unjust, by third persons against the Contractor or the Owner and the Construction Manager 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, whether actually caused by or resulting from the performance of the Work, or out of or in connection with the Contractor's operations or presence at or in the vicinity of the Site. The Contractor shall bear the risk for all deaths, injuries, damages or losses sustained or alleged to have been sustained prior to the construction completion of the Work. The Contractor shall bear the risk for all deaths, injuries, damages or losses sustained or alleged to alleged to have been sustained resulting from the Contractor's negligence or alleged negligence which is discovered, appears or is manifested after acceptance by the Owner.

- 3. The Contractor assumes entire responsibility and liability for any and all damage or injury of any kind or nature whatsoever, including death resulting therefrom, to all persons, whether employees of the Contractor or otherwise, and to all property, caused by, resulting from, arising out of or occurring in connection with the execution of the Work. If any person shall make said claim for any damage or injury, including death resulting therefrom, or any alleged breach of any statutory duty or obligation on the part of the Owner, the Owner's Representative, Construction Manager, servants and employees, the Contractor shall assume the defense and pay on behalf of the Owner, the Owner's Representative, the Construction Manager, servants and employees, any and all loss, expense, damage or injury that the Owner, the Owner's Representative, Construction Manager, servants and employees, may sustain as the result of any claim, provided however, the Contractor shall not be obligated to indemnify the Owner, the Owner's Representative, Construction Manager, servants and employees for their own negligence, if any. The Contractor agrees to assume, and pay on behalf of the Owner and the Owner's Representative, Construction Manager, servants and employees, the defense of any action at law or equity which may be brought against the Owner and the Owner's Representative, Construction Manager, servants and employees. The assumption of defense and liability by the Contractor includes, but is not limited to the amount of any legal fees associated with defending, all costs of investigation, expert evaluation and any other costs including any judgment or interest or penalty that may be entered against the Owner and the Owner's Representative, Construction Manager, servants and employees, in any said action.
- 4. The Contractor is advised that the Work required under this Contract may impose certain obligations and requirements mandated by the U.S. Department of Labor Occupational Safety and Health Administration regulations, Title 29 CFR Part 1926.62 Lead Exposure in Construction, relative to the potential exposure to lead by its employees. The Contractor assumes entire responsibility and liability for complying fully in all respects with these regulations.
- B. The Contractor's obligations under this Article shall not be deemed waived, limited or discharged by the enumeration or procurement of any insurance for liability for damages. The Contractor shall notify its insurance carrier within twenty four (24) hours after receiving a notice of loss or damage or claim from the Owner.

The Contractor shall make a claim on its insurer specifically under the provisions of the contractual liability coverages and any other coverages afforded the Owner including those of being an additional insured where applicable.

C. Neither Final Acceptance of the Work nor making any payment shall release the Contractor from the Contractor's obligations under this Article. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which the Contractor is responsible shall not be deemed to limit the effect of the provisions of this Article or to imply that the Contractor assumes or is responsible for only risks or claims of the type enumerated; and neither the enumeration in this Article nor the enumeration elsewhere in the Contract of particular risks assumed by the Contractor of particular claims for which the Contractor of particular claims for which the contractor of particular risks assumed by the Contractor of particular claims for which the contractor is responsible shall be deemed to limit the risks which the Contractor would assume or the claims for which the Contractor would be responsible in the absence of said enumerations.

Upon the conclusion of any action, proceeding or lawsuit, should a final binding determination of responsibility be made which allocates responsibility to the Owner, or the Owner's members, officers, employees or representatives, the Owner agrees that the obligation to indemnify and hold harmless shall not be applicable to the portion of any uninsured money judgment for which the Owner is responsible, and the Owner agrees to pay the Contractor the percentage of uninsured defense costs which the Contractor incurred based upon an apportionment of the Owner's allocated responsibility.

The Contractor agrees that any claim or costs of the Owner and/or Construction Manager arising from obligations in this Article and/or Article 15 shall be set off or deducted from payments due the Contractor.

ARTICLE 15--INSURANCE AND CONTRACT SECURITY

SECTION 15.01 – INSURANCE PROVIDED BY CONTRACTOR

A. The Contractor shall procure and maintain all of the insurance required under this Article until all Work, including punch list items, is complete.

The Contractor shall provide insurance as follows:

- 1. Workers' Compensation and Employers Liability Insurance
 - a. Statutory Workers' Compensation (including occupational disease)

- b. Employers Liability (with a minimum limit of \$1,000,000) New York Statutory Endorsement
- 2. Commercial General Liability (CGL) with a combined single limit for Bodily Injury, Personal Injury and Property Damage of at least \$2,000,000 per occurrence & aggregate. The limit may be provided through a combination of primary and umbrella/excess liability policies.

Coverage shall provide and encompass the following:

- a. Written on an occurrence form;
- b. Endorsement naming the following as additional insureds: The Fashion Institute of Technology, its auxiliary corporations, the State University of New York, the New York City Department of Education and the City and State of New York, the Construction Manager (if applicable) and other entities specified.
- c. Policy or policies must be endorsed to be primary as respects the coverage afforded the Additional Insureds and such policy shall be primary to any other insurance maintained by the Owner. Any other insurance maintained by the Owner shall be excess of and shall not contribute with the Contractor's or Subcontractor's insurance, regardless of the "other insurance" clause contained in the Owner's own policy of insurance.
- 3. Commercial Automobile Liability and Property Damage Insurance covering all owned, leased, hired and non-owned vehicles used in connection with the Work with a combined single limit for Bodily Injury and Property Damage of at least \$1,000,000 per occurrence. The limit may be provided through a combination of primary and umbrella/excess liability policies.
- 4. Umbrella/excess liability insurance with limits of:

\$5,000,000 per occurrence \$5,000,000 general aggregate

B. Before commencement of Work, the Contractor shall submit to the Owner for approval two (2) Certificates of Insurance, indicating the Project. Certificates shall provide thirty (30) days' written notice prior to the cancellation, non- renewal, or material modification of any policy. Upon request, the Contractor shall furnish the Owner and the Construction Manager with certified copies of each policy. In addition, where applicable, the Contractor shall provide copies of Certificates of Insurance to the Construction Manager.

Certificates shall be forwarded to Owner in care of: Purchasing

Sammy Li Purchasing Deputy Director FIT Purchasing 333 Seventh Avenue, 15th Floor New York, NY 10001

Certificate(s) of Insurance, when submitted to the Owner, constitutes a warranty by the Contractor that the insurance coverage described is in effect for the policy term shown.

Should the Contractor engage a Subcontractor, the same conditions as are applicable to the Contractor under these insurance requirements shall apply to each Subcontractor of every tier. Proof thereof shall be supplied to the Owner at the address listed above.

- C. All insurance required to be procured and maintained must be procured from insurance companies licensed to do business in the State of New York and rated at least B+ by A.M. Best and Company, or meet such other requirements as are acceptable to the Owner.
- D. Should the Contractor fail to provide or maintain any insurance required by this Contract, the Owner may, after providing written notice to the Contractor, purchase insurance complying with the requirements of this Article and charge back such purchase to the Contractor.
- E. At any time that the coverage provisions and limits on the policies required herein do not meet the provisions and limits set forth above, the Contractor shall immediately cease Work on the Project. The Contractor shall not resume Work on the Project until authorized to do so by the Owner. Any delay or time lost as a result of the Contractor not having insurance required by this Article shall not give rise to a delay claim or any other claim against the Owner or the Client.
- F. Notwithstanding any other provision in this Article, the Owner may require the Contractor to provide, at the expense of the Owner, any other form or limit of insurance necessary to secure the interests of the Owner.
- G. The Contractor shall secure, pay for, and maintain Property Insurance necessary for protection against the loss of owned, borrowed or rented capital equipment and tools, including any tools owned by employees, and any tools or equipment, staging towers, and forms owned, borrowed or rented by the Contractor. The requirement to secure and maintain such insurance is solely for the benefit of the Contractor. Failure of the Contractor to secure such insurance or to maintain adequate levels of coverage shall not render the Additional Insureds or their

agents and employees responsible for any losses; and the Additional Insureds, their agents and employees shall have no such liability.

H. Neither the procurement nor the maintenance of any type of insurance by the Owner, the Contractor or the Construction Manager shall in any way be construed or deemed to limit, discharge, waive or release the Contractor from any of the obligations or risks accepted by the Contractor or to be a limitation on the nature or extent of said obligations and risks.

SECTION 15.01A – OTHER INSURANCE PROVIDED BY CONTRACTOR

Railroad Protective Liability insurance: If any Work of the Contract is to be performed on or within fifty (50) feet of a railroad property or railroad right of way or will require entrance upon railroad property or right of way or will require assignment of a railroad employee, the Contractor shall provide and maintain a Railroad Protective Liability policy with the policy limits required by the owner(s) of the railroad, including the MTA. For purposes of this paragraph, a subway is a railroad. The policy form shall be ISO-RIMA or an equivalent form approved by the owner(s) of the railroad. The railroad owner(s) shall be the named insured on the policy and the definition of "physical damage to property" shall 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. If the Contractor shall provide a Railroad Protective Liability insurance policy, the Contractor and any Subcontractor performing on or within fifty (50) feet of railroad property or railroad right of way or entering railroad property or right of way or requiring assignment of a railroad employee shall have their CGL insurance policy endorsed to delete the exclusion of coverage for Work within fifty (50) feet of railroad property.

SECTION 15.02 – GENERAL CONFORMANCE

The Contractor and Subcontractors shall not violate, or be permitted to violate, any term or condition of their insurance policies, and shall at all times satisfy the safety requirements of the Owner and of the insurance companies issuing such policies.

SECTION 15.03 – CONTRACT SECURITY

The Contractor shall furnish a surety bond in an amount at least equal to one hundred (100%) of the Contract price as security for the faithful performance of the Contract and also labor and material bond in the form set forth in the Contract in an amount at least equal to one hundred (100%) of the Contract price for the payment of all persons performing labor or providing materials in connection with the Work. The surety on said bond shall be a surety company authorized to do business in the State of New York and shall be rated at least B+ by A.M. Best and Company, or meet such other requirements as are acceptable to the Owner.

SECTION 15.04 – ADDITIONAL OR SUBSTITUTE BOND

If at any time the Owner shall become dissatisfied with any surety or sureties upon the performance bond, or the labor and material payment bond, or if for any other reason said bonds shall cease to be adequate security to the Owner, the Contractor shall, within five (5) days after notice from the Owner to do so, substitute an acceptable bond or bonds in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on said bond or bonds shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond or bonds to the Owner.

SECTION 15.05 – FAILURE TO COMPLY WITH PROVISIONS OF ARTICLE 15

The Contract may, at the sole option of the Owner, be declared void and of no effect if the Contractor fails to comply with the provisions of Article 15.

ARTICLE 16 -- USE OR OCCUPANCY PRIOR TO ACCEPTANCE BY OWNER

SECTION 16.01 – OCCUPANCY PRIOR TO ACCEPTANCE

NOT APPLICABLE

ARTICLE 17 -- PAYMENT

SECTION 17.01 – PROVISION FOR PAYMENT

A. The Owner may make a partial payment to the Contractor on the basis of an approved estimate of the Work performed during each preceding business month. The Owner shall retain ten percent (10%) of the amount of each said estimate.

The Contractor shall submit a detailed Contract Payment Breakdown prior to the Contractor's first application for payment. The model contract payment breakdown included in the Contract Documents shall establish the minimum level of detail required for the Contractor's payment breakdown. It is understood and the Contractor acknowledges that this model is included as an administrative tool for

the purpose of illustrating a format and minimum level of detail required for the Contract Payment Breakdown and shall not be considered as delineating the Contractor's Scope of Work. The Owner may request further and more detailed Contract Payment Breakdown. Further, the Owner reserves the right to accept only those cost distributions which, in the Owner's opinion, are reasonable, equitably balanced and correspond to the estimated quantities in the Contract Documents.

No payment shall be made by the Owner until the Contract Payment Breakdown is approved by the Owner.

Each monthly partial payment requisition must include Affirmative Action Form AAP 7.0, Contractor's Compliance Report, properly executed, as a condition precedent to requisition payment by the Owner.

B. In preparing estimates for partial payment, material delivered to the Site and properly stored and secured at the Site, and Material approved to be stored off-site under such conditions as the Owner shall prescribe may be taken into consideration. All costs related to the storage of materials are the sole responsibility of the Contractor.

The Owner will provide an Agreement for Materials Stored Off-Site and specific forms which the Contractor must complete and submit with any request for approval of partial payment for such material. Required information includes but is not limited to: a general description of the material; a detailed list of the materials; a pre-approved storage area; segregation and identification of the material; insurance covering full value against all risks of loss or damage, with non-cancellation provision; immediate replacement agreement in event of loss or damage; agreement to pay the expense of all inspections of the material; ownership provisions; delivery guarantee; project completion statement; bill of sale, releases, and inventory.

- C. Any partial payment made shall not be construed as a waiver of the right of the Owner to require the fulfillment of all the terms of the Contract.
- D. After the Owner has determined Substantial Completion of the Work, the Contractor shall submit to the Owner, for the Owner's approval, a detailed estimate of the value of the known remaining items of Work as set forth by the Owner and a schedule of completion for said items of Work. The Owner shall review that estimate and make the final determination.

The Owner, when all the Work is substantially complete, shall pay to the Contractor the balance due the Contractor pursuant to the Contract, less:

- 1. two (2) times the value of any remaining items of Work to be completed or corrected; and
- 2. an amount necessary to satisfy any and all claims, liens or judgments against the Contractor.

As the remaining items of Work are completed and accepted by the Owner, the

Owner shall pay the appropriate amount pursuant to the duly completed and submitted monthly requisitions.

The list of remaining Work items may be expanded to include additional items of corrective or completion Work until final acceptance as certified by the Owner's execution of "Notification of Construction Completion". Appropriate payments may be withheld to cover the value of these items pursuant to this Section.

E. All Monthly Requisitions submitted by the Contractor shall be on AIA documents G702 and G703. The Contractor shall furnish such affidavits, vouchers and receipts as to delivery and payment for materials as required by the Owner to substantiate each and every payment requested. The Contractor and its Subcontractors will submit with all applications for payment copies of the certified payrolls and certification of payment of wage supplements in a form satisfactory to the Owner. The submission of Contractor and Subcontractor certified payrolls is required at least monthly. No progress payments will be processed without submission by the Contractor of properly executed Affidavit of Payment and Release of Liens (AIA Documents G706 and G706A)."

Section 17.02 - Acceptance of the First Payment Pursuant to Section 17.01 D. of the Contract Constitutes Release

The acceptance by the Contractor of the first payment pursuant to Section 17.01 D. shall be and shall operate as a release to the Owner of all claims by and all liability to the Contractor for all things in connection with the Work and for every act and neglect of the Owner and others relating to or arising out of the Work. No payment, final or otherwise, shall operate to release the Contractor or the Contractor's sureties from any obligations under this Contract or the performance or labor and material payment bonds.

SECTION 17.03 – RELEASE AND CONSENT OF SURETY

Notwithstanding any other provision of the Contract Documents to the contrary, the first payment pursuant to Section 17.01 D. shall not become due until the Contractor submits to the Owner a General Release and a Consent of Surety to said payment pursuant to Section 17.01 D., both in form and content acceptable to the Owner.

SECTION 17.04 - LIENS

Upon the Owner's receipt of a lien, a sum which shall be one and one-half $(1 \ 1/2)$ times the amount stated to be due in the notice of lien shall be deducted from the current payment due the Contractor. This sum shall be withheld until the lien is discharged.

SECTION 17.05 – WITHHOLDING OF PAYMENTS

- A. The Owner may withhold from the Contractor any part of any payment as may, in the judgment of the Owner, be necessary:
 - 1. to assure payment of just claims of any persons supplying labor or materials for the Work;
 - 2. to protect the Owner from loss due to defective Work not remedied; or
 - 3. to protect the Owner, Construction Manager or Consultant from loss due to failure to defend, loss due to injury to persons or damage to the Work or property of other contractors, Subcontractors or others caused by the act or neglect of the Contractor or Subcontractors.
 - 4. to assure payment of fines and penalties which may be imposed on the Contractor pursuant to the provisions of this Contract.
- B. The Owner shall have the right to apply any such amounts so withheld, in such manner as the Owner may deem proper to satisfy said claims, fines and penalties or to secure said protection. Said application of the money shall be deemed payments for the account of the Contractor.
- C. The provisions of this Article 17 are solely for the benefit of the Owner, and any action or non-action hereunder by the Owner shall not give rise to any liability on the part of the Owner.

SECTION 17.06 – OWNER'S RIGHT TO AUDIT AND INSPECTION OF RECORDS

The Contractor shall maintain and keep, for a period of at least six (6) years after the date of final payment, all records and other data relating to the Work, including records of Subcontractors and material suppliers. The Owner or the Owner's Representative shall have the right to inspect and audit all records and other data of the Contractor, Subcontractors and material suppliers relating to the Work.

SECTION 17.07 – FALSE STATEMENTS/INFORMATION

- A. False statements, information or data submitted on or with applications for payment may result in one or more of the following actions:
 - 1. Termination of the Contract for cause;
 - 2. Disapproval of future bids or contracts and sub-contracts;
 - 3. Withholding of final payment on the Contract; and
 - 4. Civil and/or criminal prosecution.

B. These provisions are solely for the benefit of the Owner, and any action or nonaction hereunder by the Owner shall not give rise to any liability on the part of the Owner.

ARTICLE 18 -- TAX EXEMPTION

SECTION 18.01 – TAX EXEMPTION

- A. The Owner is exempt from payment of Federal, State, local taxes and sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies incorporated into the completed Work. These taxes are not to be included in bids. This exception does not apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor, or to supplies and materials which, even though they are consumed, are not incorporated into the completed Work, and the Contractor and Subcontractors shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on said leased tools, machinery, equipment or other property and upon all said unincorporated supplies and materials.
- B. The Contractor and Subcontractors shall obtain any and all necessary certificates or other documentation from the appropriate governmental agency or agencies, and use said certificates or other documentation as required by law, rule or regulation.

ARTICLE 19 -- GUARANTEE

SECTION 19.01 - GUARANTEE

The Contractor shall in all respects guarantee the Work to the Owner and be responsible for all material, equipment and workmanship of the Work. The Contractor shall forthwith repair, replace or remedy in a manner approved by the Owner, any said material, equipment, workmanship, or other part of the Work found by the Owner to be defective or otherwise faulty and not acceptable to the Owner, which defect or fault appears during the minimum period of one (1) year, or such longer period as may be prescribed by the Contract, from the date of Construction Completion or any part thereof, by the Owner. The Contractor shall also pay for any damage to the Work resulting from said defect or fault.

ARTICLE 20 -- STANDARD PROVISIONS

SECTION 20.01 – PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in the Contract shall be deemed to be inserted therein and the Contract shall read and shall be enforced as though so included therein.

SECTION 20.02 – COMPLIANCE WITH LAWS, RULES AND REGULATIONS

The Contractor shall comply fully with all applicable laws, rules and regulations.

SECTION 20.03 – LAW GOVERNING THE CONTRACT

The Contract shall be governed by the laws of the state of New York.

SECTION 20.04 - ASSIGNMENT

The Contractor shall not assign the Contract in whole or in part without prior written consent of the Owner. If the Contractor assigns all or part of any moneys due or to become due under the Contract, the instrument of assignment shall contain a clause substantially to the effect that the Contractor and assignee agree that the assignee's right in and to any moneys due or to become due to the Contractor shall be subject to all prior claims for services rendered or materials supplied in connection with the performance of the Work.

SECTION 20.05 – NO THIRD PARTY RIGHTS

Nothing in the Contract shall create or shall give to third parties any claim or right of action against the Owner, the Fashion Institute of Technology, the State University of New York, Board of Education of the City of New York, the City or State of New York and the Construction Manager beyond such as may legally exist irrespective of the Contract.

SECTION 20.06 – CONTRACT DEEMED EXECUTORY

The Contractor agrees that the Contract shall be deemed executory to the extent of moneys available and that no liability shall be incurred by the Owner beyond the moneys available therefore.

SECTION 20.07 – ANTI-RIOT PROVISIONS

- A The Contractor agrees that no part of the Contract funds shall be used to make payments, give assistance, or supply services, in any form, to any individual convicted in any Federal, State or local court of competent jurisdiction for inciting, promoting, or carrying on a riot or engaging in any group activity resulting in material damage to property or injury to persons found to be in violation of Federal, State or local laws designed to protect persons or property.
- B. The Contractor and each Subcontractor shall notify their employees of all rules and

regulations adopted pursuant to Article 129-A of the Education Law of the State of New York. Notices containing the text of the aforementioned rules and regulations shall be posted by the Contractor at the Site.

SECTION 20.08 – DOMESTIC STEEL

The Contractor agrees, that if the value of this contract exceeds \$100,000 all structural steel, reinforcing steel and other major steel items to be incorporated in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.

SECTION 20.09 – PROTECTION OF LIVES AND HEALTH

- A Each Contractor and Subcontractor shall comply with all applicable provisions of the laws of the State of New York, the United States of America and with all applicable rules and regulations adopted or promulgated by agencies or municipalities of the State of New York or the United States of America. The Contractor's and Subcontractor's attention is specifically called to the applicable rules and regulations, codes and bulletins of the New York State Department of Labor and to the standards imposed under the Federal Occupational Safety and Health Act of 1970, as amended.
- B. The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment of Work under the Contract, and shall immediately notify the Owner in writing of any injury which results in hospitalization or death. The Contractor shall provide to the Owner a copy of Form C-2, Employers Report of Injury/Illness within twenty- four (24) hours of any job related injury on the Owner's job site. Further, a copy of the OSHA Log of Injury and Illness shall also be provided to the Owner for any reporting period in which a job related injury or illness is recorded. The Contractor shall also provide a list of witnesses to the Owner. The list shall include at least the full name, home address, occupation and telephone number of each person who saw or has knowledge of the incident which caused the injury or illness.
- C. The Contractor alone shall be responsible for the safety, efficiency and adequacy of the Contractor's Work, plant, appliances and methods, and for any damage which may result from the failure or the improper construction, maintenance or operation of such Work, plant, appliances and methods.
- D. If, in the performance of the Work, a harmful hazard is created for which appliances or methods of elimination have been approved by regulatory authorities, the Contractor shall install, maintain and operate said appliances or methods.
- E. The Owner may impose a payment penalty on the Contractor for any act of noncompliance with this section. The payment penalty shall not exceed one twentieth

(1/20) of the Contract price or a maximum of One Thousand Dollars (\$1,000.00) for each time the Contractor fails to perform or to provide the information, reports or forms required in this section. This payment penalty is not exclusive, the Owner may avail itself of any other contractual remedy available.

- F. The Owner, Owner's Representative, or Architect may inspect the Site at any time without notice to the Contractor. If the Owner or its representatives find that the Contractor is not complying with Section 20.10 A or any other provision of Section 20.10, the Owner may send written notice to the Contractor to correct any deficiency. Upon re-inspection, if the Owner finds the deficiencies have not been corrected, or in instances where a safety violation (s) must be corrected before Work continues and the Contractor is given three (3) hours to make correction (s) and they are not made, the Owner may let a separate contract to correct any deficiencies and back charge the cost of the separate contract to the Contractor at a premium rate. The Contractor cannot pass these additional charges on to the Owner. No action taken under this section shall be deemed as a basis for any delay claim or any other claim against the Owner by the Contractor.
- G. The Contractor shall preserve and safeguard the scene of an accident involving a ladder, scaffold, mobile machinery, equipment, safety railing or uncovered floor opening or any other incident where the injured person required emergency medical treatment. The Contractor shall "tape off" the area, and not allow any material object or property to be altered, changed, moved or removed from the accident site. In addition to "taping off" the accident site, the Contractor shall telephone and send a facsimile or email to Owner immediately, and post a person at the accident site to protect it. Safeguarding and protecting the accident site shall only be abandoned by the Contractor to comply with the provisions of this paragraph shall be deemed a breach of this Contract. In addition to any other contractual remedies available, the Owner may satisfy the breach by imposing the penalties set out in paragraph 20.10 E or void the entire Contract and retain any or all amounts due the Contractor under this Contract.

SECTION 20.10 – PROHIBITED INTERESTS / ETHICAL CONDUCT

- A No officer, employee, architect, attorney, engineer, inspector or consultant of or for the Owner authorized on behalf of the Owner to exercise any legislative, executive, administrative, supervisory or other similar functions in connection with the Contract or the Work, shall become personally interested, directly or indirectly, in the Contract, material supply contract, subcontract, insurance contract, or any other contract pertaining to the Work.
- B. The Owner strongly discourages the Contractor from offering or giving anything of value to employees of the Owner under circumstances which may constitute, or even suggest, impropriety. Contractor, or its agents, shall not directly or indirectly offer or give any gift whether in the form of money, service, loan, travel, lodging, meals, refreshments, entertainment, discount, forbearance or promise, or in any other form, to an employee or any representatives of the Owner.
- C. To promote a working relationship with the Owner based on ethical business practices, the Contractor shall:
 - furnish all goods, materials and services to the Owner as contractually required and specified,
 - submit complete and accurate reports to the Owner and its representatives as required,
 - not seek, solicit, demand or accept any information, verbal or written, from the Owner or its representatives that provides an unfair advantage over a competitor,
 - not engage in any activity or course of conduct that restricts open and fair competition on Owner-related projects and transactions,
 - not engage in any course of conduct with Owner employees or its representatives that constitutes a conflict of interest, in fact or in appearance, and
 - not offer or give any unlawful gifts or gratuities, or engage in bribery or other criminal activity.
- D. The Owner encourages the Contractor to advance and support ethical business conduct and practices among its directors, officers and employees, through the adoption of corporate ethics awareness training programs and written codes of conduct.
- E. Although the Contractor may employ relatives of Owner's employees, the Owner must be made aware of such circumstances as soon as possible, in writing, to ensure a conflict of interest situation does not arise. The Owner reserves the right to request that the Contractor modify the work assignment of a relative of an Owner's

employee or representative where a conflict of interest, or the appearance thereof, is deemed to exist.

- F. The Contractor may hire former employees of the Owner. However, as a general rule, former employees of the Owner may neither appear nor practice before the Owner, nor receive compensation for services rendered on a matter before the Owner, for a period of *two (2) years* following their separation from service with the Owner. In addition, former employees of the Owner are subject to a *"lifetime bar"* from appearing before the Owner or receiving compensation for services regarding any transaction in which they personally participated or which was under their active consideration during their tenure with the Owner.
- G. The Contractor agrees to notify Stephen Tuttle, Esq., the Owner's attorney, at (212) 217-4030 of any activity by an employee of the Owner that is inconsistent with the contents of this Section.
- H. Any violation of these provisions shall justify termination of this Contract and may result in Owner's rejection of the Contractor's bids or proposals for future contracts.

SECTION 20.11 – STATE AND FEDERAL LABOR LAW PROVISIONS

- A. Although the Work of this Contract is not public work, the Owner intends that all applicable provisions of the Labor Law of the State of New York shall be carried out in the performance of the Work.
- B. The Contractor specifically agrees to comply with Labor Law, Sections 220 and 220-d as amended, that:
 - 1. no laborer, workman or mechanic, in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the Work contemplated by the Contract shall be permitted or required to work more than eight (8) hours in any one (1) calendar day and more than five (5) days in any one week, except in the extraordinary emergencies set forth in the Labor Law;
 - 2. the wages paid for a legal day's work shall be not less than the prevailing rate of wages as defined by law;
 - 3. the minimum hourly rate of wage to be paid and supplement provided shall be not less than that stated in the Contract and as shall be designated by the Industrial Commissioner of the State of New York; and
 - 4. the Contractor and every Subcontractor shall post in a prominent and accessible place on the Site, a legible statement of all minimum wage rates and supplements to be paid or provided for the various classes of laborers and mechanics to be engaged in the Work and all deductions, if any,

required by law to be made from unpaid wages actually earned by the laborers and mechanics so engaged.

- C. The minimum wage rates, if any, herein specified for apprentices shall apply only to persons working with the tools of the trade which such persons are learning under the direct supervision of journeyman mechanics. Except as otherwise required by law, the number of apprentices in each trade or occupation employed by the Contractor or any Subcontractor shall not exceed the number permitted by the applicable standards of the New York State Department of Labor, or, in the absence of such standards, the number permitted under the usual practice prevailing between the unions and the employers' association of the respective trades or occupations.
- D. All employees of the Contractor and each Subcontractor shall be paid in accordance with the provisions of the Labor Law. Certified payroll copies shall be provided to the Owner as specified in these General Conditions and otherwise upon request.
- E. The Contractor agrees that, in case of underpayment of wages to any worker engaged in the Work by the Contractor or any Subcontractor, the Owner shall withhold from the Contractor out of payments due an amount sufficient to pay such worker the difference between the wages required to be paid under the Contract and the wages actually paid such worker for the total number of hours worked, and that the Owner may disburse such amount so withheld by the Owner for and on account of the Contractor to the employee to whom such amount is due. The Contractor further agrees that the amount to be withheld pursuant to this paragraph may be in addition to the percentages to be retained by the Owner pursuant to other provisions of the Contract.
- F. Pursuant to subdivision 3 of section 220 and section 220-d of the Labor Law the Contract shall be forfeited and no sum paid for any Work done thereunder upon a Contractor's or Subcontractor's second conviction for willfully paying or providing less than:
 - 1. the stipulated wage scale or supplement as established by the fiscal officer, or
 - 2. less than the stipulated minimum hourly wage scale as designated by the Industrial Commissioner.
- G. Pursuant Labor Law, Section 220-e, the Contractor specifically agrees:
 - 1. That in the hiring of employees for the performance of Work under the Contract or any subcontract hereunder, or for the manufacture, sale or distribution of materials, equipment or supplies hereunder, but limited to operation performed within the territorial limits of the State of New York, no Contractor, Subcontractor, nor any person acting on behalf of such Contractor or Subcontractor, 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;

- 2. That no Contractor, Subcontractor, nor any person on behalf of such Contractor or Subcontractor shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under the Contract on account of race, creed, color, disability, sex or national origin;
- 3. That there may be deducted from the amount payable to the Contractor, by the Owner under the Contract, a penalty of fifty dollars (\$50.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the terms of the Contract; and
- 4. That the Contract may be canceled or terminated by the Owner and all moneys due or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract, or when one final determination involves the falsification of payroll records or the kickback of wages and/or supplements.
- H. The Contractor specifically agrees:
 - 1. That the Contractor shall certify its payrolls and keep these certified records on site and available, and provide copies to the Owner upon request.
 - 2. That the Contractor shall provide each worker with a written notice informing the worker of the prevailing wage requirements for the job. The notice shall contain a simple statement or declaration for the worker's

SECTION 20.12 - NONDISCRIMINATION

During the performance of the Work, the Contractor agrees as follows:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion/creed, color, sex, sexual orientation, gender, gender identity/expression, national origin, age, disability, marital status, or any other protected category.
- B. If directed to do so by the Commissioner of Human Rights, the Contractor will send to each labor union or representative of workers with which the Contractor has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commissioner of Human Rights, advising such labor union or representative of the Contractor's agreement under clauses A through G (hereinafter called "non-discrimination clauses"). If the Contractor was directed to do so by the Owner as part of the bid or negotiation of this Contract, the Contractor shall request such labor union or representative to furnish a written statement that such labor union or representative will not discriminate because of race, creed, color, sex, national origin, age, disability or marital status, and that such labor union or representative will cooperate, within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these nondiscrimination clauses and that it consents and agrees that recruitment, employment and the terms and conditions of employment under this Contract shall be in accordance with the purposes and provisions of these nondiscrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the State Commissioner of Human Rights of such failure or refusal.
- C. If directed to do so by the Commissioner of Human Rights, the Contractor shall post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commissioner of Human Rights setting forth the substance of the provisions of clauses A and B and such provisions of the State's laws against discrimination as the State Commissioner of Human Rights shall determine.
- D. The Contractor shall state, in all solicitations or advertisement for employees placed by or on behalf of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, sex, national origin, age, disability or marital status.
- E. The Contractor shall comply with the provisions of Section 290-299 of the Executive Law and with the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commissioner of Human Rights under these nondiscriminatory clauses and such sections of the Executive Law, and will permit access to the Contractor's books, records and accounts by the State Commissioner for the purposes of investigation to ascertain compliance with these nondiscrimination clauses and such sections of the Executive Law and Civil Rights Law.

- F. This Contract may be forthwith canceled, terminated or suspended, in whole or in part, by the Owner upon the basis of a finding made by the State Commissioner of Human Rights that the Contractor has not complied with these nondiscrimination clauses, and the Contractor may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State, until the Contractor satisfies the State Commissioner of Human Rights that the Contractor has established and is carrying out a program in conformity with the provisions of these nondiscrimination clauses. Such finding shall be made by the State Commissioner of Human Rights after conciliation efforts by the Commissioner have failed to achieve compliance with these nondiscrimination clauses and after a verified complaint has been filed with the Commissioner, notice thereof has been given to the Contractor and an opportunity has been afforded the Contractor to be heard publicly in accordance with the Executive Law. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.
- G. The Contractor shall include the provisions of clauses A through F above in every subcontractor purchase order in such a manner that such provisions will be binding upon each Subcontractor or vendor as to operation to be performed within the State of New York. The Contractor shall take such action in enforcing such provisions of such Subcontract or purchase order as the State Commissioner of Human Rights or the Owner may direct, including sanctions or remedies for noncompliance. If the Contractor becomes involved in or is threatened with litigation with a Subcontractor or vendor as a result of such direction by the State Commissioner of Human Rights or the Owner, the Contractor shall promptly so notify the Attorney General, requesting the Attorney General to intervene and to protect the interests of the State of New York.

SECTION 20.13 – LIMITATION ON ACTIONS

No action or proceeding shall lie in favor of or shall be maintained by the Contractor against the Owner unless such action shall be commenced within six (6) months after receipt by the Owner of the Contractor's final requisition or, if the Contract is terminated by the Owner, unless such action is commenced within six (6) months after the date of such termination.

SECTION 20.14 – WAIVER OF REMEDIES

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

SECTION 20.15 – WAIVER OF CERTAIN CAUSES OF ACTION

No action or proceeding shall lie or shall be maintained by the Contractor, nor anyone claiming under or through the Contractor, against the Owner upon any claim arising out of or based upon the Contract, relating to the giving of notices or information.

SECTION 20.16 – CONTRACTOR RELATIONSHIP

The relationship created by the Contract between the Owner and the Contractor is one of an independent contractor and it is no way to be construed as creating an agency relationship between the Owner and the Contractor nor is it to be construed as, in any way or under any circumstances, creating or appointing the Contractor as an agent of the Owner for any purpose whatsoever.

SECTION 20.17 – FAILURE TO COMPLY WITH THIS ARTICLE

The Contract shall be void and of no effect unless the Contractor complies with the provisions of this Article 20.

SECTION 20.18 – YEAR 2000 WARRANTY

SECTION DELETED

SECTION 20.19 – FALSE RECORDS/KICKBACKS

The Contractor agrees that this Contract may be canceled or terminated for cause by the Owner and all moneys due or to become due hereunder may be forfeited upon the Owner's determination that the Contractor has submitted false records to the Owner and/or that the Contractor has participated in the kickback of wages. Said determination by the Owner must first allow the Contractor an opportunity to show why its Contract should not be canceled or terminated for cause for said actions.

ARTICLE 21- COOPERATION WITH INVESTIGATIONS

The Contractor agrees to cooperate fully and faithfully with any investigation, audit or inquiry conducted by the Owner or any other duly authorized representative of the Owner ("Representative").

The Contractor shall grant the Owner or the Representative the right to examine all books, records, files, accounts, computer records, documents and correspondence, including electronically-stored information, in the possession or control of the Contractor, its subsidiaries and affiliated companies and any other company directly or indirectly controlled by the Contractor, relating to the Contract. These shall include, but not be limited to: Subcontracts; bid files; payroll and personnel records; cancelled checks; correspondence; memoranda; reports; audits; vendor qualification records; original estimate files; change order/amendment estimate files; detailed worksheets; Subcontractor, consultant and supplier proposals for both successful and unsuccessful bids; back-charge logs; any records detailing cash, trade, or volume discounts earned; insurance proceeds, rebates or dividends received; payroll and personnel records; tax returns, and the supporting documentation for the aforesaid books and records.

At the Owner's or the Representative's request, said materials shall be provided in a computer readable format, where available. At the request of the Owner or the Representative, the Contractor shall execute such documents, if any, as are necessary to give the Owner or the Representative access to Contract-related books, documents or records which are, in whole or part, under control of the Contractor but not currently in the Contractor's physical possession. The Contractor shall not enter into any agreement with a Subcontractor, consultant or supplier, in connection with the Contract, that does not contain a right to audit clause in favor of the Owner. The Contractor shall assist the Owner or the Representative in obtaining access to past and present Subcontractor, consultant and supplier amendment/change order files (including detailed documentation covering negotiated settlements), accounts, computer records, documents, correspondence, and any other books and records in the possession of Subcontractors, consultants and suppliers pertaining to the Contract, and, if appropriate, enforce the right-to-audit provisions of such agreements.

The Contractor shall assist the Owner or the Representative in obtaining access to, interviews with, and information from all former and current persons employed and/or retained by the Contractor, for purposes of the Contract.

The Contractor shall require each Subcontractor to include in all agreements that the

Subcontractor may hereinafter enter into with any and all Subcontractors, consultants and suppliers, in connection with the Contract, a right-to-audit clause in favor of the Owner conferring rights and powers of the type outlined in this section. The Contractor shall not enter into any Subcontract with a Subcontractor in connection with the Contract that does not contain such a provision.

The Contractor shall not make any payments to a Subcontractor, consultant or supplier from whom the Contractor has failed to obtain and supply to the Owner or the Representative complete, accurate and truthful information in compliance with a request from the Owner or the Representative to the Contractor.

Any violation of the provisions of this Article shall justify termination of this Contract and may result in the Owner's rejection of the Contractor's bids or proposals for future contracts.

SECTION VI. LABOR & MATERIAL PAYMENT BOND

LABOR & MATERIAL PAYMENT BOND

KNOW ALL BY THESE PRESENTS:

That
(Here insert the name and address or legal title of the Contractor)
as Principal, hereinafter called Principal, and
(Here insert the legal title of Surety)
(Address)
as Surety, hereinafter called Surety, are held and firmly bound unto The Fashion Institute of Technology, as applicable, as Obligee, hereinafter called Owner, for the use and benefit of the claimants as hereinbelow defined, in the amount of
and /100 Dollars (\$)
WHEREAS, Principal has by written agreement dated
entered into a Contract with Owner for

in accordance with the Contract Documents and any changes thereto, which are made a part hereof, and are hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise such obligation shall remain in full force and effect, subject, however, to the following conditions:

- 1. A claimant is defined as one having a direct Contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
- 2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full

before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

- 3. No suit or action shall be commenced hereunder by any claimant:
 - Unless claimant, other than one having a direct contract with the a Principal, shall have given written notice to any two (2) of the following: 1) the Principal, 2) the Owner, or 3) the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, or Surety, at any place where an office is regularly maintained by said Principal, Owner, or Surety for the transaction of business, or served in any manner in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer.
 - b. After the expiration of one (1) year following the date on which Principal ceased work of said Contract, however, if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
 - c. Other than in a State court of competent jurisdiction in and for the county or other political subdivision of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.
- 4. The penal sum of this Bond is in addition to any other Bond furnished by the Contractor and in no way shall be impaired or affected by any other Bond.
- 5. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of Mechanics' Liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this Bond.

Signed this	day of	20
IN THE PRESE	NCE OF:	
(Principal)		(Surety)
(Signature)		(Signature)
(Print Name and	Title)	(Print Name and Title)
(Address)		(Address)
(City, State, Zip)		(City, State, Zip)
Telephone ()	
Fax No		
ACKN	OWLEDGEMENT	OF PRINCIPAL, IF A CORPORATION
STATE OF) ss	:
COUNTY OF)	
On the	day of	in the year 20, before me personally
came		_to me known, who, being by me duly sworn, did
depose and say th	at (s)he resides at	, that (s)he is the
		, the corporation
		above instrument; and that (s)he signed her/his name
thereto by order of	of the Board of Direct	tors of said corporation.

Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP

STATE OF_____)ss:

COUNTY OF_____)

On the_____ day of_____ in the year 20__, before me personally came

_____, to me known and known to me to be a member of the firm_____, described in and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same for and in behalf of said firm for the uses and purpose mentioned therein.

Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF_____) ss:

COUNTY OF_____)

On the ______ day of ______ in the year 20__, before me personally came ______, to me known and known to me to be the person described in and who executed the foregoing instrument and (s)he duly acknowledged that (s)he executed the same.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF NEW YORK) COUNTY OF_____) ss: On the ____day of _____in the year 20__, before me personally came ______to me known, who, being by me duly sworn, did depose and say that (s)he resides at ______, that (s)he is the _______, that (s)he is the corporation described in and which executed the above instrument; and that (s)he signed her/his name thereto by order of the Board of Directors of said corporation.

Notary Public

SECTION VII. PERFORMANCE BOND

PERFORMANCE BOND

KNOW ALL BY THESE PRESENTS:

That
(Here insert the name and address or legal title of the Contractor)
as Principal, hereinafter called Principal, and
(Here insert the legal title of Surety)
(Address)
as Surety, hereinafter called Surety, are held and firmly bound unto The Fashion Institute of
Technology, as applicable, as Obligee, hereinafter called Owner, in the amount of
and/100 Dollars (\$) for
the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators
successors and assigns, jointly and severally, firmly by these presents.
WHEREAS, CONTRACTOR has by written agreement dated
entered into a Contract with Owner for

in accordance with the Contract Documents and any changes thereto, which are made a part hereof, and are hereinafter referred to as the Contract.

- 1. If the Contractor performs the Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 2.1.
- 2. If there is no Owner default, the Surety's obligation under this Bond shall arise after:
- 2.1 The Owner has notified the Contractor, the Surety at its address described in Paragraph 8. below that the Owner is considering declaring a Contractor in default.
- 2.2 The Owner has declared a Contractor in default and formally terminated the Contractor's right to complete the Contract.

- 2.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Contract or to a Contractor selected to perform the Contract in accordance with the terms of the Contract with the Owner.
- 3. When the Owner has satisfied the conditions of Paragraph 2 herein., the Surety shall, at the Owner's option, promptly and at the Surety's expense take on the following actions:
- 3.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Contract; or
- 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
- 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Owner and the Contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified Surety equivalent to the bonds issued on the Contract, and pay to the Owner the amount of damages as described in Paragraph 5. in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor default.
- 4. If the Surety does not proceed with reasonable promptness, the Surety shall be deemed to be in default on this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner.
- 5. After the Owner has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under Subparagraph 3.1, 3.2, or 3.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:
- 5.1 The responsibilities of the Contractor for correction of defective work and completion of the Contract;
- 5.2 Additional legal, design, professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 3.; and
- 5.3 Liquidated Damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor. 3
- 6. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators or successors.
- 7. The Surety hereby waives notice of any change, including changes of time, to the Contract

or to related subcontracts, purchase orders, and other obligations.

- 8. Notice of the Surety and the Contractor shall be mailed or delivered to the address shown on the signature page. Notice to the Owner shall be mailed or delivered to the address shown in the preamble.
- 9. Definitions:
- 9.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
- 9.2 Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 9.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
- 9.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

The penal sum of this Bond is in addition to any other Bond furnished by the Contractor and in no way shall be impaired or affected by any other Bond.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which Final Payment is made under this Contract.

Signed this_	day of	20 .

IN THE PRESENCE OF:

(Principal)

(Surety)

(Signature)

(Signature)

(Print Name and Title)

(Print Name and Title)

(Address)	(Address)
(City, State, Zip)	(City, State, Zip)
Felephone ()	
Fax No	
ACKNOWLEDGEMEN	T OF PRINCIPAL, IF A CORPORATION
STATE OF) ss:
COUNTY OF	
On the day of	in the year 20, before me personally came
to me	e known, who, being by me duly sworn, did depose and say
hat (s)he resides at	, that (s)he is theof, the corporation described in and which executed
he above instrument; and that (s)he sign of said corporation.	gned her/his name thereto by order of the Board of Directors
	Notary Public
ACKNOWLEDGEMEN	NT OF PRINCIPAL, IF A PARTNERSHIP
STATE OF)ss:	
COUNTY OF)	
On the day of	in the year 20, before me personally came
	, to me known and known to me to be a member of the , described in and who executed the knowledged to me that (s)he executed the same for and in
irm	, described in and who executed the

behalf of said firm for the uses and purpose mentioned therein.

Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF____) ss: COUNTY OF____)

On the _____ day of _____ in the year 20__, before me personally

came______, to me known and known to me to be the person described in and who executed the foregoing instrument and (s)he duly acknowledged that (s)he executed the same.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF NEW YORK)	
COUNTY OF) ss:	
On the day of	in the year 20, before me personally came
and say that (s)he resides at	to me known, who, being by me duly sworn, did depose
	, that (s)he is the
of	, the corporation described in and which
executed the above instrument; and the	hat (s)he signed her/his name thereto by order of the Board of
Directors of said corporation.	

Notary Public

SECTION VIII. FORM OF BID

FORM OF BID

(Contract for Total of All Materials and Labor)

The Fashion Institute of Technology (Owner)

For:

The Fashion Institute of Technology is requesting Bids for the Work described in Section II. Bid Terms and Conditions, II. Summary of Scope of Work and as shown and described on the drawings and specifications provided with this document at the Fashion Institute of Technology's "

_____" located on 27th street campus. To be known from this point forward as the "

Pursuant to and in compliance with the Owner's advertisement for bids dated 201 and the Contract Documents relating hereto, the undersigned hereby offers to provide all plant, labor, materials, supplies, equipment, and other facilities and things necessary or proper for or incidental to, the General Contracting and Electrical Work as required by, and in strict accordance with, the applicable provisions of the Contract Documents, as defined in the General Conditions, including changes thereto, and all of the addenda issued by the Owner and sent to the undersigned by facsimile transmission or delivered to the bidder prior to the date of opening of bids, whether received by the undersigned or not, for the total sum of

Dollars

(\$).

The Bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

If written notice of the acceptance of the Bid is sent to the undersigned by certified or registered mail or by facsimile transmission or delivered to the undersigned within ninety (90) days after the date of opening of the bids, or any time thereafter before the Bid is withdrawn, the undersigned shall, within eight (8) days after the date of such mailing, facsimile transmission, or delivery of such notice, execute and deliver a Contract in the Form of Contract included in the Contract Documents.

The undersigned hereby designates as the undersigned's office to which such notice of acceptance may be mailed, transmitted, or delivered as _____

SECTION IX. NON-COLLUSIVE BIDDING CERTIFICATION

Non-collusive Bidding Certification

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and, in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief:

- 1. The prices in the bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
- 2. Unless otherwise required by law, the prices which have been quoted in the bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
- 3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.

Firm Name
Address
By(Signature and Title)
Dated:
Telephone () Fax No. ()
(Taxpayer ID or Social Security Number)
ACKNOWLEDGEMENT OF BIDDER, IF A CORPORATION
STATE OF NEW YORK)COUNTY OF) ss:
On theday of, 20, before me personally came
to me known, who, being by me duly sworn, did depose and say that (s)he resides at
, that (s)he is theof
, the corporation described in and which executed the above instrument;
and that (s)he signed her/his name thereto by order of the Board of Directors of said corporation.

ACKNOWLEDGEMENT OF BIDDER, IF A PARTNERSHIP

STATE OF NEW YORK)COUNTY OF) ss:

On the _____day of _____, 20__, before me personally came _____

to me known and known to me to be a member of the firm

_____, described in and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same for and in behalf of said firm for the uses and purposes mentioned therein.

Notary Public

ACKNOWLEDGEMENT OF BIDDER, IF AN INDIVIDUAL

STATE OF NEW YORK)COUNTY OF) ss:

On the _____day of _____, 20__, before me personally came ______ to me known and known to me to be the person described in and who executed the foregoing instrument, and (s)he duly acknowledged that (s)he executed the same.

Notary Public

SECTION X:

SUBSTITUTION FORM REQUEST

FASHION INSTITUTE OF TECHNOLOGY

SUBSTITUTION REQUEST FORM

1.1 CONDITIONS OF SUBSTITUTIONS

- A. Substitution indicated on this Form is a proposed substitute to requirements indicated in the Contract Documents. Substitution listed has not been included in an Addendum. Submit one Form for each proposed substitution.
- B. For each proposed Substitution, state difference in price or "No Change" where Substitution is offered.
- C. Attach complete technical data, specifications, and description of substitutions.
- D. Architect reserves the right to accept or reject any or all proposed substitutions.

1.2 SUBSTITUTION REQUEST

The following information is hereby submitted for a substitution to the specified item.

Specification Section	andTitle:	
Paragraph	Page Specified Iter	n
Proposed Substitution	1:	
Manufacturer:	Address:	Phone:
Trade Name:		Model No:
Price Difference:	or No Cł	ange
product.B.Same warr.C.Same mainD.Proposed sE.Proposed sF.Payment w	ubstitution has been fully investig anty will be furnished for propose tenance service and source of rep ubstitution will have no adverse e ubstitution does not affect dimens	ated and determined to be equal or superior in all respects to specified d substitution as for specified product. acement parts, as applicable is available. ffect on other trades and will not affect or delay progress schedule. ions and functional clearances. lding design, including A/E design, detailing, and construction costs
Submitted by:		
Signed by:		
Firm:		
Address:		
Telephone:		FAX:
ARCHITECT'S RE	VIEW AND ACTION	
□ Substitutio □ Substitutio		
Signed by:		
Supporting Data At	ttached: Drawings Prod Reports Othe	

SECTION XI. CONTRACT

TO BE SIGNED ONLY UPON AWARD

CONTRACT

This Agreement made as of the	day of	20	, by and between the
	;	, hereinafter referred	to as the "OWNER" and
			hereinafter referred to
as the "Contractor", for Work at			

WITNESSETH: That the **OWNER** and the Contractor for the consideration named agree as follows:

1. The Contractor shall Provide and shall perform all Work of every kind or nature whatsoever required and all other things necessary to complete in a proper and workmanlike manner the ______

in strict accordance with the Contract Documents as defined in the General Conditions (and of which a listing of specifications and drawings are attached hereto) and in strict accordance with such changes as are ordered and approved pursuant to the Contract, and shall perform all other obligations imposed on such Contractor by the Contract.

2. The Contractor agrees to perform all Work and labor required, necessary, proper for, or incidental to the Work, and to Furnish all supplies and materials required, necessary, proper for, or incidental to the Work for the total sum of ______

and 00/100 Dollars (\$

.00), which sum shall be deemed to be in full consideration for the performance by the Contractor of all the duties and obligations of such Contractor under the Contract.

3. The Contractor shall commence Work on the Contract at a time to be specified in a written notice to proceed issued by the OWNER and complete the project no later than_____.

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

Fashion Institute of Technology

(Name of Contractor)

Sherry Brabham, VP of Finance

By_____(Signature)

(Print Name and Title)

ACKNOWLEDGEMENT OF CONTRACTOR, IF A CORPORATION

STATE OF_____) COUNTY OF_____) ss:

On the ______day of ______in the year 20_____, before me personally came _______to me known, who, being by me duly sworn, did depose and say that (s)he resides at _______, that (s)he is the _______of _____, the corporation described in and which executed the above instrument; and that (s)he signed her/his name thereto by order of the Board of Directors of said corporation.

Notary Public

ACKNOWLEDGEMENT OF CONTRACTOR, IF A PARTNERSHIP

STATE OF_____) COUNTY OF_____) ss:

On the ______ day of ______ in the year 20__, before me personally came _______ to me known and known to me to be a member of the firm _______, described in and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same for and in behalf of said firm for the uses and purpose mentioned therein.

Notary Public

ACKNOWLEDGEMENT OF CONTRACTOR, IF AN INDIVIDUAL

STATE OF_____) COUNTY OF_____) ss:

On the _____day of _____in the year 20__, before me personally came ______, to me known and known to me to be the person described in and who executed the foregoing instrument and (s)he duly acknowledged that (s)he executed the same.

Notary Public

SECTION XII. AFFIRMATIVE ACTION FORM

MONTHLY CONTRACTOR'S COMPLIANCE REPORT FORM AAP 7.0

INSTRUCTION SHEET

ALL PAYMENT REQUISITION, CONTRACTOR AND PROJECT INFORMATION ON THE TOP PORTION OF THE FORM MUST BE COMOPLETELY FILLED OUT. PLEASE NOTE:

False statements, information or data submitted on or with application for payment may result in one or more of the following actions: Termination of Contract for cause; Disapproval of future bids, or contracts or subcontracts; Withholding of final payments on the contract; and Civil and/or criminal prosecution.

PART B- PAYMENTS TO SUBCONTRACTORS AND SUPPLIERS

- 1) ALL FIRMS THAT YOU ARE UTILIZING ON THE JOB MUST BE LISTED EACH TIME **REGARDLESS** IF THEY ARE SCHEDULED TO RECEIVE PAYMENTS OUT OF THE PROCEEDS OF THE REQUISITION FOR PAYMENT.
- All relevant information for each subcontractor and/or supplier must be filled in. This includes firm's complete name, address, phone number and Federal ID #. In addition, if the firm is a NYS CERTIFIED MBEIWBE, please indicate as such in the appropriate box.

AS A REMINDER, ONLY THOSE FIRMS THAT HAVE NYS CERTIFICATION BY THE EMPIRE STATE DEVELOPMENT CORPORATION CAN BE COUNTED TOWARDS THE MBE/WBE GOAL ACHIEVEMENT FOR THE PROJECT.

- 3) The percentage of the job or purchases completed must be filled in and in addition, please indicate the number of change orders issued on any subcontract agreement or the number of purchase orders issued to date if purchasing supplies.
- 4) A description of the work being performed by a subcontractor or the type of supplies being purchased must befilled in.

DEFINITIONS

INTENDED PAYMENT: This is the amount of money that you intend to pay to each firm with the money that you will receive from the accompanying requisition. <u>This is not</u> the amount that you intend to pay over the life of the contract.

<u>AMOUNT PAID TO DATE</u>: This is the amount of money that has <u>ACTUALLY</u> been paid to date from previous requisitions submitted. It does not include the amount that you intend to pay from this requisition. THIS AMOUNT WILL BE VERIFIED BY OUR OFFICE PRIOR TO CLOSE OUT OF THE JOB BY THE RECEIPT OF COPIES OF CANCELED CHECKS OR PAID INVOICES.

CURRENT VALUE OF SUBCONTRACT: This is the total value to date of any subcontract agreement that has been issued to the firm by your company. It should be inclusive of any change orders issued to the original contract. **NOTE:** THIS LINE IS FOR SUBCONTRACTOR INFORMATION ONLY. IF THE FIRM LISTED IS A SUPPLIER THAT YOU ARE PURCHASING SUPPLIES OR MATERIAL FROM, LEAVE BLANK AND GO TO THE NEXT LINE.

TOTAL VALUE OF ALL PURCHASE ORDERS: This is the total amount of **all** purchase orders that will be issued to the firm for the entire job. The number of purchase orders issued to date should be reflected in the area indicated to the left. **NOTE:** THIS LINE IS FOR SUPPLIER INFORMATION ONLY. IF THE FIRM IS A SUBCONTRACTOR, LEAVE THIS AREA BLANK. A SUBCONTRACTOR AGREEMENT SHOULD BE ISSUED WHICH WOIULD BE REFLECTED ON THE PREVIOUS LINE.

The current form that you should be utilizing is form: AAP 7.0 Revised 1/9/08. This form must be included with each payment requisition submitted or the payment will not be processed.

If the form is not filled out according to the above instructions, your next payment requisition may be held until corrections are made. In addition, each report submitted must have an original signature and date.

MONTHLY CONTRACTOR'S COMPLIANCE REPORT

Page	1	of

	Payment Requisition Date Payment Requisition Amount \$
	FIT ContractNumber
CONTRACTOR INFORMATION	
Name	Federal ID No
Address	
Contact Person	Telephone Number
PROJECT INFORMATION	
Institution	City and Zip Code
Work Description	

Part B – Payments to Subcontractors and Suppliers: Provide name, address and telephone number of **ALL** subcontractors to which you have awarded a subcontract or suppliers to which you have issued a purchase order. Place **X** in check box to indicate whether they are a New York State certified MBE or WBE or Other. In addition, for each firm listed below you must also include: the firms federal identification number; amount of intended payment to be made from proceeds of the accompanying requisition; percent complete, amount paid to date; the number of change orders or purchase orders; current value of subcontract (including change orders) or cumulative value of purchase orders; and a brief description of the work or service. All subcontractors or suppliers with whom you have an agreement should be listed below, even if they are not scheduled to receive a payment out of the proceeds of the attached requisition for payment. For further details, see Instruction Sheet

Firm	MBE WBE Other	Fed. ID#
Address	Phone#	Intended Payment\$
Address	Percent Complete	Amount Paid to Date\$
No. of Change Orders	Current Value of Subcontrac	ct \$
No. of Purchase Orders Issued	Total Value of Purchase Ore	ders \$
Work Description		
Firm	MBE WBE Other	Fed. ID#
Address	Phone #	Intended Payment\$
Address	Percent Complete	Amount Paid to Date\$
No. of Change Orders	Current Value of Subcontrac	ct \$
No. of Purchase Orders Issued	Total Value of Purchase Ord	ders \$
Work Description		
False statements, information or data submitted on or	with application for payment n	nay result in one or more of the
following actions: Termination of Contract for cause; D)isapproval of future bids, or co	ontracts or subcontracts; Withholding
of final payments on the contract; and Civil and/or crim	ninal prosecution.	
Name of Principalor Officer (Type or Print)	Title of Principal or Office	er {Type or Print)
Signature of Principal or Officer	Date	

Form AAP 7.0 Revised 1/9108

<u>SECTION XIII.</u> <u>CHANGE ORDER FORM</u>

CHANGE ORDER

TO:	
Contractor:	Contract No.
Street:	Contract Date:
City, State, Zip:	Original ContractAmount: \$
Phone No	Total Approved Change Orders:
	Current Contract Amount: \$

You are hereby directed to perform all labor and to provide all materials necessary to carry out the Work described below:

Full consideration for this change order shall be on INCREASE/DECREASE of the original contract amount by:

			Dollars.	
	Labor = Materials =			
Contractor, its heirs, e Owner, its successors law or in equity which	SE of the original schedule executors, administrators, suc s, and assigns from any and a	by days. In accepting cessors, and assigns h Il actions, causes of ac	and executing this change order, the ereby release and forever discharge to tion, claims and demands whatsoever inst the Owner in any way arising out	the r in
this change. Recommended by: CONSTRUCTION MA	NAGER OR ARCHITECT	Accepted by: CONTRACTOR		
Name:	_	Name:		
		Ву:	Date:	
By: Approved by:	Date:	OWNER		
Name:		Name:		
Ву:	Date:	Ву:	Date:	

SECTION XIV. CONTRACTOR'S TRADE PAYMENT BREAKDOWN

TRADE PAYMENT BREAKDOWN

PROJECT:_____

CONTRACT # C

CONTRACTOR: _____

		CONTRACT AMOUNT				
ITEM no.	DESCRIPTION	UNIT MEAS.	QUANTITY	LABOR	MATERIAL	TOTAL
1	Mobilization	LS				
2	Bonds	LS				
3	Insurance	LS				
4	Safety Program	MTLY				
5	Supervision	MTLY				
6	Permits/Licenses	LS				
7	CPM Schedules	LS				
8	Samples - Submittals	LS				
9	Data Submittals	LS				
10	Field Coordination	MTLY				
11	Coordinate with HVAC, Electrical	MTLY				
12	Coordinate with Plumbing/Fire Prevention	MTLY				
13	Coordinate with Kitchen Equipment Contractor	MTLY				
14	Temporary Electric	LS				
15	Temporary Light	LS				
16	Temporary Facilities	MTLY				
17	Fire Prevention	LS				
18	Temporary Field Office	MTLY				
19	Material Hoisting	LS				
20	Hoisting Operations	LS				
21	Storage	LS				
22	Warranties, Etc.	LS				

EXHIBIT A: SAFETY EHS PLAN

EXHIBIT A. SAFTEY EHS PLAN

FASHION INSTITUTE OF TECHNOLOGY

OUTLINE FOR PREPARING WORK-SPECIFIC ENVIROMENT, HEALTH AND SAFETY (EHS) PLAN

Before commencing work on site at FIT, Contractor shall prepare a work-specific EHS Plan and submit the EHS Plan to both the Facilities Management and EHS Departments for review and approval. Such approval shall be given in a timely manner.

I) A work-specific EHS Plan is required in the following instances:

- A) When proposed work will:
 - 1) use regulated hazardous chemicals;
 - 2) have the potential to generate fumes, vapors or dusts;
 - involve cutting torches or other spark-generating equipment ("hot" work);
 - 4) generate any waste;
 - 5) involve high-energy systems or
 - 6) require any type of air monitoring.
- B) When work involves the removal of less than 25 liner feet, or 10 square feet, of asbestos-containing material (that is greater than 1% asbestos). For work involving more than these amounts of asbestos, Contractor must consult with the EHS Department for additional guidelines.
- C) When work involves the use of tools and equipment in areas where FIT employees or students are present.
- D) When work involves construction, other than minor repairs or alterations to on-campus facilities.
- E) When work involves dangerous environments, such as confined spaces, hazardous energy, use scaffolds greater than 10 feet high, or vehicle-mounted articulated booms.
- **II**) Use the outline below to develop the work-specific EHS Plan. Contractor shall amend the work-specific EHS Plan as needed to accommodate work on-campus as it proceeds.

DESCRIPTION OF CONTENTS OF WORK-SPECIFIC EHS PLAN

III) GENERAL INFORMATION – PROJECT PLANNING

A) List primary information about Contractor's firm and that of sub-

contractors, if any, Project Name, FIT Bid Number and Contractor's safetyrelated performance measurements on Table 1.

- B) Describe the scope of work and list a breakdown of its specific tasks.
- C) Provide a project schedule that, at a minimum, shows the anticipated start date of the work, the duration of each phase of the work, the anticipated date of completion of each phase, and the project completion date.
- D) List name of Contractor's on-site EHS Coordinator and the names of all OSHA- competent persons needed to carry out the scope of work on Table 2. The EHS Coordinator shall serve as the primary contact with FIT's Director of EHS Compliance during all work.

IV) WORK-SPECIFIC HAZARD ANALYSIS/RISK ASSESSMENT

- A) Describe each task associated with the work of the project.
- B) List the potential hazards, if any, associated with each task.
- C) Provide copies of Contractor's EH&S program applicable to scope of work.
- D) List the types of protective work practices or personal protective equipment (PPE) Contractor will employ to carry-out each task.
- E) Describe the types of exposure assessments that are needed to address potential hazardous exposures related to the work of the project. These include:
 - 1) Work practices and engineering controls Contractor will use to prevent exposure of Contractor's employees to hazardous chemicals or hazardous energy;
 - 2) Work practices and engineering controls Contractor will use to prevent exposure of FIT students and staff to any detectable chemical exposure;
 - 3) Contractor's use of respiratory protection and other protective equipment (PPE) and
 - 4) Qualitative or quantitative monitoring protocols, personal and area monitoring equipment, and contaminant action levels.
- F) Attach copies of certified documentation of "Hazard Assessment and Equipment Selection" required by 29 CFR 1910.132 (d)(2) that complies with 1910 Subpart I Appendix B for all tasks in the work-specific EHS Plan.
- G) Attach a copy of Contractor's written Hazard Communication Program that OSHA requires for the work-specific EHS Plan.

V) WORK-SPECIFIC ENVIRONMENTAL, HEALTH AND SAFETY ELEMENTS

- A) To address health and safety issues, the work-specific EHS Plan shall:
 - 1) Describe criteria for upgrading or downgrading personal protective equipment (PPE) or modifying work practices to control hazardous exposures during the work;
 - 2) Describe criteria Contractor will use to set up exclusion zones, including physical barriers and decontamination zones, as needed to prevent spread of debris and restrict access of unauthorized persons to work areas;
 - 3) List equipment Contractor will use for routine and emergency on-site communication;
 - 4) Describe utility clearance and marking procedures to prevent damage to buried utilities, or to lines, piping, or cables located inside of walls and ceilings, if applicable;
 - 5) Describe decontamination and cleaning procedures for Contractor's employees and equipment to prevent the spread of debris. This includes procedures during work, at the end of each work day, and at the completion of the project before FIT's final inspection of the work area;
 - 6) Identify measures to manage dangerous environments, such as confined spaces, scaffold work greater than 10 feet, or articulated booms;
 - 7) List "Hot Work" procedures involved in the work of the project. This may include, but not be limited to, work such as welding, burning, open flames, tar melting or other type of melting pots, grinding that throws sparks. (See Appendix 1 - "Daily Safety Management Work Permit");
 - 8) Identify the need for air monitoring or special testing to carry out the work. Include a listing of monitoring equipment or special tests and the Action Levels that Contractor will apply to project work;
 - 9) Describe safety procedures for excavations more than four 4 feet deep and sloping or shoring procedures where excavations will exceed 5 feet deep;
 - 10) Describe fire protection and explosive hazard review;
 - 11) List the name and address of Contractor's on-contract Confined Space rescue team;
 - 12) Describe spill control procedures for chemical products Contractor will have on-campus during work. Include a listing of spill control or containment supplies that Contractor will have on-hand in case of a spill;
 - 13) Describe the need for site coordination with FIT employees, other contractors on-site and other adjacent work groups. This includes identification of hazardous energy Lock Out and Tag Out

requirements to make to work area safe and

- 14) Provide a listing of other safety equipment that Contractor will have on site during the work of the project.
- B) To address oil, chemical and waste management issues, the work-specific EHS Plan shall:
 - 1) Provide estimates of the types and amounts of waste (both hazardous and non-hazardous) that Contractor anticipates the work will generate. As applicable, provide a copy of a waste analysis plan that lists the types of analysis required, the USEPA SW-846 method number and the method detection limits;
 - 2) Provide facility name, USEPA ID number, and a contact name for each facility that will transport and dispose of each of the waste streams identified above. Provide this information for any facility that will dispose of residuals from the treatment of project waste, as applicable;
 - 3) On a copy of a drawing that will be provided by FIT, identify location where Contractor proposes to accumulate waste during work, to set-up exclusion zones and to provide employee decontamination areas;
 - 4) Provide a statement that describes the methods that Contractor will use to minimize the amount of waste generated from the work of the project;
 - 5) Provide a tabular listing, along with copies of Safety Data Sheets (SDS), for any chemical products that Contractor intends to store or use on-site during the work. The listing shall include the product name, manufacturer's name, type, amounts, intended storage location on FIT site, the specific use of the chemical and identification of any NYCDEP/USEPA regulated hazardous substances that Contractor intends to store or use on-site during the work. In all cases, Contractor must submit the listing before chemical products are delivered to the FIT campus;
 - 6) On a copy of a drawing that will be provided by FIT, identify location where Contractor proposes to store chemical products onsite during work;
 - 7) Identify the need, if any, to amend existing FIT emergency contingency planning documents. Such documents include, but are not limited to: Spill Prevention Control and Countermeasure Plan, Spill Prevention Report, Right-to-Know Survey and
 - 8) List permits and Certificates of Fitness (NYCDEP, NYSDEC, USEPA, FDNY) needed to carry-out the scope of work and have copies on-site of permits and Certificates to carry-out project work.

VI) ON-SITE DOCUMENTATION

 A) Contractor shall record initial and daily safety-related procedures on Table 3. These shall include:

- 1) Before start of the work, FIT's Project Manager will conduct a FIT Hazard Communication briefing for Contractor's employees;
- 2) Before start of the work, FIT's Project Manager and Contractor's on-site EHS Coordinator shall conduct a briefing for FIT employees in areas adjacent to work areas about proposed work;
- 3) Review of FIT Emergency Evacuation Procedures;
- 4) Listing of initial and ongoing project status meetings on-site with FIT Project Manager to address EHS concerns safety and health and
- 5) Scheduled and unscheduled employee safety briefings, toolbox talks.
- B) Contractor shall provide a summary of the on-site EHS Coordinator's EHS-related training and experience relevant to the work of the project.
- C) Contractor's employees shall sign-in daily with FIT Security in the A-Building Lobby.
- D) For each work shift necessary to complete the project, Contractor's on-site EHS Coordinator shall open and fill out the "Daily Safety Management Work Permit" (See Appendix 1) at the start of each work shift and close the Permit at the end of each work shift.

VII) EMERGENCY RESPONSE PLANNING

Contractor shall review the summary of the Emergency Response Contact Names listed on Table 4 and provide the information as follows:

- A) On a site map that will be provided by FIT, identify the primary and secondary routes for the evacuation of Contractor's employees, including the "rally point" where Contractor's employees will assemble and carry-out an accountability check in case of an evacuation;
- B) List emergency response contacts with titles and telephone numbers. Contractor shall immediately call FIT Security and the FIT Project Manager in the event of a spill of oil, chemicals, waste water, or hazardous materials;
- C) Identify the name, address and route to nearest hospital or Contractor's wellness center and
- D) Provide a listing of emergency equipment for first aid, personal protection, spill response, fire protection and rescue.

Page	1	of	1
------	---	----	---

TABLE 1

Project Name:

Number:

Bid

CONTACTOR ORGANIZATION CHART AND SAFETY DATA

COMPANY	:	Name: Address: Phone:
President	:	Name: Phone:
Vice President – Operations		Name: Phone:
Director of Environmental, Health, and Safety	:	Name: Phone:
Contractor EHS Program Development	•	Name: Phone:
OSHA Total Case Recordable Rate (TCRR)	:	
Days Away from work, or Restricted work or job Transfer (DART)	:	
Experience Modification Rate (EMR)	:	

Listing of On-site Subcontractors for project work, as applicable -

COMPANY NAME	ADDRESS	PHONE NUMBER	TASKS

ON-SITE SUPERVISORY PERSONNEL of 2	Page 1
TITLE	: NAME(S) AND ON-SITE PHONE NUMBER
On-site EHS Coordinator	:
Contractor Project Managers	:
FIT's Project Manager(s)	:
Contractor's Competent Persons	List all that Apply – Indicate not applicable areas for department /project work as "NA" For subcontractor employees, place subcontractor firm name in parenthesis after the employee's name
Confined Spaces	:
• Excavations	:
Industrial Hygiene	:
ElectricalLock Out/Tag Out	:
• PPE, Respiratory Protection	:
• Hazard Communication (Required for each department and project. Identify responsible employee for each subcontractor)	:
• Fall Protection	:
• Scaffolds	:
Cranes & Derricks	:
• Blasting & Use of Explosives	:

TABLE 2 (Cont'd)		
DN-SITE SUPERVISORY PERSONNEL Page 2 of 2		
•	Asbestos (Attach copies of Company license, supervisor and handler certificates for all employee that will perform work)	
•	Lead	
•	Silica	
•	Hot Work (Complete and submit permits daily - see Appendix 1)	
•	FDNY Certificate of Fitness-Torch Operations	
•	FDNY Certificate of Fitness-Fire Guard	
•	FDNY Certificate of Fitness-Fire proofing	
•	FDNY Certificate of Fitness-Powder Activated Tools	
•	FDNY Certificate of Fitness-Air Compressors	
٠	FDNY Certificate of Fitness-Use of LPG and Use in Tar Kettles	
•	FDNY REFRIGERATING SYSTEM OPERATING ENGINEER	
•	FDNY Certificate of Fitness-Other	
•	FDNY Certificate of Fitness-Other	
•		
•		

TABLE 3

LISTING OF REQUIRED EMPLOYEE/SUPERVISORY BRIEFINGS Page 1 of 1

DATE	ΤΟΡΙϹ	Comments	TYPE (Monthly Supervisor/Bi- weekly Employee/Supervisor	Comments
	FIT Haz Com Briefing	At start of Work		
	Briefing for FIT Employees in work area(s)	FIT briefing for all FIT Department Supervisors in areas where work may potentially affect FIT employees or students at start of work. Record name of FIT employee(s) briefed	Complete Daily Safety Management Work Permit (See Appendix 1)	
	Review of FIT Emergency Evacuation Procedures	At start of Work		

TABLE 4

EMERGENCY CONTACT NAMES & TELEPHONE NUMBERS 1

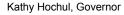
Page 1 of

EMERGENCY PHONE TITLE CONTACT NAME **NUMBERS** Contractor: MAIN OFFICE **Contractor President: On-site EHS Coordinator Executive Director:** George Phone: 212-217-4423 FIT Facilities Management Jefremow Phone: 212-217-4424 Assoc. Executive Director: Allen King **Director:** Paul DeBiase paul_debiase@fitnyc.edu Phone: 212-217-3752 FIT Environmental, Health and Safety Department Acting Coordinator: Kathy Espinoza-Caraba Phone: 212-217-3754 kathy_espinozacaraba@fitnyc.edu Contractor Project Manager(s) 212-217-7777, or Central Control FIT Public Safety Use Red Phone Occupational Safety And Health Provide Zip Code for the location of 800-321-6742 Administration. – Area Director Accident Location of nearest hospital and/or contractor's wellness center Rally Point and Accountability Check In case of Building Evacuation Alarm Location

Note: Call FIT Central Control at 212-217-7777 in case or any emergency such as fire, chemical spills, injury requiring medical treatment, or exposure of contractor or FIT personnel to fumes, vapors, or dusts.

EXHIBIT B: PREVAILING WAGE SCHEDULE

Roberta Reardon, Commissioner





Fashion Institute of Technolog

Sam Li, InterminDirector of Purchasing 227 W 27th St New York NY 10001

Schedule Year Date Requested 01/19/2024 PRC#

2023 through 2024 2024000704

Location Fashion Institute of Technolog Project ID# C1591 Project Type Provide labor, materials, tests, tools and equipment to complete the installation of a new fire pump and remove the existing one. Provide new electrical work and fire alarm as shown on plans to allow

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 form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment. Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed \$100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds \$25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8. Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 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 220e(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.

Roberta Reardon, Commissioner





Fashion Institute of Technolog

Sam Li, InterminDirector of Purchasing 227 W 27th St New York NY 10001 Schedule Year Date Requested PRC#

2023 through 2024 01/19/2024 2024000704

Location	Fashion Institute of Technolog
Project ID#	C1591
Project Type	Provide labor, materials, tests, tools and equipment to complete the installation of a new fire pump and remove the existing one. Provide new electrical work and fire alarm as shown on plans to allow

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.

Federal Employer Identification N	umber:		
Name:			
City:		State:	Zip:
Amount of Contract: Approximate Starting Date:	<u>\$/ /</u>		Contract Type: [] (01) General Construction [] (02) Heating/Ventilation
Approximate Completion Date:	//_		 [] (03) Electrical [] (04) Plumbing [] (05) Other :

Contractor Information All information must be supplied

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: <u>dol.misclassified@labor.ny.gov</u>.

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 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 <u>dol.misclassified@labor.ny.gov</u>. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name: IA 999 (09/16)

WE ARE YOUR DOL



New York State Department of Labor **Bureau of Public Work**

Attention Employees

THIS IS A:

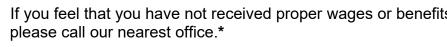
PUBLIC WORK PROJECT

If you are employed on this project as a **worker**, **laborer**, or mechanic you are entitled to receive the prevailing wage and supplements rate for the classification at which you are working.

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,

Albany (518) 457-2744 Binghamton (607) 721-8005 Buffalo (716) 847-7159 Garden City (516) 228-3915 New York City (212) 932-2419 Newburgh (845) 568-5287

Patchogue Rochester Syracuse Utica White Plains

(631) 687-4882 (585) 258-4505 (315) 428-4056 (315) 793-2314 (914) 997-9507

For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name:

Project Location:

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is \$250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (Note: Completion cards do not have an expiration date.)
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is \$3 million in Bronx, Kings, New York, Queens and, Richmond counties; \$1.5 million in Nassau, Suffolk and Westchester counties; and \$500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stopbid 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 countyby-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor Bureau of Public Work State Office Campus, Bldg. 12 Albany, NY 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

New York County General Construction

Ashestos Worker

Asbestos Worker		01/01/2024
JOB DESCRIPTION As	bestos Worker	DISTRICT 4
ENTIRE COUNTIES Bronx, Kings, Nassau, New	v York, Queens, Richmond, Suffolk	
WAGES Per Hour:	07/01/2023	
Asbestos Worker Removal & Abatement Onl	\$ 46.75 y*	
NOTE: *On Mechanical Sy SUPPLEMENTAL BENE Per Hour:	stems that are NOT to be SCRAPPE E FITS	D.
Asbestos Worker Removal & Abatement Onl	\$ 12.65 y	
OVERTIME PAY See (B, B2, *E, J) on OVER *Hours worked on Saturday		if forty hours have been worked during the week.
HOLIDAY Paid: Overtime:	See (1) on HOLIDAY PAGE See (5, 6, 8) on HOLIDAY PAGE	
REGISTERED APPREN Apprentice Removal & Aba 1000 hour terms at the follo 1st 78%		ates.
SUPPLEMENTAL BENEFI Per Hour: Apprentice		
Removal & Abatement	\$ 12.65	4-12a - Removal Only
Boilermaker		01/01/2024
JOB DESCRIPTION BO	ilermaker	DISTRICT 4
-	assau, New York, Orange, Putnam, C	Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester
WAGES Per Hour:	07/01/2023	01/01/2024
Boilermaker Repairs & Renovations	\$ 65.88 65.88	\$ 67.38 67.38
Repairs & Renovation: Incl SUPPLEMENTAL BENE Per Hour:	udes Repairing, Renovating replacer E FITS	nent of parts to an existing unit(s).
Boilermaker Repair \$ Renovations	33.5% of hourly Wage Paid + \$ 26.49	33.5% of Hourly Wage Paid + \$26.85
NOTE: "Hourly Wage Paid'	shall include any and all premium(s) pay.
Repairs & Renovation Inclu OVERTIME PAY See (*B, O, **U) on OVER ⁻		s & renovation of existing unit.

Note:* Includes 9th & 10th hours, double for 11th or more. ** Labor Day ONLY, if worked.

Prevailing Wage Rates for 07/01/2023 - 06/30/2024 Last Published on Jan 01 2024

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

(1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

33.5% of Hourly Wage Paid Plus Amount Below	33.5% of Hourly Wage Paid Plus Amount Below
\$ 20.12	\$ 20.36
21.03	21.28
21.95	22.22
22.83	23.12
23.76	24.07
24.67	25.00
25.58	25.93
	Wage Paid Plus Amount Below \$ 20.12 21.03 21.95 22.83 23.76 24.67

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

+ 9.79*

NOTE: "Hourly Wage Pai	d" shall include any and all premit	um(s)		4-5
Broadband				01/01/2024
JOB DESCRIPTION B	roadband		DISTRICT 4	
ENTIRE COUNTIES Bronx, Kings, Nassau, Ne	w York, Queens, Richmond, Suff	olk		
WAGES				
Per Hour:	7/01/2023	06/30/2024 Additional		
Field Tech Install/Repair	\$ 50.87	3% *		
(*)To be allocated at a late	er date.			
(demarcation), installing/r	naintaining/repairing broadband ir	ction/alteration/renovation projects nternet service.	s), stopping at first point of a	ttachment
Per Hour:	\$ 23.24			
OVERTIME PAY See (B, K, *R) on OVERT Note: *Two and one half t		hour		
HOLIDAY Paid:	See (5, 6, 7, 11, 12) on HOLID	AY PAGE		
				4-CWA-Dist1
Carpenter				01/01/2024
JOB DESCRIPTION C	arpenter		DISTRICT 8	
ENTIRE COUNTIES Bronx, Kings, Nassau, Ne	w York, Putnam, Queens, Richm	ond, Rockland, Suffolk, Westches	ter	
WAGES				
Per hour:	07/01/2023			
Piledriver	\$ 59.16			

Dockbuilder \$ 59.16 + 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$45.34

OVERTIME PAY

See (B, E2, O) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr. Apprentices

See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

\$ 31.83

REGISTERED APPRENTICES

Wages per hour (1)year terms:

S:				
	1st	2nd	3rd	4th
	\$25.60	\$31.20	\$39.58	\$47.97
	+ 5.30*	+ 5.30*	+ 5.30*	+ 5.30*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All Terms:

8-1556 Db

01/01/2024

DISTRICT 8

Carpenter

JOB DESCRIPTION Carpenter

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2023

Carpet/Resilient Floor Coverer \$ 55.05 + 8.25*

*This portion is not subject to overtime premiums

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS

Per hour:

\$ 39.45

OVERTIME PAY See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid:

See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr. Apprentices Overtime:

See (5,6,11,13,16,18,19,25) See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wage per hour - (1) year terms:

1st	2nd	3rd	4th
\$ 25.20	\$ 28.20	\$ 32.45	\$ 40.33
+ 1.85*	+ 2.35*	+ 2.85*	+ 3.85*

*This portion is not subject to overtime premiums

Supplemental benefit	1st	2nd	3rd	4th	
	\$ 15.22	\$ 16.22	\$ 19.32	\$ 20.32	8-2
Carpenter					01/01/20
JOB DESCRIPTIO	N Carpenter				DISTRICT 8
ENTIRE COUNTIE	S	rk, Orange, P	utnam, Queen	s, Richmond, Rock	kland, Suffolk, Westchester
WAGES					
Per Hour:	07/01/2023				
Marine Construction:					
Marine Diver	\$ 74.03 + 9.79*				
Marine Tender	\$ 53.57 + 9.79*				
*This portion is not su	ubject to overtime pre	emiums			
SUPPLEMENTAL	BENEFITS				
Journeyworker	\$ 45.34				
OVERTIME PAY See (B, E, E2, Q) on	OVERTIME PAGE				
HOLIDAY Paid: Overtime:	See (18, 19) See (5, 6, 11,	on HOLIDAY 13, 16, 18, 19	PAGE 9, 25) on HOLI	DAY PAGE	
REGISTERED APF Wages per hour: One (1) year terms.	PRENTICES				
1st year	\$ 25.60 + 5.30*				
2nd year	31.20 + 5.30*				
3rd year	+ 5.30 39.58 + 5.30*				
4th year	47.97 + 5.05*				
*This portion is not su	ubject to overtime pre	emiums			
Supplemental Benefit Per Hour:	ts				
All terms	\$ 31.83				8-1456
Carpenter					01/01/20
JOB DESCRIPTIO	N Carpenter				DISTRICT 8
ENTIRE COUNTIE	S		have d D i i		
Bronx, Kings, Nassau	u, New York, Putnam	, Queens, Ric	nmond, Rockl	and, Suttolk, West	cnester
WAGES	07/04/0000				

Dor	hours	
Per	hour:	

Building Millwright 07/01/2023

Page 23

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS Per hour:

Millwright

OVERTIME PAY See (B, E, Q) on OVERTIME PAGE

HOLIDAY

See (18,19) on HOLIDAY PAGE.

Overtime

Paid:

See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

\$44.31

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$31.74	\$37.19	\$42.64	\$53.54
+ 6.75*	+ 7.92*	+ 9.09*	+ 11.43*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

One (1) year te	erms:			
	1st.	2nd.	3rd.	4th.
	\$29.81	\$32.34	\$35.52	\$39.94

Carpenter

JOB DESCRIPTION Carpenter

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:

07/01/2023 Timberman

\$ 54.05 + 10.26*

*This portion not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2023

\$44.55

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr. Apprentices

See (5,6,11,13,25)

Overtime:

See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:	:			
One (1) year te	rms:			
	1st	2nd	3rd	4th
	\$23.42	\$28.53	\$36.18	\$43.84
	+ 5.55*	+ 5.55*	+ 5.55*	+ 5.55*

*This portion is not subject to overtime premiums

DISTRICT 8

8-740.1

01/01/2024

Supplemental benefits per hour: All terms \$ 31.54

Carpenter

WAGES

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES

Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.

Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border. Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

Per hour:	07/01/2023
Core Drilling: Driller	\$ 43.88 + 2.50*
Driller Helper	\$ 34.47 + 2.50*

Note: Hazardous Waste Pay Differential:

For Level C, an additional 15% above wage rate per hour

For Level B, an additional 15% above wage rate per hour

For Level A, an additional 15% above wage rate per hour

Note: When required to work on water: an additional \$ 3.00 per hour.

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Driller and Helper \$ 28.85

OVERTIME PAY See (B, G, P) on OVERTIME PAGE

HOLIDAY	
Paid:	See (5, 6) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

Carpenter

DISTRICT 8

ENTIRE COUNTIES

JOB DESCRIPTION Carpenter

Bronx, Kings, New York, Putnam, Queens, Richmond

PARTIAL COUNTIES

Nassau: That portion of the county that lies west of Seaford Creekand south of the Southern State Parkway.

WAGES	
-------	--

Per hour:	07/01/2023
Show Exhibit	\$ 55.75 + 9.50**
Bldg. Carpenter*	\$55.05 + 8.25**

* Not applicable in Putnam County

**This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour worked:

Show Exhibit	\$ 44.50
Bldg. Carpenter	39.45

8-1556 Tm

01/01/2024

8-1536-CoreDriller

01/01/2024

See (B, E, Q) on OVERTIME PAGE

OVERTIME PAY

HOLIDAY Paid:		See (18,19) o	n HOLIDAY P	AGE.		
Paid:for 1st & 2 Apprentices	nd yr.	See (5,6,11,13,16,18,19,25)				
Overtime: REGISTERED Wages per hour		ITICES	3,16,18,19,25)	on HOLIDAY P	AGE.	
(1) year terms:	1st. \$22.30 + 4.75*	2nd. \$27.88 + 4.75*	3rd. \$36.24 + 4.75*	4th. \$44.60 + 4.75*		
*This portion is	not subject	to overtime pre	emiums			
Supplemental b All terms	enefits per	hour: \$ 30.25				
Wages per hour (1) year terms:	: Bldg. Car 1st \$20.20 + 1.85*	2nd \$23.20	3rd \$27.45 + 2.80*	4th \$35.33 + 3.80*		
*This portion is						
Supplemental b	1st	2nd	3rd	4th		
Carpenter - H	\$15.22 eavy&Hig	\$16.27 ghway	\$19.37	\$20.37		
JOB DESCRIF ENTIRE COUI Bronx, Kings, N	NTIES					DISTRICT
PARTIAL COL Nassau: That p		e county that lie	es West of Sea	ford Creek and S	South of the Sou	thern State Parkway.
WAGES Per hour:			07/01/2023			
Heavy & Highwa Carpenter	ау		\$ 59.16 + 9.79*			
*This portion is a SUPPLEMEN Per hour worked	TAL BENI	-	emiums			
Heavy & Highwa	ау					

Heavy & Highway Carpenter \$45.34

OVERTIME PAY

See (B, E2, Q) on OVERTIME PAGE

HOLIDAY

See (1) on HOLIDAY PAGE Paid: Overtime: See (5, 6, 11, 13, 25) on HOLIDAY PAGE Paid : for 1st & 2nd yr See (5, 6, 11, 13, 25) Apprentices

REGISTERED APPRENTICES

Wage per hour: One (1) year terms: 01/01/2024

8-EXHIB

DISTRICT 8

Prevailing Wage Rates for (Last Published on Jan 01 2		2024			Published by the New York State Department of Labo PRC Number 2024000704 New York Count
Heavy & Highway	1st \$ 25.60 + 5.30*	2nd \$ 31.20 + 5.30*	3rd \$ 39.58 + 5.30*	4th \$ 47.97 + 5.30*	
This portion is not subject	ct to overtime prei	niums			
Supplemental Benefits: Per Hour:					
	,	All terms \$ 31.83			
		·			8-NYC H/
Electrician					01/01/2024
	lectrician				DISTRICT 9
ENTIRE COUNTIES Bronx, Kings, New York,	Queens, Richmor	nd			
WAGES					
Per hour:	07/01/2023		01/01/2024		
Tree Trimmer Ground Person	\$ 34.21 20.69		\$ 35.24 20.69		
Applies to line clearance,	tree work, and rig	ght-of-way pr	eparation on all	new or existing	overhead, electrical, telephone, and CATV lines.
SUPPLEMENTAL BEN Per hour:	NEFITS				
Free Trimmer Ground Person	\$ 12.81 7.75		\$ 13.20 7.75		
OVERTIME PAY See (B, *H, Q) on OVER *Worked performed on S applicable. HOLIDAY HOLIDAY: Paid:	Sundays & Holiday		7.00am - 4.00p n HOLIDAY PA		at double time, in addition to the holiday pay if
(An additional floating hol	lidav after four ve	ars service)			
Overtime:			n HOLIDAY PA	GE	
overtime.	366 (3,0,10,11	,10,10,20)0		GL.	9-3
Electrician					01/01/2024
JOB DESCRIPTION E	ectrician				DISTRICT 9
ENTIRE COUNTIES Bronx, Kings, New York,	Queens, Richmor	nd			
NAGES Per hour:	07/01/2023		04/11/2024		
Electrician Telephone	\$ 31.25 31.25		\$ 32.00 32.00		
Maintenance and Jobbing and teledata equipment.	g-Electrical and te	ledata work	of limited durati	on and scope, c	onsisting of repairs and/or replacement of electrical
	sary to retrofit se	vice mainta	in and repair all	kinds of lighting	fixtures and local lighting controls and washing and

- Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

SUPPLEMENTAL BENEFITS

Journeyworker:

07/01/2023	04/11/2024
\$ 26.55	\$ 27.21

Prevailing Wage Rates for 07/01/2023 - 06 Last Published on Jan 01 2024	/30/2024			ork State Department of Labor 024000704 New York County
28.53*		29.23*		
* Applies to overtime hours OVERTIME PAY See (B, H) on OVERTIME PAGE HOLIDAY				
Paid: See (1) on Overtime: See (5, 6, 7)	HOLIDAY PAGE 11, 15, 16, 25, 26) on	HOLIDAY PAGE		9-3m
Electrician				01/01/2024
JOB DESCRIPTION Electrician			DISTRICT 9	
Bronx, Kings, New York, Queens, Rich	mond, Westchester			
WAGES Per hour:	07/	01/2023	03/07/2024	
Service Technician	\$	36.40	\$ 37.40	
Service and Maintenance on Alarm and	Security Systems.			
Maintenance, repair and /or replaceme Access - Life Safety Systems and asso SUPPLEMENTAL BENEFITS Per hour:				
Journeyworker:	\$	21.07	\$ 21.85	
OVERTIME PAY See (B, E, Q) on OVERTIME PAGE HOLIDAY Paid: See (5, 6, 7) Overtime: See (5, 6, 7)	11, 15, 16, 17, 25, 26) 11, 15, 16, 17, 25, 26)	on HOLIDAY PAGE on HOLIDAY PAGE		9-3H
Electrician				01/01/2024
JOB DESCRIPTION Electrician ENTIRE COUNTIES Bronx, Kings, New York, Queens, Rich	mond		DISTRICT 9	
WAGES Per Hour:	07/01/2023	04/11/2024		
Electrician Audio/Sound and Temporary Light/ Power	\$ 61.00	\$ 62.00		
Evening (Swing Shift):				
Electrician Audio/Sound and Temporary Light/ Power	71.58	72.75		
Night (Graveyard Shift): Electrician Audio/Sound and Temporary Light	80.17	81.49		
Solar-Photovoltaic Systems				
Group 1 All tasks not listed in Group 2	61.00	62.00		

Group 2	31.25	32.00

D.C portion and associated mechanical equipment related to solar systems,

(excluding battery storage and its associated equipment) including work related to

Weather Stations and Data Acquisitions/Monitoring Systems on solar photovoltaic systems.

Mounting of PV modules.

Mounting of DC optimizers to back of modules if the installation calls for this equipment.

Mounting of microinverters to back of modules and install trunk cabling on racking if called for.

Module to module connection of PV modules to adjacent modules. If racking manufacturer provides integrated inter-row cable management, install string jumper to complete the string in full in same sub-array.

If racking manufacturer does not provide integrated inter-row cable management, run conduit between rows, bond it and run string jumper to complete string in full in same sub-array.

Installation of weather stations and other weather station relevant sensors as specified.

Installation of data acquisition system (DAS) for PV system monitoring.

SUPPLEMENTAL BENEFITS

Per Hour:

Electrician	\$ 63.84 67.69*	\$ 66.00 69.91*
Swing Shift:	72.58 77.10*	74.96 79.56*
Graveyard Shift:	79.96 85.02*	82.54 87.69*
Temporary Light/Power:	28.56 31.81*	30.33 33.64*
Group 1:	63.84 67.69*	66.00 69.91*
Group 2:	26.55 28.52*	27.20 29.23*

* Applies when premium (OT) wages are paid.

Temporary Light and Power benefit rate applies for three or less workers.

Reduce benefit rate by 6.2% for any employee who has accumulated wages of \$137,700 for the same employer.

OVERTIME PAY

See (A, H) on OVERTIME PAGE See (B) for Temporary Light and Power

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages Per Hour:

07/01/2023	04/11/2024
\$ 18.00	\$ 18.00
18.50	18.50
19.50	19.50
20.50	20.50
21.50	21.50
22.50	22.50
23.50	23.50
25.50	25.50
26.75	27.50
	\$ 18.00 18.50 19.50 20.50 21.50 22.50 23.50 25.50

Prevailing Wage Rates for 07/01/ Last Published on Jan 01 2024	/2023 - 06/30					PRC Number 202	24000704	New York County
13-18 mos.		31.25		32.00				
Supplemental Benefits per hou	ur:							
One (1) year terms:								
First Term:	Regular	Overtime		Regular	Overtime			
0-6 mos.	\$ 16.43	\$ 17.63		\$ 17.18	\$ 18.38			
7-12 mos.	16.69	17.92		17.44	18.67			
Second Term:								
0-6 mos.	17.21	18.51		17.97	19.26			
7-12 mos.	17.74	19.10		18.49	19.85			
Third Term:								
0-6 mos.	18.27	19.70		19.02	20.44			
7-12 mos.	18.79	20.28		19.54	21.03			
Fourth Term:								
0-6 mos.	19.31	20.87		20.06	21.62			
7-12 mos.	20.36	22.05		21.11	22.80			
	20.30	22.05		21.11	22.00			
Fifth Term/MIJ:	04.40	05.00		04 70	00 50			
1-12 mos.	24.13	25.82		24.79	26.52			
13-18 mos.	26.55	28.52		27.21	29.23			9-3
Electrician - Highway and	l Street Lig	ghting, Traff	ic Signals					
Electrician - Highway and and Controls	l Street Liç	ghting, Traff	ïc Signals					01/01/2024
			•	c Signals ar	nd Controls	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES	ician - Highv	way and Stree	•	c Signals ar	nd Controls	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES	ician - Highv	way and Stree	•	c Signals ar	nd Controls	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee	ician - Highv	way and Stree	•	c Signals ar	nd Controls 04/18/2024	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour:	ician - Highv	way and Stree	t Lighting, Traffi 07/01/2023	c Signals ar	04/18/2024	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES	ician - Highv	way and Stree	t Lighting, Traffi	c Signals ar		DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation	ician - Highv	way and Stree	07/01/2023 \$ 61.00	c Signals ar	04/18/2024 \$ 62.00	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Electrician Electro Pole Foundation Installer	ician - Highv	way and Stree	07/01/2023 \$ 61.00 46.66	c Signals ar	04/18/2024 \$ 62.00 47.66	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFI	ician - Highv	way and Stree	07/01/2023 \$ 61.00	c Signals ar	04/18/2024 \$ 62.00	DISTRICT 9		
and Controls JOB DESCRIPTION Electric ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer	ician - Highv	way and Stree	07/01/2023 \$ 61.00 46.66	c Signals ar	04/18/2024 \$ 62.00 47.66	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFI	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFI	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61	DISTRICT 9		
and Controls JOB DESCRIPTION Electric ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77*	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12*	DISTRICT 9		
and Controls JOB DESCRIPTION Electric ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77* 50.05	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12* 51.68	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77*	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12*	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77* 50.05	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12* 51.68	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFIT Per Hour: Electro Pole Electrician Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77* 50.05	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12* 51.68	DISTRICT 9		
and Controls JOB DESCRIPTION Electri ENTIRE COUNTIES Bronx, Kings, New York, Quee WAGES Per hour: Electro Pole Electrician Electro Pole Foundation Installer Electro Pole Maintainer SUPPLEMENTAL BENEFT Per Hour: Electro Pole Electrician Electro Pole Electrician Electro Pole Electrician	ician - Highv	way and Stree	et Lighting, Traffi 07/01/2023 \$ 61.00 46.66 40.61 07/01/2023 \$ 65.91 69.77* 50.05 53.00*	c Signals ar	04/18/2024 \$ 62.00 47.66 41.61 04/18/2024 \$ 68.20 72.12* 51.68 54.69*	DISTRICT 9		

*Applies when premium wages are paid

Note: Reduce benefit rate by 6.2% for any employee who has accumulated wages in \$137,700 for the same employer.

OVERTIME PAY See (A, B, E4, F, K) on OVERTIME PAGE B - Applies to Electro Pole Foundation Installer E4 - Applies to Electro Pole Maintainer

HOLIDAY Paid: Overtime:

See (1) on HOLIDAY PAGE See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE

9-3J

Elevator Constructor

01/01/2024

JOB DESCRIPTION Elevator Constructor

DISTRICT 4

ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES

Rockland: Entire County except for the Township of Stony Point Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per	nour		

Elevator Constructor

Modernization & Service/Repair

07/01/2023
\$ 77.49
\$ 60.89

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:

Elevator Constructor	\$ 45.574
Modernization & Service/Repairs	44.412

OVERTIME PAY

Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY	
Paid:	See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES PER HOUR:

*Note:1st, 2nd, 3rd Terms are based on Average wage of Constructor & Modernization. Terms 4 thru 9 Based on Journeyman's wage of classification Working in.

6 MONTH TERMS:

1st Term* 50%	2nd & 3rd Term* 50%	4th & 5th Term 55%	6th & 7th Term 65%	8th & 9th Term 75%
SUPPLEMENTAL BENEF Elevator Constructor 1st Term 2nd & 3rd Term 4th & 5th Term 6th & 7th Term 8th & 9th Term	ITS \$ 0.00 36.024 36.943 38.448 39.953	3		
Modernization & Service/Repair 1st Term 2nd & 3rd Term 4th & 5th Term 6th & 7th Term 8th & 9th Term	\$ 0.00 35.694 36.525 37.948 39.38	5		

01/01/2024

Glazier

JOB DESCRIPTION Glazier

DISTRICT 8

ENTIRE COUNTIES Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

Per hour:	7/01/2023
Glazier & Glass Tinting \$ 61.64 *Scaffolding Window Film	65.64
**Repair & Maintenance	30.76

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under \$184,000.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2023
Glazier & Glass Tinting	\$ 40.20
Window Film Repair & Maintenance	23.19

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE For 'Repair & Maintenance' Paid: See(5, 6, 16, 25) Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:

(1) year terms at the following wage rates:	7/01/2023
1st term 2nd term 3rd term 4th term	\$ 21.93 30.05 39.95 48.97
Supplemental Benefits: (Per hour) 1st term 2nd term 3rd term 4th term	\$ 18.25 25.97 31.27 34.32

Insulator - Heat & Frost

JOB DESCRIPTION Insulator - Heat & Frost

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES

Per Hour: 07/01/2023

Insulators Heat & Frost \$ 70.51

SUPPLEMENTAL BENEFITS

8-1087 (DC9 NYC)

DISTRICT 4

Per Hour:

Insulators \$35.76 Heat & Frost

OVERTIME PAY

See (B, E, *Q, V) on OVERTIME PAGE * Triple time for Labor Day (If worked)

HOLIDAY

See (1) on HOLIDAY PAGE See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE Paid: Overtime:

REGISTERED APPRENTICES

Wages:

1 year terms.

Wages Per Hour:

1st	2nd	3rd	4th
\$ 28.20	\$ 35.26	\$ 42.31	\$ 49.36

Supplemental Benefits:

\$14.30 \$17.88 \$21.46 \$25.03

Ironworker

JOB DESCRIPTION Ironworker

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES Per Hour:	07/01/2023	01/01/2024
Stone Derrickmen Rigger	\$ 72.90	Additional + \$ 1.64
Stone Handset Derrickman SUPPLEMENTAL BENEFITS Per hour:	70.47	+ \$ 1.11
Stone Derrickmen Rigger	\$ 43.10	
Stone Handset Derrickman	42.84	

OVERTIME PAY

See (B, D1, *E, Q, **V) on OVERTIME PAGE

*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter. ** Benefits same premium as wages on Holidays only

HOLIDAY Paid: See (18) on HOLIDAY PAGE See (5, 6, 8, 25) on HOLIDAY PAGE Overtime: Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES

Wage per hour:

Stone Derrickmen Rigger:				
	1st	2nd	3rd	4th
07/01/2023	\$ 35.90	\$ 51.53	\$ 57.32	\$ 63.11
Supplemental Benefits:				
Per hour:				
07/01/2023	22.11	32.58	32.58	32.58

Stone Handset:

1/2 year terms at the following hourly wage rate:

DISTRICT 9

4-12

01/01/2024

Prevailing Wage Rates for (Last Published on Jan 01 2		2024			Publis		tate Department of Labor 00704 New York County
07/01/2023	34.56	49.75	55.33	60.90			
Supplemental Benefits: Per hour:							
07/01/2023	22.10	32.46	32.46	32.46			9-197D/R
Ironworker							01/01/2024
JOB DESCRIPTION I	onworker					DISTRICT 4	
ENTIRE COUNTIES Bronx, Kings, Nassau, Ne		Richmond, S	uffolk, Westch	ester			
WAGES							
Per Hour:		07/01/2023					
Ornamental		\$ 46.90					
Chain Link Fence Guide Rail		46.90 46.90					
SUPPLEMENTAL BEN		40.90					
Per hour:							
Journeyworker:		\$ 63.04					
OVERTIME PAY See (B, B1, Q, V) on OVE	ERTIME PAGE						
HOLIDAY	See (1) en 110						
Paid: Overtime:	See (1) on HO See (5, 6, 25)	DAY PAGE	PAGE				
REGISTERED APPRE Apprentices Hired after 9. 1 year terms							
		07/01/2023					
1st Term 2nd Term		\$ 21.13 24.77					
3rd Term		28.40					
4th Term		32.06					
Supplemental Benefits pe	er hour:						
1st Term		\$ 17.90					
2nd Term 3rd Term		19.15 20.41					
4th Term		21.67					
							4-580-Or
Ironworker							01/01/2024
JOB DESCRIPTION In	onworker					DISTRICT 4	
ENTIRE COUNTIES Bronx, Kings, Nassau, Ne	ew York, Queens,	Richmond, S	uffolk, Westch	ester			
WAGES							
PER HOUR:	07/01/2023		01/01/2024		07/01/2024		
Ironworker:	07/01/2023		01/01/2024		Additional		
Structural	\$ 57.20		\$ 57.70		\$ 1.75/Hr.*		
Bridges Machinery							
(*)To be allocated at a lat	er date						
SUPPLEMENTAL BEN							
PER HOUR PAID:							
Journeyman	\$ 87.35		\$ 88.60				

OVERTIME PAY See (B, B1, Q, *V) on OVERTIME PAGE *NOTE: Benefits are calculated for every hour paid

HOLIDAY See (1) on HOLIDAY PAGE Paid: Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE **REGISTERED APPRENTICES** WAGES PER HOUR: 6 month terms at the following rate: \$ 29.98 \$29.73 1st 2nd 30.33 30.58 3rd - 6th 30.94 31.19 Supplemental Benefits PER HOUR PAID: All Terms \$60.69 \$61.59 4-40/361-Str Ironworker 01/01/2024 JOB DESCRIPTION Ironworker **DISTRICT** 4 **ENTIRE COUNTIES** Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester **PARTIAL COUNTIES** Rockland: Southern section - south of Convent Road and east of Blue Hills Road. WAGES Per hour: 07/01/2023 Reinforcing & Metal Lathing \$ 56.95 "Base" Wage \$ 55.20 plus \$ 1.75 "Base" Wage is used to calculate overtime hours only. SUPPLEMENTAL BENEFITS Per hour: \$42.72 Reinforcing & Metal Lathing **OVERTIME PAY** See (B, E, Q, *X) on OVERTIME PAGE *Only \$23.50 per Hour for non worked hours Supplemental Benefit Premiums for Overtime Hours worked: Time & One Half \$49.47 Double Time \$ 56.22 HOLIDAY See (1) on HOLIDAY PAGE Paid: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE Overtime: *Note: Work performed after first 4 Hours. **REGISTERED APPRENTICES** (1) year terms at the following wage rates: 1st term 2nd term 3rd term 4th Term Wage Per Hour:

\$ 22.55	\$ 28.38	\$ 34.68	\$ 37.18
"Base" Wage			
\$ 21.00	\$ 26.80	\$ 33.10	\$ 35.60
plus \$1.55	plus \$1.58	plus \$1.58	plus \$1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENIFITS

Per Hour:				
1st term \$ 18.17	2nd term \$ 21.34	3rd term \$ 22.00	4th Term \$ 22.50	
·		·	·	4-46Rein
Laborer				01/01/2024
JOB DESCRIPTIO ENTIRE COUNTIE Bronx, Kings, New Y WAGES Per hour:			DISTRICT 9	
Striper (Highway/stre	eets):	07/01/2023	07/01/2024	
Striping-Machine Op	erator	\$ 40.00	Additional \$ 3.00	
Striping Thermoplast	lic	44.00		
Flagger - Traffic Safe	ety*	38.00		
	protection of traffic safety.	of cones and directing of tra	ffic using handheld devices. Exclude	s the Driver/Operator of
Per hour paid:	BENEITTO			
Journeyworker		\$ 17.27		
OVERTIME PAY See (B, H) on OVER	TIME PAGE			
HOLIDAY Paid: Overtime:	See (5, 6, 8, 13) on See (5, 6, 8, 13) on	HOLIDAY PAGE HOLIDAY PAGE		
	PRENTICES			
Wages per hour: 1st Term (1-2000 ho	urs)	\$ 30.86		
2nd Term (2001-400	0 hours)	32.50		
Supplemental Benefi	its per hour:			
All Terms		17.27		9-1010-LS
Laborer				01/01/2024
JOB DESCRIPTIO	N Laborer		DISTRICT 9	
ENTIRE COUNTIE				
WAGES				
Per hour:		07/01/2023	07/01/2024	
Laborer/Excavation **Asbestos and Leac	1 Abatement &		Additional \$ 2.30	
Removal, Hazardous			Ψ 2.00	
(including soil)		\$ 44.50		
Basic Flagman		44.50 44.50		
Pipelayer		44.50 44.50		
*Tree Work, *Landsc	ape	44.50		
*Includes trimming, c ** Applies to Heavy &	cutting, planting and/or remo & Highway projects	val of trees.		
	BENEFITS			
Per hour:				

Per hour:

DISTRICT 9

Note: No payment of Supplemental Benefits is required on paid holidays, when employees do not work.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

When an observed holiday falls on a Saturday, work done shall be paid at double time.

HOLIDAY	
Paid:	See (2, 20) on HOLIDAY PAGE
Overtime:	See (2, 5, 6, 11, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

1000 hour terms at the following hourly wage rate.

		07/01/2023
1st	0 - 1000	\$ 22.25
2nd	1001-2000	26.70
3rd	2001-3000	33.38
4th	3001-4000	40.05
Supplem	ental Benefits per hour:	

All Apprentices

52.23

9-731Ex

01/01/2024

Laborer

JOB DESCRIPTION Laborer

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

Per hour:

GROUP 14: Blasters.

GROUP 16: Tunnel workers - including Miners, Drill Runners, Iron Men, Maintenance Men, Conveyor Men, Safety Miners, Riggers, Block Layers, Cement Finishers, Rod Men, Caulkers, Powder Carriers, Miners' Helpers, Chuck Tenders, Track Men, Nippers, Brake Men, Derail Men, Form Men, Bottom Bell, Top Bell or Signal men, Form Workers, Movers, Concrete Workers, Shaft Men, Tunnel Laborers and Caulkers' Helpers.

GROUP 17: All others including: Powder Watchmen, Top Laborers and Changehouse Attendants.

Wages: (per hour)	07/01/2023
Laborer (Tunnel)-FREE AIR: Group 14 Group 16 Group 17*	\$ 75.40 72.10 66.65
Small Bore Micro Tunnel Machines	80% of rates above
For Repairs on Existing Water Tunnels	90% of rates above
For Repairs of Sewer & Drainage Tunnels	85% of rates above
For Repair & Maintenance of all Subway & Vehicular Tunnels	80% of rates above

*An additional \$3.00 per day when using an air spade, jack hammer or pavement breaker.

Note: Employer shall pay \$10.00 per day for each half mile starting at a point 500 feet from the bottom of the shaft.

SUPPLEMENTAL BENEFITS Per hour:

GROUP 14 GROUP 16 GROUP 17	\$ 53.97 51.76 47.91	
Small Bore Micro Tunnel Machines	80% of rates above	
For Repairs on Existing Water Tunnels	90% of rates above	
For Repairs of Sewer & Drainage Tunnels	85% of rates above	
For Repair & Maintenance of all Subway& Vehicular Tunnels	80% of rates above	
OVERTIME PAY OVERTIME:	For Laborer (Free Air) See (D, M, R*) on OVERTIME PAGE. For Repair Categories See (B, F, R*) on OVERTIME PAGE. & Micro Tunneling * Straight time first 8 hours, double time after 8 hours.	
HOLIDAY Paid: Overtime: Good Friday may be excha	See (5, 6, 9, 11, 12, 15, 16, 25) on HOLIDAY PAGE See (5, 6, 9, 11, 12, 15, 16, 25) on HOLIDAY PAGE anged for one of the holidays listed.	9-147Tnl/Free
Laborer - Building		01/01/2024

JOB DESCRIPTION La	borer - Building				DISTRICT 9
ENTIRE COUNTIES Bronx, Kings, New York, Q	ueens, Richmo	nd			
WAGES Per hour:		07/01/2023		01/01/2024	
Basic Laborer and Mason Tender		\$ 43.80*		\$ 44.70**	
*Before calculating premiu **Before calculating premiu					
SUPPLEMENTAL BENI Per hour:	EFITS				
Basic Laborer and Mason Tender		\$ 29.39		\$ 29.99	
OVERTIME PAY See (B, B2, E, E2, Q, R) or	n OVERTIME P	AGE			
HOLIDAY Paid: Overtime:	See (1) on H0 See (5, 6, 25)	LIDAY PAGE on HOLIDAY	PAGE		
REGISTERED APPREN Wage per hour:	ITICES				
1000 hour terms at the follo	owing wage rate	e:			
Term:	1st	2nd	3rd	4th	
Basic Laborer and Mason Tender 07/01/2023 01/01/2024	\$ 21.80* \$ 22.05*	\$ 23.55* \$ 23.80*	\$ 25.05* \$ 25.30*	\$ 27.55* \$ 27.80*	

*Before calculating premium wage deduct \$0.50

Supplemental Benefits per hour:

All Terms		• · • · -					
07/01/2023 01/01/2024		\$ 10.47 \$ 10.77					
0 1/0 1/202 1		φ 10.77					9-MTDC(79)
Laborer - Building							01/01/2024
JOB DESCRIPTIO	N Laborer - Building				DIS	TRICT 9	
ENTIRE COUNTIE	-						
	ork, Queens, Richmon	d					
WAGES Per hour:							
r ei nour.				07/01/2023			
Skilled Interior Demo	lition Laborer:			\$ 39.70*			
General Interior Dem				28.89**			
* Before calculating c	overtime wages deduct	\$1.70					
**Conoral Domolition	Laborer performs mar	ual work and	work incident	al to demolition	such as loading	and carting of debu	is from work site
	an be loaded into truck						IS HOTH WORK SILE
SUPPLEMENTAL	BENEFITS						
Per Hour:							
Skilled Interior Demo				24.84			
General Interior Dem	olition Laborer:			19.16			
OVERTIME PAY See (B, B2, I, R) on (OVERTIME PAGE						
HOLIDAY							
Paid: Overtime:	See (1) on HOI See (5, 6, 25) o		PAGE				
REGISTERED APP	,						
Wage Per Hour:							
1000 hour terms at th	ne following wage rate:						
	st 2nd	3rd	4th				
\$ Z I	.80* \$23.55*	\$ 25.05*	\$ 27.55*				
* Before calculating c	overtime wages deduct	\$0.50					
Supplemental Benefit	ts Per Hour:						
All Terms:				10.47			
							9-MTDC (79-ID)
Laborer - Building	9						01/01/2024
JOB DESCRIPTIO	N Laborer - Building				DIS	TRICT 9	
ENTIRE COUNTIE Bronx, Kings, New Yo	S ork, Queens, Richmon	d					
WAGES	- , ,						
Per hour:		07/01/2023					
Laborer:							
Laborer-Concrete		¢ 10 50					
(including flag persor		\$ 42.53 \$7.75*					
-	subjected to overtime p						
SUPPLEMENTAL Per Hour	BENEFITS						
		\$ 10 70					

\$ 19.70 + \$8.00** ** This portion subjected to overtime premiums only on codes (E,Q)

OVERTIME PAY

OVERTIME:	See (A,E,Q) on OVERTIME PAGE attached.
	See (B,E,Q,) for work below street level to top of foundation.

HOLIDAY Paid: Overtime:

See (1) on HOLIDAY PAGE See (5, 6, 8, 11, 13, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

Terms based on hours listed:		
1st	2nd	3rd
0-1334	1334-2668	2669-4000
\$ 18.57	\$ 19.95	\$ 25.68
+\$1.99*	+\$6.82*	+\$7.30*

* This portion is not subjected to overtime premiums.

Supplemental Benefits: Per hour:

\$ 12.20	\$ 16.20	\$ 16.20
+\$2.00*	+\$2.45*	+\$3.55*

Journeyworker rate applies after 4000 hours

*This portion subjected to same premium as wages.

9-6A/18A/20-C

Laborer - Building					01/01/2024
JOB DESCRIPTION La	aborer - Building		DISTRICT 9		
ENTIRE COUNTIES Bronx, Kings, New York, (Queens, Richmo	nd			
WAGES					
Per hour:			07/01/2023	01/01/2024	
Building:				Additional	
Plasterer Tender and					
Spray Fireproofing Tende	ſ		\$ 43.80*	\$ 1.25	
* Before calculating overti	me wages dedu	ct \$3.00.			
SUPPLEMENTAL BEN	EFITS				
Per hour:					
Journeyworker			\$ 29.39		
OVERTIME PAY See (B, B2, E, E2, Q, R) c	on OVERTIME P	AGE			
HOLIDAY					
Paid: Overtime:	See (1) on H0 See (5, 6, 25)	OLIDAY PAGE on HOLIDAY	E Ý PAGE		
REGISTERED APPRE	NTICES				
1000 hours terms at the fo 1st	2nd	3rd	4th		
\$21.80*	\$23.55*	\$25.05*	\$27.55*		
* Before calculating overti	me wages dedu	ct \$ 0.50			
Supplemental Benefits pe	r hour:				
07/01/2023					
All Terms:			\$ 10.47		9-30 (79
Laborer - Building					01/01/2024

JOB DESCRIPTION Laborer - Building

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk WAGES

WAGES		
Per Hour:	07/01/2023	01/02/2024
		Additional
Asbestos, Lead	\$ 39.50*	\$ 1.50/Hr.
and Hazardous		to be allocated

Material Abatement Laborer

(Re-Roofing Removal See Roofer) NOTE: Asbestos removed from Mechanical Systems not to be scrapped See Asbestos Worker

\$ 19.65

SUPPLEMENTAL BENEFITS

Per Hour:

Laborer

OVERTIME PAY

See (B, B2, I) on OVERTIME PAGE *Calculate at \$39.50 per hour then add \$0.95

HOI IDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 28) on HOLIDAY PAGE

REGISTERED APPRENTICES

1000 hour terms at the following; Per Hour:

1st term 2nd Term 3rd Term 4th Term	\$ 20.50* 21.50** 24.50*** 26.50****
SUPPLEMENTAL BENEFIT Per Hour:	
All Terms	\$ 14.25

OVERTIME PAY:

*Calculate at \$20.00 per hour then add \$0.50

**Calculate at \$21.00 per hour then add \$0.50

***Calculate at \$24.00 per hour then add \$0.50

****Calculate at \$26.00 per hour then add \$0.50

Laborer - Building			01/01/2024
JOB DESCRIPTION Laborer - Building ENTIRE COUNTIES Bronx, Kings, New York, Queens, Richmond		DISTRICT 9	
WAGES Per hour:	07/01/2023	01/01/2024	
Skilled Demolition Laborer: General Demolition Laborer:	\$ 41.93* 30.51**	\$ 42.23* 30.81**	
*Before calculating overtime wages deduct \$3.00			

Before calculating overtime wages deduct \$3.00 **Before calculating overtime wages deduct \$2.35

**General Demolition Laborer performs manual work and work incidental to demolition, such as loading and carting of debris from work site to an area where it can be loaded into trucks for removal. Also performs clean-up of the site when demolition is complete.

DISTRICT 9

NOTE: Total Demolition Only: Demolition shall be the complete demolition (wrecking) or dismantling of entire buildings or structures. Also may include the removal of all or any portion of a roof in which structural change is to occur. Structural change is defined as the removal of structural slabs, steel members, concrete members and penetration through the structural slab.

SUPPLEMENTAL BENEFITS

Per hour: Journeyworker:

Skilled Demolition Laborer General Demolition Laborer	•		\$ 28.27 21.33		\$ 28.57 21.63
OVERTIME PAY See (B, E, E2, Q) on OVE	RTIME PAGE				
HOLIDAY Paid: Overtime:	See (1) on H0 See (5, 6, 25)	LIDAY PAGE on HOLIDAY	PAGE		
REGISTERED APPREN Wage per hour: (1) year terms at the follow					
07/01/2023	1st	2nd	3rd	4th	
01/01/2024	\$ 21.80* \$ 22.05*	\$ 23.55* \$ 23.80*	\$ 25.05* \$ 25.30*	\$ 27.55* \$ 27.80*	
*Before calculating overtime wages deduct \$0.50					
Supplemental Benefits per hour:					

All Terms:	
07/01/2023	\$ 10.47
01/01/2024	\$ 10.77

9-79/95

JOB DESCRIPTION Laborer - Concrete & Asphalt Paving

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

Group 1: Slurry Seal Coater, Maintenance Safety Surface, Small Power Tool Operator, Play Equipment Installer, Temporary Fence Installer & Repairs, Laborer.

Group 2: Production Paving Work: Shoveler, small equipment operator.

Per hour:	07/01/2023
Concrete Formsetter	\$ 48.85 + \$ 7.25*
Asphalt Screeperson/Micro Paver	49.95 + \$ 7.25*
Asphalt Raker	58.85 + \$ 7.25*
Group 1	44.98 + \$ 7.25*
Group 2	44.98 + \$ 7.25*

* This portion is not subjected to overtime premiums.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker

\$44.62

Note: No payment of supplemental benefits is required on paid holidays, when employees do not work.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE Note: Saturday premium rate applies from 7:00 am on Saturday to 6:59 am Sunday Note: Sunday premium rate applies from Sunday 7:00 am to Monday 6:59 am.

HOLIDAY Paid:	See (5, *11, 20) on HOLIDAY PAGE
HOLIDAY:	
Overtime:	See (21,22)** on HOLIDAY PAGE.

Note: See (5,20) Holiday pay -at the single time pay rate-shall be prorated based on 25% of a day's wages and benefits for each day worked during that calendar week.

**New Year's Day and Christmas Day: If an employee is performing work on these (2) days the employee will receive the single rate plus 25%.

* Columbus Day shall be an unpaid holiday. In the event work is performed on Columbus Day, wages shall be paid on a double time basis.

Note-When Independence day falls on Saturday, it will be observed on that Saturday, however, when it occurs on a Sunday, it will be observed on the Monday.

REGISTERED APPRENTICES

Wage per hour:

2000 hours term:

1st term	2nd term
1-1999	2000-4000
\$ 30.86 + \$ 7.25*	\$ 32.50 + \$ 7.25*
* This portion is not subjected to overtime premiums.	

Supplemental Benefits per hour:

2000 hours term:

1st term	2nd term
1-1999	2000-4000
\$ 17.15	\$ 17.15

Laborer - Trac Drill

JOB DESCRIPTION Laborer - Trac Drill

DISTRICT 9

9-1010H/H

01/01/2024

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

Group 1:Chipper/Jackhammer, Powder Carrier, Hydraulic Chuck tender, Chuck Tender and Nipper, Magazine Keeper

Group 2: Hydraulic Trac Drill

Group 3: Air Trac, Wagon and Quarry bar

Group 4: Blaster

Per Hour:	07/01/2023
Group 1	\$ 44.50
Group 2	51.85
Group 3	51.02
Group 4	57.71

SUPPLEMENTAL BENEFITS

Per Hour:

All Classifications

52.23

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE When an observed holiday falls on a Saturday, work done shall be paid at double time.

HOLIDAY

Paid:	See (2, 20) on HOLIDAY PAGE
Overtime:	See (2, 5, 6, 11, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

1000 hour terms at the following hourly wage rate.

DISTRICT 9

1st	0 - 1000	\$ 22.25	
2nd	1001-2000	26.70	
3rd	2001-3000	33.38	
4th	3001-4000	40.05	
Supplem	ental Benefits per hour: entices	52.23	9-731/29
Labore	r - Tunnel		01/01/2024

JOB DESCRIPTION Laborer - Tunnel

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

GROUP 5: Blasters and Mucking Machine Operators

GROUP 6: Tunnel Workers* * (including Miners, Drill Runners, Iron Men, Maintenance Men, Inside Muck Lock Tender, Pumpmen, Electricians, Cement Finishers, Rod Men, Caulkers, Carpenters, Hydraulic Men, Shield Drivers, Monorail Operators, Motor Men, Conveyor Men, Safety Miners, Powder Carriers, Pan Men, Riggers, Miner's Helpers, Chuck Tenders, Track Men, Nippers, Brake Men, Form Workers, Concrete Workers, Tunnel Laborers, Caulker's Helpers), Hose Men, Grout Men, Gravel Men, Derail Men and Cable Men.

GROUP 7: Top Nipper

GROUP 8,9: Outside Man Lock Tender, Outside Muck Lock Tender, Shaft Men, Gauge Tender and Signal Men.

GROUP 10: Powder Watchmen, Top Laborers and Changehouse Attendants.

WAGES: (per hour)	ES: (per hour)
-------------------	----------------

Laborer (Compressed Air)

07/01/2023

64.66

GROUP 5	\$ 79.02
GROUP 6	76.21
GROUP 7	74.94
GROUP 8,9	73.43

Note: For jobs bid before July I, 2010 employer shall pay \$6.00 per day for each one half (1/2) mile or fraction starting from a point 500 feet from the shaft. For all jobs bid after July 1, 2010, said premium shall be \$10.00 per day.

SUPPLEMENTAL BENEFITS

SUPPLEMENTAL BENEFITS:

per	hour:	

GROUP 10

GROUP 5	\$ 56.19
GROUP 6	54.44
GROUP 7	53.34
GROUP 8,9	52.51
GROUP 10	49.65

OVERTIME PAY

See (D, M, *R) on OVERTIME PAGE NOTE: Time and one-half to be paid for all overtime repair-maintenance work on existing equipment and facilities.

* Straight time first 8 hours, double time after 8 hours.

HOLIDAY

Paid:	See (5, 6, 9, 11, 12, 15, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 9, 11, 12, 15, 16, 25) on HOLIDAY PAGE
Good Friday may be excha	inged for one of the holidays listed.

9-147Tnl/Comp Air

Edot i donom		2021			1100		••••••••••••••••••
JOB DESC	CRIPTION	Mason			DIS	TRICT 4	
ENTIRE C Bronx, King	OUNTIES js, Nassau, N	lew York, Que	eens, Richmor	nd, Suffolk			
WAGES Per Hour:				07/01/2023			
Brick/Block	Layer			\$ 65.39			
Base Wage	for OT Calc	ulation		55.24			
SUPPLEM Per Hour:	IENTAL BE	NEFITS					
Brick/Block	Layer			\$ 32.60			
	E2, Q) on O∖	/ERTIME PAC Base Wage p	GE blus \$ 10.15/hr				
HOLIDAY Paid: Overtime:		See (1) o See (5, 6	n HOLIDAY P , 25) on HOLII	AGE DAY PAGE			
	RED APPR Terms at the		centage of Jou	urney workers "Base Wage	e" plus \$ 5.40/hr.:		
1st 50%	2nd 60%	3rd 70%	4th 80%	5th 90%			
Supplemen	tal Benefits p	per hour:					
All Apprenti	ices			\$ 23.60			4-1Brk
Mason - E	Building						01/01/2024
JOB DES	CRIPTION	Mason - Build	ling		DIS	TRICT 9	
ENTIRE C Bronx, King		lew York, Qu	eens, Richmor	nd, Suffolk, Westchester			
WAGES Building							
Wages per	hour:			07/01/2023	01/01/2024		
	errazzo Mec errazzo Finis			\$ 60.65 59.04	\$ 60.57 58.96		
SUPPLEM Per hour:	IENTAL BE	NEFITS					
Mosaic & T	errazzo Mec	hanic		\$ 30.26* + \$9.16	\$ 31.36* + \$9.17		
Mosaic & T	errazzo Finis	sher		\$ 30.26* + \$9.15	\$ 31.36* + \$9.16		

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (A, E, Q) on OVERTIME PAGE 07/01/2023- Deduct \$7.25 from hourly wages before calculating overtime. 01/01/2024- Deduct \$7.00 from hourly wages before calculating overtime.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE Easter Sunday is an observed holiday.Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES

9-7/3

Wages Per hour:						
	1st	2nd	3rd	4th	5th	6th
	0-	1501-	3001-	3751-	4501-	5251-
	1500	3000	3750	4500	5250	6000
07/01/2023	\$ 25.82	\$ 32.19	\$ 36.39	\$ 40.38	\$ 48.52	\$ 54.59
01/01/2024	\$ 25.05	\$ 32.21	\$ 37.93	\$ 38.99	\$ 47.18	\$ 55.38
Supplemental Benefits per h	our:					
07/01/2023	\$6.00*	\$7.72*	\$18.16*	\$23.27*	\$24.21*	\$27.24*
	+\$3.21	+\$4.12	+\$5.50	+\$6.41	+\$7.33	+\$8.29
01/01/2024	\$7.12*	\$9.16*	\$17.22*	\$25.36*	\$26.36*	\$27.36*
	+\$3.21	+\$4.12	+\$5.51	+\$6.42	+\$7.34	+\$8.25

*This portion of benefits subject to same premium rate as shown for overtime wages.

Mason - Bu	uilding								01/01/2024
JOB DESCI	RIPTION M	ason - Building	3				DISTRICT	9	
ENTIRE CO Bronx, Kings,		ueens, Richm	ond						
WAGES									
Per hour:		07/01/2023	3	12/04/2023	3	06/03/2024 Additional			
Tile Setters		\$ 63.46		\$ 63.98		\$ 0.73			
SUPPLEME Per Hour:	NTAL BEN	EFITS							
		\$ 26.46*		\$ 26.66*					
		+ 10.05		+ 10.06					
*This portion	of benefits su	bject to same	premium rate	as shown for	overtime wage	S.			
OVERTIME See (B, *E, C	PAY (, V) on OVEF	RTIME PAGE		uble the hourly					
HOLIDAY Paid: Overtime:		See (1) on H	IOLIDAY PAG						
REGISTERI Wage per ho	ED APPREN ur:	ITICES							
750 hour tern	ns at the follo	wing wage rat	e:						
1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6501-
750	1500	2250	3000	3750	4500	5250	6000	6750	7000
07/01/2023	¢06.66	¢00.75	¢20.60	¢40.05	¢45 70	¢40.20	¢54.00	¢57.00	¢64.05
\$21.70	\$26.66	\$33.75	\$38.69	\$42.25	\$45.70	\$49.29	\$54.23	\$57.09	\$61.25
12/04/2023 \$21.96	\$26.95	\$34.10	\$39.08	\$42.68	\$46.16	\$49.79	\$54.77	\$56.66	\$61.90
φ21.00	φ20.00	φ01.10	400.00	ψ12.00	φ10.10	φ10.10	φ01.11	\$00.00	ψ01.00
Supplementa	l Benefits per	hour:							
lst	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2023									

\$12.55*	\$12.55*	\$15.36*	\$15.36*	\$16.36*	\$17.86*	\$18.86*	\$18.86*	\$16.86*	\$22.11*
+ \$0.73	+ \$0.78	+ \$0.89	+ \$0.94	+ \$1.38	+ \$1.43	+ \$1.84	+ \$1.89	+ \$6.04	+ \$6.62
This portion c	of benefits sub	ject to same p	remium rate as	shown for o	vertime wages.				9-7/52
Mason - Bui	ilding								01/01/2024
OB DESCR	RIPTION Mas	on - Building					DISTRICT 9		
NTIRE COU		York Queens	, Richmond, Sı	uffolk Westch	ester				
VAGES			,						
er hour:			07/01/2023		07/03/2023				
	le Restoration	:			A				
larble, Stone	Å.		\$ 47.22		\$ 47.44				
errazzo Polis									
SUPPLEMEI Per Hour:	NTAL BENE	FIIS							
ourneyworke	r:								
	le Restoration	:							
larble, Stone olisher	&		¢ 20 20		¢ 20 64				
JUSHEL			\$ 30.29		\$ 30.64				
OVERTIME I See (B, *E, Q,	V) on OVER1		CESSIVE HO	JRS PAID AT	DOUBLE HOU	JRLY RATE.			
OVERTIME I See (B, *E, Q, ON SATURD	V) on OVER1 AYS, 8TH HO	UR AND SUC		JRS PAID AT	DOUBLE HOU	JRLY RATE.			
OVERTIME I ee (B, *E, Q, ON SATURD IOLIDAY aid:	, V) on OVER1 AYS, 8TH HO	UR AND SUC	LIDAY PAGE			JRLY RATE.			
OVERTIME I see (B, *E, Q, ON SATURD IOLIDAY vaid: Overtime:	, V) on OVER1 AYS, 8TH HO	UR AND SUC See (1) on HC See (5, 6, 8, 1		IOLIDAY PAG	GE	JRLY RATE.			
DVERTIME I iee (B, *E, Q, ON SATURD IOLIDAY aid: Dvertime: ST TERM AF REGISTERE	, V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC	DLIDAY PAGE 1, 15, 25) on F	IOLIDAY PAG	GE	JRLY RATE.			
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h	, V) on OVERT AYS, 8TH HO PPRENTICE G E D APPRENT Jour:	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on F	IOLIDAY PAG	GE	JRLY RATE.			
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followir	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF	IOLIDAY PAG	GE AYS.	JRLY RATE.	4th		
OVERTIME I ee (B, *E, Q, ON SATURD IOLIDAY aid: Overtime: ST TERM AF REGISTERE VAGES per h	, V) on OVERT AYS, 8TH HO PPRENTICE G E D APPRENT Jour:	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on F	IOLIDAY PAG	GE	JRLY RATE.	4th 2701		
OVERTIME I ee (B, *E, Q, ON SATURD IOLIDAY aid: Overtime: ST TERM AF REGISTERE VAGES per h	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followir 1st	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd	IOLIDAY PAG	GE AYS. 3rd	JRLY RATE.			
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1-	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901-	IOLIDAY PAG	GE AYS. 3rd 1801-	JRLY RATE.			
OVERTIME I ee (B, *E, Q, ON SATURD IOLIDAY aid: OVertime: ST TERM AF REGISTERE /AGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901- 1800 \$ 37.78	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49	JRLY RATE.	2701 \$ 47.22		
OVERTIME I Gee (B, *E, Q, ON SATURD IOLIDAY Paid: OVertime: ST TERM AF REGISTERE VAGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901- 1800	IOLIDAY PAG	GE AYS. 3rd 1801- 2700	JRLY RATE.	2701		
DVERTIME I lee (B, *E, Q, ON SATURD IOLIDAY aid: Dvertime: ST TERM AF REGISTERE VAGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901- 1800 \$ 37.78	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49	JRLY RATE.	2701 \$ 47.22		
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H 27.65	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901- 1800 \$ 37.78	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49	JRLY RATE.	2701 \$ 47.22		
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H 27.65 at the followin 1st 1-	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	2nd 901- 1800 \$ 37.78 28.52 2nd 901- 1800 28.52 2nd 901-	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49 29.41 3rd 1801-	JRLY RATE.	2701 \$ 47.22 30.29		
VERTIME I ee (B, *E, Q, ON SATURD IOLIDAY aid: Overtime: ST TERM AF EGISTERE /AGES per h 00 hour term upplemental 7/03/2023	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H 27.65 at the followin 1st	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	DLIDAY PAGE 1, 15, 25) on H DR ALL OBSEF 2nd 901- 1800 \$ 37.78 28.52 2nd	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49 29.41 3rd	JRLY RATE.	2701 \$ 47.22 30.29 4th		
DVERTIME I Gee (B, *E, Q, ON SATURD IOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h 00 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H 27.65 at the followin 1st 1-	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	2nd 901- 1800 \$ 37.78 28.52 2nd 901- 1800 28.52 2nd 901-	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49 29.41 3rd 1801-	JRLY RATE.	2701 \$ 47.22 30.29 4th		
DVERTIME I See (B, *E, Q, ON SATURD HOLIDAY Paid: DVertime: ST TERM AF REGISTERE VAGES per h 100 hour term Supplemental 17/03/2023 100 hour term	V) on OVERT AYS, 8TH HO PPRENTICE G D APPRENT our: at the followin 1st 1- 900 \$ 33.04 Benefits Per H 27.65 at the followin 1st 1- 900	UR AND SUC See (1) on HC See (5, 6, 8, 1 GETS PAID FC TICES ng wage:	2nd 901- 1800 \$ 37.78 28.52 2nd 901- 1800 28.52 2nd 901- 1800	IOLIDAY PAG	GE AYS. 3rd 1801- 2700 \$ 42.49 29.41 3rd 1801- 2700	JRLY RATE.	2701 \$ 47.22 30.29 4th 2701		

JOB DESCRIPTION Mason - Building

ENTIRE COUNTIES Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester WAGES

Per Hour:				07/01/2023	}	7/03/2023		
Marble Cutte	rs & Setters			\$ 62.82		\$ 63.12		
	ENTAL BEN	EFITS						
Journeywork	er			\$ 39.03		\$ 39.34		
OVERTIME See (B, E, Q	, PAY , V) on OVER	TIME PAGE						
HOLIDAY Paid: Overtime:		See (1) on H						
		-	, 11, 15, 10, 23	5) on HOLIDAY	FAGE			
Wage Per Ho 07/01/2023	our:							
750 hour terr 1st	ns at the follo 2nd	wing wage 3rd	4th	5th	6th	7th	8th	
0- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000	6001- 6750	6751- 7500	7500+	
\$ 26.42	\$ 39.62	\$ 42.91	\$ 46.22	\$ 49.52	\$ 53.38	\$ 59.67	\$ 62.82	
Supplementa 07/01/2023	al Benefits per							
1st	2nd	3rd	4th	5th	6th	7th	8th	
\$ 25.38	\$ 28.86	\$ 29.74	\$ 30.60	\$ 31.48	\$ 36.44	\$ 38.17	\$ 39.03	
07/03/2023 Wage Per Ho	our:							
750 hour terr 1st	ns at the follo 2nd	wing wage. 3rd	4th	5th	6th	7th	8th	
0- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000	6001- 6750	6751- 7500	7500+	
\$ 26.60	\$ 39.82	\$ 43.13	\$ 46.45	\$ 49.78	\$ 53.64	\$ 59.95	\$ 63.12	
Supplementa	al Benefits Pe	r Hour:						
1st	2nd	3rd	4th	5th	6th	7th	8th	
\$ 25.54	\$ 29.09	\$ 29.97	\$ 30.84	\$ 31.72	\$ 36.73	\$ 38.48	\$ 39.34	9-7/4
Mason - Bu	uilding							01/01/2024
JOB DESC	RIPTION M	ason - Building	9				DISTRICT 9	
ENTIRE CC Bronx, Kings		Queens, Richm	nond					
WAGES Per hour:		07/01/2023	3	12/04/2023	5	06/03/2024		
Tile Finisher		\$ 48.78		\$ 49.16		Additional \$ 0.60		
	ENTAL BEN	EFITS						
Per Hour:		\$ 23.31*		\$ 23.15*				

* This portion of benefits is subject to same premium rate as shown for overtime wages.

+ \$9.87

+ \$9.88

See (A, *E, Q) on OVERTIME PAGE Double time rate after 10 hours on Saturdays

HOLIDAY	
Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88-tf

Mason - Building			01/01/2024
JOB DESCRIPTION Mason - Building		DISTRICT 9	
ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Queens, Richmond,	Suffolk, Westchester		
WAGES	07/01/2022	07/02/2022	
Per hour: Marble, Stone,	07/01/2023	07/03/2023	
Maintenance Finishers:	\$ 27.26	\$ 27.44	
Note 1: An additional \$2.00 per hour for time spent grinding floor using "60 grit" and below. Note 2: Flaming equipment operator shall be paid an additional \$25.00 per day. SUPPLEMENTAL BENEFITS Per Hour:			
Marble, Stone Maintenance Finishers:	\$ 14.97	\$ 15.20	
OVERTIME PAY See (B, *E, Q, V) on OVERTIME PAGE *Double hourly rate after 8 hours on Saturday	·		
HOLIDAY Paid: See (5, 6, 8, 11, 15, 25) or Overtime: See (5, 6, 8, 11, 15, 25) or 1st term apprentice gets paid for all observed holidays	1 HOLIDAY PAGE		
REGISTERED APPRENTICES WAGES per hour:			
	07/01/2023	07/03/2023	
0-750	\$ 21.89	\$ 22.04	
751-1500 1501-2250	22.60 23.32	\$ 22.75 \$ 23.48	
2251-3000	24.04	\$ 24.20	
3001-3750	25.11	\$ 25.27	
3751-4500	26.54	\$ 26.72	
4501+	27.26	\$ 27.44	
Supplemental Benefits: Per hour:			
0-750	12.03	\$ 12.24	
751-1500	12.43	\$ 12.64	
1501-2250	12.82 13.21	\$ 13.03 \$ 12.42	
2251-3000 3001-3750	13.80	\$ 13.42 \$ 14.02	
3751-4500	14.58	\$ 14.80	
4501+	14.97	\$ 15.20	9-7/24M-MF
Mason Ruilding / Hospar? Highway			
Mason - Building / Heavy&Highway			01/01/2024
JOB DESCRIPTION Mason - Building / Heavy&High	nway	DISTRICT 9	
ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Queens, Richmond,	Suffolk, Westchester		

WAGES Per hour:

07/01/2023

07/03/2023

Prevailing Wage Rates for 07/01/2023 - 06/30/2024 Last Published on Jan 01 2024			Published by the New York State Department of Lab PRC Number 2024000704 New York Coun			
Marble-Finisher SUPPLEMENTAL B Journeyworker: Per hour	ENEFITS	\$ 49.32		\$ 49.65	\$ 49.92	
Marble- Finisher		\$ 36.62		\$ 36.67	\$ 36.93	
OVERTIME PAY See (B, E, Q, V) on O\ Work beyond 8 hours (be paid at do	uble the rate.			
HOLIDAY Overtime: When an observed hol) on HOLIDAY observed the ne			9-7/20-MF
Mason - Building /	Heavy&Highway					01/01/2024
JOB DESCRIPTION ENTIRE COUNTIES Bronx, Kings, Nassau,			-		DISTRICT 4	
WAGES Per Hour:		07/01/2023				
Cement Mason		\$ 53.77				
SUPPLEMENTAL B Per Hour:	ENEFITS					
Cement Mason 1.5 X overtime rate 2 X overtime rate		\$ 34.16 \$ 61.70 \$ 68.32				
OVERTIME PAY See (B1, Q) on OVER	TIME PAGE	·				
HOLIDAY Paid: Overtime:	See (1) on HC See (5, 6, 8, 1	DLIDAY PAGI 11, 13, 25) on	E HOLIDAY PAG	θE		
REGISTERED APP (1) year terms at the t		e of Journey	vorkers Wage.			
1st Term		\$ 19.92				
2nd Term 3rd Term		\$ 24.82 \$ 30.22				
Supplement Benefits p	er hour paid:					
1st Term		\$ 14.36	1.5X OT \$ 21.55	2X OT \$ 28.72		
2nd Term		\$ 14.66	\$ 22.00	\$ 29.32		
3rd Term		\$ 14.77	\$ 22.16	\$ 29.54		4-780
Mason - Building /	Heavy&Highway					01/01/2024
JOB DESCRIPTION	-		-		DISTRICT 4	
				Walks) Marble	and Granite pavers 2'x 2' or larger.	
Per Hour:	07/01/2023		05/01/2024 Additional			
Stone Setter Base Rate Stone Tender	\$ 68.45 52.76 51.82		\$ 3.32*			

Stone Tender

Base Rate

51.82

44.54

SUPPLEMENTAL BENEFITS

Per Hour:

Stone Setter	\$ 40.78

Stone Tender 23.15

OVERTIME PAY

See (*C, **E, Q) on OVERTIME PAGE Base Rates are use to Calculate Overtime Premiums then adding in: \$15.69/Hr. for Stone Setter and \$7.28/Hr. for Stone Tender * On weekdays the eighth (8th) and ninth (9th) hours are time and one-half all work thereafter is paid at double the hourly rate. ** The first nine (9) hours on Saturday is paid at time and one-half all work thereafter is paid at double the hourly rate.

HOLIDAY

Paid:See (*18) on HOLIDAY PAGEOvertime:See (5, 6, 10) on HOLIDAY PAGE

Paid: *Must work first 1/2 of day

REGISTERED APPRENTICES

Operating Engineer - Building

Per Hour:

Stone Setter(800 hour) terms at the following Percentage of Stone Setters Base wage rate per hour plus \$7.33:

			wing r creenta		citers base wa	ge rate per riour plus	φ1.00.	
1st	2nd	3rd	4th	5th	6th			
50%	60%	70%	80%	90%	100%			
Supplement All Apprentio		\$ 25.50						4-1Stn
Mason - H	eavy&Hig	hway						01/01/2024
ENTIRE C	OUNTIES	Mason - Heavy& New York, Queer		Suffolk		DIST	RICT 4	
Per Hour:			07/01/2023	3				
Pointer, Cau Cleaners	ulkers &		\$ 62.19					
SUPPLEM Per Hour:	ENTAL BE	NEFITS						
Pointer, Clea Caulkers	inter, Cleaners & \$30.65 nulkers							
OVERTIME See (B, E2,		RTIME PAGE						
HOLIDAY Paid: Overtime:		See (1) on H See (5, 6, 2	IOLIDAY PAG 5, 26) on HOLI	E DAY PAGE				
REGISTER Wages per l		ENTICES						
One (1) yea	r terms at th	e following wage	rates.					
		1st \$ 31.48	2nd \$ 35.54	3rd \$ 41.14	4th \$ 49.50			
Apprentices		tal Benefits:						
(per hour pa	iia)	\$ 15.30	\$ 20.00	\$ 23.75	\$ 24.75			4-1PCC

Published by the New York State Department of Labor PRC Number 2024000704 New York County

9-15Db

01/01/2024

JOB DESCRIPTION Operating Engineer - Building

ENTIRE COUNTIES

Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES

Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES

NOTE: Construction surveying Party Chief--One who directs a survey party Instrument Man--One who runs the instrument and assists Party Chief. Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour)	07/01/2023
Building Construction:	
Party Chief Instrument Man Rodman	\$ 77.39 61.25 41.39
Steel Erection:	
Party Chief Instrument Man	80.16 63.60
Rodman	44.23
Heavy Construction-NYC counties only: (Foundation, Excavation.)	
Party Chief Instrument man	85.74 64.40

Instrument man Rodman	64.40 54.90
SUPPLEMENTAL BENEFITS Per Hour:	07/01/2023
Building Construction	\$ 28.04* +\$ 7.65
Steel Erection	28.64* +\$ 7.65
Heavy Construction	28.85* +\$ 7.64

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:

OVERTIME PAY

See (A, B, E, Q) on OVERTIME PAGE

Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.

21.19

Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

Paid:	
Overtime:	

See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

Operating Engineer - Building, Maintenance, Steel Erection & Heavy Construction

JOB DESCRIPTION Operating Engineer - Building, Maintenance, Steel Erection & Heavy DISTRICT 9 Construction

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

STEEL ERECTION:

Group 2: Oiler (Truck Crane)

Group 3: Oiler (Crawler Crane)

BUILDING CONSTRUCTION:

Group 1: Installing, repairing, maintaining, dismantling of all equipment including Steel cutting& bending machines, mechanical heaters, mine hoists, climbing cranes, tower cranes, Linden Peine, Lorain, Liebherr, Mannes and machines of a similar nature; Well Point system, Deep Well pumps, Concrete mixers with loading devices, Concrete plants, motor generators (When used for temporary power and lights(Driving maintenance trucks and mounted-welded machines)-All Pumps(excluding River Cofferdam Pumps and Well Point Pumps), Motorized Concrete Buggies(When three or more are on job site), Skid-Steer and similar machines

Group 2: Maintenance of: Pumps, Generators, Mixers, Heaters

Group 3: Oilers of all gasoline, electric, diesel or air operated Gradalls; Concrete Pumps, Overhead Cranes in Power Houses, Assist in oiling, greasing and repairing of all machines, including: Driving Truck Cranes, Driving and operating Fuel and Grease Trucks, Cherry Pickers(Hydraulic Cranes) over 70,000 GVW and machines of a similar nature

Group 4: Oiler on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors(3 or more in battery)

Group 5: Maintenance on Radiant Mechanical Heaters

HEAVY CONSTRUCTION (Excavation, Foundations, etc)

Group 1: Maintenance of: Generators, Light Towers

Group 2: Maintenance of: Pumps, Mixers including mudsucking

Group 3: Base Mounted Tower Cranes

Group 4: Installing, repairing, maintaining, dismantling(of all equipment including Steel cutting & Bending machines, Fusion Coupling Machines, Vermeer Trenching machines, on-site crushing plant, mechanical heaters(1 through 7), Mine hoists, Tower Cranes, Linden Peine, Lorrain, Lebherr, Mannes or machines of a similar nature, Wellpoints)-Driving maintenance trucks and truck mounted welding machines, burning, welding-operating of accumilator for shield-driven tunnels, in addition to the performance of other duties: Handling, installation, jointing, coupling of all permanent steel and plastic pipe. RIDE UPON MOLES-tunnel boring machines-MICRO TUNNELING SYSTEMS, All temporary pipefitting; When three or more motorized concrete buggies(Ride type)are utilized on the jobsite they shall be serviced, maintained and repaired by the maintenance engineer. The Operating Engineer on autogrades(C.M.I.) is to be assisted by the maintenance engineer who shall in addition perform other duties.

WAGES: Per hour: Steel Erection: Group 1 Group 2 Group 3 Building Construction: Group 1 Group 2 Group 3 Group 4 Group 5	07/01/2023 \$ 78.26 74.05 57.92 \$ 73.54 58.49 70.22 53.75 47.20
Heavy Construction: Group 1 Group 2 Group 3 Group 4 SUPPLEMENTAL BENEFITS Per Hour: Building Construction Steel Erection & Heavy	\$ 56.10 57.38 105.22 81.67 07/01/2023 \$ 29.40* plus \$7.40 29.90* plus \$7.40

* This portion of benefits subject to same premium as wages.

Non-Worked Holiday Supplemental Benefits:

DISTRICT 9

23.47

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY	
Paid:	See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages Per Hour:

(1) year terms at the following wage rates:

1st	2nd	3rd	4th.
\$ 37.28	\$ 44.23	\$ 47.70	\$ 51.17

Supplemental Benefits:	
Per Hour:	
All Terms	\$ 15.65* Plus 7.40

* This portion of benefits subject to same OT premium as wages.

Operating Engineer - Building / Heavy&Highway	01/01/2024
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JOB DESCRIPTION Operating Engineer - Building / Heavy&Highway

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

EQUIPMENT COVERED: Jet-Rodder/Vacuum Truck, Flusher, Sewer Rodder, Stetco Hoist and similar, Sewer Winch/Tugger Hoist and similar, Vacall/Vactor, Closed Circuit Television Inspection Equipment, Chemical Grouting Equipment and similar, John Beame, Meyers and similar.

Per Hour:			07/01/2023	
Maintenance Eng (Sewer Systems)	ineer		\$ 81.67	
SUPPLEMENT		FITS		
Per Hour:			07/01/2023	
Journeyman			29.90*	
*This portion of be	enefits sub		plus \$ 7.40 remium as wa	ges.
Non-Worked Holid	day Suppl	emental Benefi	ts:	
	, II		23.94	
OVERTIME PAY See (D, O) on OV		PAGE		
HOLIDAY				
Paid:		See (5, 6, 7, 1		
Overtime:		See (5, 6, 7, 1	1, 16) on HOL	IDAY PAGE
REGISTERED <i>A</i> Per Hour:	PPREN	TICES		
(1) year terms at	the follow	ving wage rates	S.	
	1st	2nd	3rd	4th
:	\$37.28	\$44.23	\$47.70	\$51.17
Supplemental Ber Per Hour:	nefits:			
All Apprentices:			\$ 15.65* plus	\$ 7.40
* This portion of h	onofite eu	hiect to the sar	ne premium a	s overtime wa

* This portion of benefits subject to the same premium as overtime wages

9-15Sewer

9-15Ab

JOB DESCRIPTION Operating Engineer - Building / Heavy&Highway

ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES		
Per Hour:	07/01/2023	08/01/2023
Well Driller	\$ 40.63	\$ 41.85
Well Driller Helper	34.17	\$ 36.26
Hazardous Waste Differ Added to Hourly Wage:	rential	

Level A	\$ 3.00
Level B	2.00
Level C	1.00

Monitoring Well Work

Add to Hourly Wage:	
Level A	\$ 3.00
Level B	2.00

SUPPLEMENTAL BENEFITS

Per Hour:

Well Driller	10% of straight
& Helper	time rate plus \$ 13.50

Additional \$ 4.25/Hr. for Premium Time Hours Worked

OVERTIME PAY See (B2, P, S) on OVERTIME PAGE

HOLIDAY See (5, 6, 16, 23) on HOLIDAY PAGE See (5, 6, 16, 23) on HOLIDAY PAGE Paid:

Overtime: See (5, 6, 16, 23) on HOLIDAY PAG

REGISTERED APPRENTICES

Apprentices at 12 Month Terms

Wages Per Hour:

1st Term	\$ 28.00
2nd Term	29.00
3rd Term	30.00

SUPPLEMENTAL BENEFI	rs
Per Hour:	
All Terms	10% of Wage + \$ 13.50

Additional \$4.25/Hr. for premium time hours worked.

Operating Engineer - Building & Steel Erection

JOB DESCRIPTION Operating Engineer - Building & Steel Erection		
ENTIRE COUNTIES Bronx, Kings, New York, Queens, Richmond		
WAGES Per Hour: STEEL ERECTION:	07/01/2023	
Three Drum Derricks Cranes, Two Drum Derricks, Hydraulic Cranes & Fork L Boom Trucks	100.81	
Compressors, Welding Machines Compressors (not combined with welding machines)	63.21 60.56	

DISTRICT 4

4-138well

01/01/2024

BUILDING CONSTRUCTION:

Cranes, Stone Derrick, Boom Trucks, Hydraulic Cranes,	
	101.22
Double Drum	96.01
4 Pole Hoists and Single	
Drum Hoists	87.63
Fork Lifts, Plaster(Platform Machine)Plaster Bucket, Conc Pumps and all other equipment used for hoisting	rete
	80.39
*House Cars and Rack & Pinion	71.20
*House Cars (New Projects)	58.32
Erecting and dismantling Cranes	88.49

Compressors, Welding Machines(Cutting Concrete-Tank Work), Paint Spraying, Sand Blasting, Pumps(With the exclusion of concrete pumps), House Car (Settlement basis only), All Engines irrespective of power(Power-Vac)used to drive auxiliary equipment Air, Hydraulic, etc., Boilers, Jacking System 62.05

APPLICABLE TO ALL CATEGORIES: **CRANES: Crawler Or Truck**

	In Addition To Above Crane Rates
100' to 149' Boom	\$ 1.75/hr
150' to 249' "	\$ 2.00/hr
250' to 349' "	\$ 2.25/hr
350' to 450' "	\$ 2.75/hr
Tower Crane	\$ 2.00/hr
SUPPLEMENTAL BENEFITS	
Per Hour:	07/01/2023
All Operator Classes	\$ 25.40*
	plus \$ 6.20

* This portion of the benefits is subject to the same premium as shown for overtime wages.

OVERTIME PAY See (*B, **C, ***D, O) on OVERTIME PAGE

*Applies to House Cars and Rack & Pinion after 8 hours worked in a day, Saturday, Sunday and Holidays

**Applies to Building Construction category

***Applies to Steel Erection

HOLIDAY

See (5, 6, 7, 8, 11, 12, 16, 26) on HOLIDAY PAGE See (5, 6, 7, 8, 11, 12, 16, 26) on HOLIDAY PAGE Paid: Overtime: Codes 8 and 12 apply ONLY to Steel Erection Code 16 applies ONLY to Building Construction

REGISTERED APPRENTICES

Wage Per Hour:

Apprentices (1) year terms at the following rates:

07/01/2023	1st \$ 43.95	2nd \$ 53.21	3rd \$ 62.47
Supplemental Benefits Per H	lour:		
Straight Time			07/01/2023 \$ 14.90*
Straight Time			plus \$ 6.20

* This portion of benefits subject to the same premium as shown for overtime wages.

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

(For Groups 23 - 28, see Operating Engineer - Heavy Construction 2)

Group 1: Tower Crane/Climbing Crane

Group 2: Backhoes (Including all track and rubber tire backhoes over 37,000 lbs), Power Shovels, Steel Erection: Hydraulic Clam Shells, Moles and machines of a similar nature

Crown 2: Mine Heiste, Cronce, etc. used as M

Group 3: Mine Hoists, Cranes, etc, used as Mine Hoists

Group 4: Gradalls, Keystones, Cranes (With digging buckets), Bridge Cranes, Trenching Machines, Vermeer Cutter and machines of a similar nature

Group 5: Pile Drivers and Rigs (Employing Dock-Builders Foreman), Derrick Boats, Tunnel Shovels,

Group 6: All Drills and machines of a similar nature

Group 7: Back-Filling Machines and Cranes, Mucking Machines, Dual Drum Pavers

Group 8: Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power House (Low pressure units)

Group 9: Concrete Pumps, Concrete Plant, Stone Crushers, Double Drum Hoists, Power Houses (Other than above)

Group 10: Concrete Mixer

Group 11: Elevators

Group 12: Concrete Breaking Machines, Single Drum Hoists, Load Masters, Locomotives and Dinkies (Over 10 tons), Hydraulic Crane-Second Engineer

Group 13: On-Site Concrete Plant Engineers, On-Site Asphalt Plant Engineer and Vibratory Console

Group 14: Barrier Mover, Barrier Transport and machines of a similar nature

Group 15: Compressors (Portable, 3 or more), Truck Compressor (Engineer Driver), Tugger Machines, Well Point Pumps, Chum Drill Group 16: Boilers(High pressure), Compressors, Pumps(River Cofferdam) and Welding Machines(except where arc is operated by another Operating Engineer) Push Button Machines, All Engines, irrespective of power(Power Pac) used to drive auxiliary equipment, Air, Hydraulic, etc.

Group 17: Utility-Horizontal Boring Rig

Group 18: Utility Compressors

Group 19: Paving-Asphalt Spreader, Autogrades (C.M.I.), Roto-Mill

Group 20: Paving-Asphalt Roller

Group 21 Paving-Asphalt Plant

Group 22: Roller (non paving, all sizes)

WAGES:(per hour)	07/01/2023
Group 1	\$ 120.29
Group 2	100.67
Group 3	103.65
Group 4	101.34
Group 5	99.50
Group 6	95.86
Group 7	97.51
Group 8	94.93
Group 9	93.11
Group 10	89.36
Group 11	84.03
Group 12	85.71
Group 13	86.28
Group 14	78.25
Group 15	67.08
Group 16	62.93
Group 17	90.70
Group 18	62.57
Group 19	94.93
Group 20	92.71
Group 21	79.64
Group 22	92.71

Cranes:	Crawler	or	Truck	
Clanes.	Clawler	UI	TTUCK	

100' to 149'	\$0.50 per hour additional to above Crane Rates
150' to 249'	\$0.75 per hour additional to above Crane Rates
250' to 349'	\$1.00 per hour additional to above crane Rates
350' to 450'	\$1.50 per hour additional to above crane Rates

SUPPLEMENTAL BENEFITS

Per Hour: Groups 1-22

Regular Time

\$ 25.40* plus \$ 6.20

DISTRICT 9

* This portion of benefits subject to the same premium as shown for wages.

Non-Worked Holiday Supplemental Benefits: \$ 19.95

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY Overtime:

Paid:

See (5, 6, 7, 11, 16) on HOLIDAY PAGE See (5, 6, 7, 11, 16) on HOLIDAY PAGE

REGISTERED APPRENTICES

Per Hour:

(1) year terms at the following wage rates:

Groups 1-22	1st	2nd	3rd
	43.95	53.21	62.47

Supplemental Benefits:

Groups 1-22	
Regular Time	\$ 14.90*
	plus \$ 6.20

* This portion of benefits is subject to the SAME PREMIUM as shown for overtime wages

Operating Engineer - Heavy Construction 2

JOB DESCRIPTION Operating Engineer - Heavy Construction 2

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

(For Groups 1 - 22, see Operating Engineer - Heavy Construction 1)

Group 23: Cherry Picker (Over 20 tons), Loader (Over 6 yards)

Group 24: Backhoes and Loaders (Up to 37,000lbs), Bulldozers, Scrapers, Turn-A-Pulls, Tugger Hoists, Tractors, Hysters, Roustabout Cranes, Conveyors, Ballast Regulators (Ride On), Track Removal Machine or similar, Motor Graders, Locomotives (10 tons and under), Curb & Gutter Pavers and machines of a similar nature

Group 25: Post Hole Digger, Ditch Winch, Road Finishing Machines, Rollers (5 tons and under, Dual Purpose Trucks, Forklifts, Dempsey Dumpsters, Fireman

Group 26: Service Engineer (Gradalls, Concrete Pumps, Cold Planers Grader)

Group 27: Service Mechanic (Shovels, Draglines, Crawler Cranes, Backhoes, Trenching Machines, Compressors (3 or more in battery)

Group 28: Steam Equipment Operator (Water rigs, steam shovels, power boilers, derrick boats)

WAGES:(per hour)	07/01/2023
Group 23	\$ 84.34
Group 24	82.03
Group 25	78.16
Group 26	74.26
Group 27	53.38
Group 28	78.16

Cranes: Crawler or Truck	
100' to 149'	\$0.50 per hour additional to above Crane Rates
150' to 249'	\$0.75 per hour additional to above Crane Rates
250' to 349'	\$1.00 per hour additional to above crane Rates
350' to 450'	\$1.50 per hour additional to above crane Rates

SUPPLEMENTAL BENEFITS

Per Hour:

9-14 HC

Groups 23-28 **Regular Time**

29.90* plus \$7.40

* This portion of benefits subject to the same premium as shown for wages.

Non-Worked Holiday Supplemental Benefits:

·····	23.47
OVERTIME PAY See (D, O) on OVER	TIME PAGE
HOLIDAY Paid: Overtime:	See (5, 6, 7, 11, 16) on HOLIDAY PAGE See (5, 6, 7, 11, 16) on HOLIDAY PAGE
	DENTIOEO

REGISTERED APPRENTICES

(1) year terms at the follow	wing wage rates	s:		
	1st	2nd	3rd	4th
Groups 23-28	\$37.28	\$44.23	\$47.70	\$51.17

Supplemental Benefits:

\$ 15.65* plus \$ 7.40 **Regular Time**

* This portion of benefits subject to same OT premium as wages.

Operating Engineer - Marine Dredging

JOB DESCRIPTION Operating Engineer - Marine Dredging

ENTIRE COUNTIES

Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES

These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2023	10/01/2023
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more	\$ 43.94	\$ 45.26
CLASS A2 Crane Operator (360 swing)	39.16	40.33
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer Licensed Boat, Crew Boat Operator	38.00	39.14
CLASS B2 Certified Welder	35.77	36.84
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	34.79	35.83

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01/01/2024

Prevailing Wage Rates for 07/01, Last Published on Jan 01 2024			ate Department of Labor 00704 New York County
CLASS C2 Boat Operator	33.67	34.68	
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	27.97	28.81	
SUPPLEMENTAL BENEFI Per Hour: THE FOLLOWING SUPPLEM	TS IENTAL BENEFITS APPLY TO ALL CATEGOR	IES	
All Classes A & B	\$ 11.85 plus 6% of straight time wage, Overtime hours add \$ 0.63	\$ 12.00 plus 6% of straight time wage, Overtime hours add \$ 0.63	
All Class C	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50	\$ 11.75 plus 6% of straight time wage, Overtime hours add \$ 0.50	
All Class D	\$ 11.35 plus 6% of straight time wage, Overtime hours add \$ 0.38	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50	
OVERTIME PAY See (B2, F, R) on OVERTIME	PAGE		
HOLIDAY Paid: Se Overtime: Se	ee (1) on HOLIDAY PAGE ee (5, 6, 8, 15, 26) on HOLIDAY PAGE		4-25a-MarDredge
Operating Engineer - Sur	vey Crew - Consulting Engineer		01/01/2024
ENTIRE COUNTIES	iting Engineer - Survey Crew - Consulting Engin ork, Putnam, Queens, Richmond, Suffolk, Weste		
PARTIAL COUNTIES	ss County lying South of the North City line of P		
WAGES	sign surveying, any line and grade surveying for		
Per hour: Survey Classifications	07/01/2023		
Party Chief Instrument Man Rodman	\$ 47.15 39.30 34.35		

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members: \$23.15

OVERTIME PAY

OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE. *Double-time paid on the 9th hour on Saturday.

HOLIDAY

HULIDAT	
Paid:	See (5, 6, 7, 11, 16) on HOLIDAY PAGE
Overtime:	See (5, 6, 7, 11, 16) on HOLIDAY PAGE

JOB DESCRIPTION Painter

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES Per hour:	07/01/2023
Brush	\$ 51.70*
Abatement/Removal of lead based	51.70*
or lead containing paint on materials to be repainted.	• … •
Spray & Scaffold Fire Escape Decorator Paperhanger/Wall Coverer	\$ 54.70* 54.70* 54.70* 54.48*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:

Paperhanger	\$ 34.60
All others	32.73
Premium	36.70**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY

See (A, H) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rate.

Per hour:	07/01/2023
Appr 1st term	\$ 19.95*
Appr 2nd term	25.56*
Appr 3rd term	31.05*
Appr 4th term	41.62*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental benefits:	
Per Hour:	
Appr 1st term	\$ 16.06
Appr 2nd term	19.95
Appr 3rd term	23.02
Appr 4th term	29.16

Painter

JOB DESCRIPTION Painter

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

PARTIAL COUNTIES

Nassau: Atlantic Beach, Ceaderhurst, East Rockaway, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave, Rockville is the boundary line up to Lawson Blvd, turning right going west all the above territory. Starting at Union Turnpike &Lakeville Rd going north to northern Blvd. the west side of Lakeville Rd to Northern Blvd. At Northern Blvd doing east the district north of Northern blvd to Port Washington blvd. West of Port Washington blvd to St.Francis Hospital then north of first traffic light to Port Washington & Sands Point Manor Haven & Harbour Acres first traffic light to Port Washington & Sands Point, Manor Haven, & Harbour Acres.

WAGES

Per hour:

01/01/2024

DISTRICT 8

DISTRICT 8

8-NYDC9-B/S 01/01/2024

Drywall Taper \$ 55.10

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:

OVERTIME PAY See (A, H) on OVERTIME PAGE

See (A, H) OII OVER HIME PAGE

HOLIDAY	
Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (4, 6, 8, 11, 18, 19, 25, 26) on HOLIDAY PAGE

\$23.88

REGISTERED APPRENTICES

Wage per hour:

1st term	\$ 21.29
2nd term	27.84
3rd term	33.29
4th term	44.20

Supplemental Benefits per hour:

1st term	\$ 14.43
2nd term	18.16
3rd term	19.30
4th term	21.59

Painter - Bridge & Structural Steel

JOB DESCRIPTION Painter - Bridge & Structural Steel

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per Hour: STEEL: Bridge Pain

dge Painting:	07/01/2023	10/01/2023
	\$ 54.50	\$ 56.00
	+ 10.10*	+ 10.35*

ADDITIONAL \$6.50 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:		
Journeyworker:		
	\$ 11.78	\$ 12.43
	+ 30.85*	+ 31.55*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

8-NYC9-1974-DWT

01/01/2024

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

REGISTERED APPRENTICES

Wage - Per hour: Apprentices: (1) year terms.

1st year	\$ 21.80 + 4.04	\$ 22.40 + 4.14
2nd year	\$ 32.70 + 6.06	\$ 33.60 + 6.21
3rd year	\$ 43.60	\$ 44.80
Supplemental Benefits - Per hour:	+ 8.08	+ 8.28
1st year	\$.90 + 12.34	\$ 1.16 + 12.62
2nd year	\$ 7.07 + 18.51	\$ 7.46 + 18.93
3rd year	\$ 9.42 + 24.68	\$ 9.94 + 25.24

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

01/01/2024

Painter - Metal Polisher

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
	07/01/2023
Metal Polisher	\$ 38.18
Metal Polisher*	39.28
Metal Polisher**	42.18
	42.10

*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, F, P, T) on OVERTIME PAGE		

e (B, E, P, T) on OVERTIME PAGE HOLIDAY

Paid:	See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime:	See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime.	See (5, 6, 11, 15, 16, 25, 26) 011 HOLIDAT PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

1st year	\$ 16.00
2nd year	17.00

2rd year				24000704 New Fork County
3rd year	18.00			
1st year*	\$ 16.39			
2nd year*	17.44			
3rd year*	18.54			
nu year	10.54			
st year**	\$ 18.50			
2nd year**	19.50			
Brd year**	20.50			
	onstruction & complete renov orking on scaffolds over 34 fe			
Supplemental benefits: Per hour:				
1st year	\$ 8.69			
2nd year	8.69			
Brd year	8.69			
,				8-8A/28A-MI
Plasterer				01/01/2024
	Plasterer		DISTRICT 9	
E NTIRE COUNTIES Bronx, Kings, Nassau, No	ew York, Queens, Richmond,	Suffolk		
WAGES				
Per hour:				
		07/01/2023	08/01/2023	
Building:				
Plasterer/Traditional &		\$ 46.00	\$ 47.72	
Spraying Fireproofing		+ \$5.00*	+ \$5.00*	
SUPPLEMENTAL BEI	NEFITS			
Per hour:				
lourneyworker		\$ 23.15	\$ 25.35	
		φ 20.10	¢ 20.00	
DVERTIME PAY See (B, E, Q) on OVERT This portion is not subje				
HOLIDAY	-			
Paid:	See (1) on HOLIDAY PAC	θE		
		YPAGE		
	See (5, 6, 25) on HOLIDA	TINOL		
Overtime:	See (5, 6, 25) on HOLIDA	TTNOL		
Overtime: REGISTERED APPRE			08/01/2023	
Overtime: REGISTERED APPRE Vages:		07/01/2023	08/01/2023	
Overtime: REGISTERED APPRE Vages: per hour)			08/01/2023	
Overtime: REGISTERED APPRE Vages: per hour) 000 hours term:		07/01/2023		
Overtime: REGISTERED APPRE Vages: Der hour) 00 hours term: st term		07/01/2023 \$ 25.44 + 2.75*	\$ 19.30+ 0.68*	
Overtime: REGISTERED APPRE Vages: Der hour) 00 hours term: st term nd term		07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Overtime: REGISTERED APPRE Vages: per hour) 000 hours term: st term and term and term		07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50*	\$ 19.30+ 0.68*	
Overtime: REGISTERED APPRE Vages: per hour) 00 hours term: st term nd term rd term		07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Overtime: REGISTERED APPRE Vages: per hour) 300 hours term: st term and term and term and term th term	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Dvertime: REGISTERED APPRE Wages: per hour) 300 hours term: 1st term 2nd term 3rd term 4th term 4th term This portion is not subje	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Dvertime: REGISTERED APPRE Vages: per hour) 300 hours term: 1st term 2nd term 3rd term 4th term This portion is not subje Supplemental Benefits:	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Dvertime: REGISTERED APPRE Vages: per hour) 300 hours term: 1st term 2nd term 2nd term 3rd term th term This portion is not subje Supplemental Benefits: per hour):	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50*	\$ 19.30+ 0.68* \$ 22.53+ 0.81*	
Overtime: REGISTERED APPRE Vages: ber hour) 00 hours term: st term nd term rd term th term This portion is not subje Supplemental Benefits: ber hour): 300) hours term:	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50* 34.68 + 3.75*	\$ 19.30+ 0.68* \$ 22.53+ 0.81* \$ 25.79+ 0.95*	
Overtime: REGISTERED APPRE Vages: Der hour) 00 hours term: st term nd term rd term th term This portion is not subje Supplemental Benefits: Der hour): 300) hours term: st term	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50* 34.68 + 3.75* \$ 14.70	\$ 19.30+ 0.68* \$ 22.53+ 0.81* \$ 25.79+ 0.95* \$ 11.59	
Overtime: REGISTERED APPRE Vages: per hour) 100 hours term: 100 term 101 term 101 term 101 term 102 term 103 term 104 term 105 portion is not subje 105 Supplemental Benefits: 105 per hour): 105 Bond term 105 term 105 term 105 term 105 term	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50* 34.68 + 3.75* \$ 14.70 15.60	\$ 19.30+ 0.68* \$ 22.53+ 0.81* \$ 25.79+ 0.95* \$ 11.59 \$ 12.02	
Dvertime: REGISTERED APPRE Vages: per hour) 300 hours term: 1st term 2nd term Brd term Hth term This portion is not subje	INTICES	07/01/2023 \$ 25.44 + 2.75* 27.49 + 2.51* 32.38 + 3.50* 34.68 + 3.75* \$ 14.70	\$ 19.30+ 0.68* \$ 22.53+ 0.81* \$ 25.79+ 0.95* \$ 11.59	

Plumber

JOB DESCRIPTION Plumber

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

Per hour:	07/01/2023		
Plumber	\$ 72.50		
Temporary Service**	\$ 58.08		

** Temporary Service- Includes Maintenance of cooling & heating apparatus, maintenance work on pneumatic systems during the construction period, and work on temporary heat. All hours paid at straight time, including holidays.

**THERE ARE NO HELPERS UNDER THIS CLASSIFICATION.

On tower work, bridges, elevated highway, or buildings, where pipe is being installed, fifty (50) or more feet vertically in a free drop from its base, an additional \$1.00 per hour.

SHIFT WORK:

Shift work, when directly specified in public agency or authority contract documents, and continues for a period of not less than ten (10) consecutive work days. A shift shall consist of seven(7) hours with one-half (1/2) hour for lunch after the first four (4) hours of each shift. A premium of thirty percent (30%) for wages and supplemental benefits on shift work performed Monday through Friday on the 4 P.M. and midnight shifts.

For shift work performed on weekends the shift premium shall be fifty percent (50%) of wages and supplemental benefits. For shift work performed on holidays designated below, double time wages and supplemental benefits shall be paid. Also noted that the normal workday Monday through Friday 8:00 A.M. to 3:00 P.M. is not considered shift work, and therefore not subject to shift premium.

SUPPLEMENTAL BENEFITS

Per hour:

Plumber	\$ 41.45
	φ

Temporary

Service

OVERTIME PAY Plumber See (C, O, V) on OVERTIME PAGE.

\$ 33.08

HOLIDAY

Plumber	
Overtime:	See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE.
Repairs & Maintenance	
Paid:	See (1) on HOLIDAY PAGE.
Overtime:	See (5, 6, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

(1/2) year terms at the following wage:

1	st	2nd	3rd&4th	5th&6th	7th&8th	9th	10th
\$1	6.78	\$19.78	\$28.99	\$31.09	\$33.94	\$35.34	\$47.41

Supplemental Benefits:

(1/2) year term at the following dollar amount:

1st 2nd 3rd-10th \$5.43 \$6.43 \$21.95

9-1 Const

Plumber - Pump & Tank: Oil Trades Installation & Maintenance

JOB DESCRIPTION Plumber - Pump & Tank: Oil Trades Installation & Maintenance

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

01/01/2024

DISTRICT 9

Plumber - Repairs 8	& Maintenance	01/01/2024
HOLIDAY Paid: Overtime:	See (1) on HOLIDAY PAGE. See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE.	9-1-P&T
OVERTIME PAY Pump & Tank	\$ 20.33 See (B, F, H) on OVERTIME PAGE.	
SUPPLEMENTAL BE Per hour: Plumber	ENEFITS \$ 26.33	
Pump & Tank	07/01/2023 \$ 69.31	

JOB DESCRIPTION Plumber - Repairs & Maintenance

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond

WAGES

Per hour:

Repairs &	07/01/2023
Maintenance	\$ 47.50

*Repair & Maintenance work is any repair and/or replacement of present plumbing system that does not change existing roughing or water supply lines. Projects regardless of work type which have approved plans and specifications wherein the plumbing exceeds \$725,000 are excluded.

SUPPLEMENTAL BENEFITS

Per hour:

Repair

\$ 19.06

Maintenance **OVERTIME PAY**

Repairs &

Maintenance See (B, H) on OVERTIME PAGE.

HOLIDAY

Repairs & Maintenance Paid: See (1) on HOLIDAY PAGE. Overtime: See (5, 6, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Note: The Repairs & Maintenance Category has NO Apprentices.

9-1 R&M

Roofer			01/01/2024
JOB DESCRIPTION Roofer		DISTRICT 9	
ENTIRE COUNTIES Bronx, Dutchess, Kings, New York, Or	ange, Putnam, Queens,	Richmond, Rockland, Sullivan, Ulster, Westchester	
WAGES			
Per Hour:	07/01/2023	05/01/2024 Additional	
Roofer/Waterproofer	\$ 46.50 + \$7.00*	\$2.50	
* This portion is not subjected to overt	ime premiums.		
Note: Abatement/Removal of Asbesto	s containing roofs and roo	ofing material is classified as Roofer.	
SUPPLEMENTAL BENEFITS Per Hour:	\$ 31.37		

OVERTIME PAY See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HO	LIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term	apprentices i	ndentured pric	or to 01/01/202	3
	1st	2nd	3rd	4th
	\$ 16.28	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.50*	+ 4.20*	+ 5.26*
Supplements:				
	1st	2nd	3rd	4th
	\$ 4.03	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

(1) year term	apprentices	indentured afte	er 01/01/2023		
	1st	2nd	3rd	4th	5th
	\$ 17.67	\$ 20.93	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.16*	+ 3.50*	+ 4.20*	+ 5.26
Supplements:					
	1st	2nd	3rd	4th	5th
	\$ 7.61	\$ 14.29	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

Sheetmetal Worker

JOB DESCRIPTION Sheetmetal Worker			DISTRICT	4					
ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester									
WAGES Per Hour:			07/01/2023	3					
Sign Erector			\$ 56.00						
			Highway Sigr	ns(See STRUC	CTURAL IRON	I WORKER CL	ASS)		
Per Hour:	ENTAL BEN	EFIIS	07/01/2023	3					
Sign Erector			\$ 55.66						
OVERTIME See (A, F, S	PAY) on OVERTIN	IE PAGE							
HOLIDAY Paid: Overtime:	Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE								
Per Hour:	ED APPREN		ge of Sign Ere	ectors wage ra	te:				
1st 35%	2nd 40%	3rd 45%	4th 50%	5th 55%	6th 60%	7th 65%	8th 70%	9th 75%	10th 80%
SUPPLEMENTAL BENEFITS Per Hour:									
07/01/2023 1st \$ 14.95	2nd \$ 16.95	3rd \$ 18.93	4th \$ 20.93	5th \$ 28.56	6th \$ 31.05	7th \$ 33.57	8th \$ 36.05	9th \$ 38.56	10th \$ 41.05
									4-137-SE
Sheetmeta	al Worker								01/01/2024

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

	W York, Queens, Richmond, Suffolk	
WAGES Per Hour:	7/01/2023	11/01/2023
Sheetmetal Worker	\$ 59.94	\$ 61.09
Maintenance of Fans Temporary Operation SUPPLEMENTAL BEN	\$ 47.95 E FITS	\$ 48.87
Per Hour:		
Sheetmetal Worker	\$ 51.16	\$ 53.25
Maintenance Worker	\$ 51.16	\$ 53.25
OVERTIME PAY See (B, E, E2, Q, V) on OV For Maintenance See Cod		
HOLIDAY Paid: Overtime:	See (1) on HOLIDAY PAGE See (5, 6, 11, 15, 16, 25, 26) on HO	LIDAY PAGE
REGISTERED APPREN Per Hour:Wages	ITICES	
Six(6) Month Terms As Fo	llows:	
1st & 2nd Term 3rd & 4th Term 5th & 6th Term 7th & 8th Term 9th Term	\$ 20.85 26.87 32.89 41.94 47.53	\$ 21.26 27.39 33.52 42.75 48.55
Per Hour: Supplemental B	enefits	
1st & 2nd Term 3rd & 4th Term 5th & 6th Term 7th & 8th Term 9th Term	\$ 19.02 25.90 30.55 37.49 42.14	\$ 19.66 26.73 31.57 38.78 43.62
Steamfitter		
JOB DESCRIPTION Sta ENTIRE COUNTIES Bronx, Kings, Nassau, New WAGES	eamfitter v York, Queens, Richmond, Suffolk	
Per Hour:	07/01/2023	01/01/2024 Additional
AC Service/Heat Service	\$ 44.85	

4-28

JOB DESCRIPTION Steamfitter			DISTRICT 4
ENTIRE COUNTIES Bronx, Kings, Nassau, New York, Q	ueens, Richmond, Suffolk		
WAGES			
Per Hour:	07/01/2023	01/01/2024 Additional	07/01/2024 Additional
AC Service/Heat Service & Refrigeration	\$ 44.85	\$1.25/Hr.*	\$1.25/Hr.*
(*)To be allocated at a later date.			
Refrigeration, A/C, Oil Burner and S NOTE: Refrigeration Compressor ins NOTE: Air Condition / Heating Comp	stallation. (Not to exceed 5		
SUPPLEMENTAL BENEFITS Per Hour Worked:			
AC Service/Heat Service Per Hour Paid:	\$ 20.71 17.65		
OVERTIME PAY See (B, E, Q) on OVERTIME PAGE			

HOLIDAY Paid:

	See (5, 6, 11,	15, 25, 26) on HOLIDAY PAGE
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REGISTERED APPRENTICES

1 year terms Wages per hour:

1st Term 2nd Term 3rd Term 4th Term	\$ 21.71 26.21 30.53 36.87	
Benefits per hour Worked: Per Hour Paid: 1st Term 2nd Term 3rd Term 4th Term	\$ 14.20 14.57 15.91 17.72	Per Hour Paid: \$ 11.14 12.48 13.38 15.77

Steamfitter

JOB DESCRIPTION Steamfitter

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

AC/Heat Fitter

Per Hour:	07/01/2023	
Sprinkler/Steam	\$ 69.11	

Temporary Heat & AC Fitter

Note: Add 15% to Hourly Wage for "Contracting Agency" Mandated Off Shift Work.

52.54

SUPPLEMENTAL BENEFITS

Per Hour:

Sprinkler/Steam	\$ 53.24
Fitter	

Temporary 43.67 Heat & AC Fitter

Note: Add 15% to Hourly Benefit for "Contracting Agency" Mandated Off Shift Work.

OVERTIME PAY

Note: The posted overtime rates are applicable after 8 hours plus Saturday, Sunday and Holidays on Fire Protection/Sprinkler contracts under \$3,000,000.00 and HVAC/Mechanical contracts under \$30,000,000.00:

Sprinkler/Steam	Wages \$ 138.22	Benefit \$ 106.48
Temp Heat/AC	Wages \$ 105.08	Benefit \$ 87.34

но	LIDAY	
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Paid: Overtime: See (1) on HOLIDAY PAGE See (5, 6, 11, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

1 year Terms at the Following:

WAGES per hour: 1st Term \$ 27.68	2nd Term \$ 34.59	3rd Term \$ 41.49	4th Term \$ 48.40	5th Term \$ 55.30
SUPPLEMENTAL BE	ENEFIT per hour:			
1st Term	2nd Term	3rd Term	4th Term	5th Term
\$ 21.80	\$ 27.05	\$ 32.28	\$ 37.53	\$ 42.76

DISTRICT 4

4-638B-StmFtrRef

JOB DESCRIPTION Teamster - Heavy Construction DISTRICT 4 ENTIRE COUNTIES Bronx, Kings, New York, Queens, Richmond WAGES Per Hour: Dump Trucks/Drivers (Debris Removal, Street Level and below) 07/01/2023 07/01/2024 Additional Dump Trucks 07/01/2023 07/01/2024 Additional Dump Trucks \$43,835 \$7.93 Tractor Trailers 46.115 6.60 Euclid/Turnapull 46.68 6.60 SUPPLEMENTAL BENEFITS Per Hour: Dump Trucks Up to 40 Hours Worked \$51.5525 ALL OTHERS Up to 40 Hours Worked \$51.5025 OVERTIME PAY See (8, E, Q) on OVERTIME PAGE HOLIDAY Paid: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE Note: Employees receive 5 1/3 hours of Holiday Pay for each day worked in Thanksgiving Holiday Week.	Premium Time Amounts: 43.60	54.10	64.56	75.06	85.52 4-638A-StmSpFtr
ENTIRE COUNTIES Bronx, Kings, New York, Queens, Richmond WAGES Per Hour: Dump Trucks/Drivers (Debris Removal, Street Level and below) 07/01/2023 07/01/2024 Additional Dump Trucks \$ 43.835 \$ 7.93 Tractor Trailers 46.115 6.60 Euclid/Turnapull 46.68 6.60 SUPPLEMENTAL BENEFITS Per Hour: Dump Trucks Up to 40 Hours Worked \$ 51.5525 ALL OTHERS Up to 40 Hours Worked \$ 51.5025 OVERTIME PAY See (B, E, Q) on OVERTIME PAGE HOLIDAY Paid: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE Note: Employees receive 2 hours of Holiday Pay for each day worked in Thanksgiving Holiday Week.	Teamster - Heavy Const	truction			01/01/2024
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Welder 01/0	Paid: Note: Employees receive 2 h	nours of Holiday Pay for	each day worked in holid		
weider 01/0'	Woldow				4-282
JOB DESCRIPTION Welder DISTRICT 1		der		חופדם	01/01/2024

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 b	y Articles 8	3 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**

	Huse De Typeu
Submitted By: (Check Only One) Contracting Agency Architect or Engineerin	g 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	2. NY State Units (see Item 5). 07 City 01 DOT 08 Local School District 02 OGS 09 Special Local District, i.e., 03 Dormitory Authority Fire, Sewer, Water District 04 State University 10 Village Construction Fund 11 Town 05 Mental Hygiene 12 County Facilities Corp. 13 Other Non-N.Y. State
E-Mail:	06 OTHER N.Y. STATE UNIT (Describe)
3. SEND REPLY TO (check if new or change) Name and complete address:	4. SERVICE REQUIRED. Check appropriate box and provide project information. New Schedule of Wages and Supplements. APPROXIMATE BID DATE : Additional Occupation and/or Redetermination
Telephone Fax E-Mail:	PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :
B. PROJECT PARTICULARS	
5. Project Title Description of Work	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 : Fuel Delivery Construction (Building, Heavy Highway/Sewer/Water) Guards, Watchmen Janitors, Porters, Cleaners, Elevator Operators Tunnel Besidential Moving furniture and equipment Landscape Maintenance Trash and refuse removal Exterminators, Fumigators Window cleaners Fire Safety Director, NYC Only Other (Describe)
9. Does this project comply with the Wicks Law involving separate	arate bidding? YES 🗌 NO 🗌
10.Name and Title of Requester	Signature



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, <u>or</u> under NYS Workers' Compensation Law Section 141-b, access the database at this link: <u>https://apps.labor.ny.gov/EDList/searchPage.do</u>

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

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 GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****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		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	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	****5078	BLACK RIVER TREE REMOVAL, LLC		29807 ANDREWS ROAD BLACK RIVER NY 13032	10/17/2023	10/17/2028
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	*****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	DOL	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTI ON	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC	*****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028

DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		FRANKLIN SQUARE NY 11010 26 NORTH MYRTLE AVENUE	02/18/2021	02/18/2026
	_				SPRING VALLEY NY 10956		
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		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	****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		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
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		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
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		EUGENIUSZ "GINO" KUCHAR		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
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	*****2998	G.E.M. AMERICAN CONSTRUCTION CORP.		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
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	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	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
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	11/07/2023	11/07/2028

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DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		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		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	****5116	JP RACE PAINTING, INC. T/A		3469 STATE RT. 69	02/09/2022	02/09/2027
DOL	DOL		RACE PAINTING		PERISH NY 13131		

DOL	DOL	****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		JRN CONSTRUCTION CO, LLC	1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC	531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC	531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC	531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JRN PAVING, LLC	531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC	531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC	531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JULIUS AND GITA BEHREND	5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		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		KEAN INDUSTRIES, LLC	2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL	*****2959	KELC DEVELOPMENT, INC	7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER	7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		KMA GROUP II, INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****1833	KMA GROUP INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KRIN HEINEMANN	2345 ROUTE 52, SUITE 2N HOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	NYC		KULWANT S. DEOL	9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION	150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR	531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR	531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		LEROY E. NELSON JR	531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	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		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	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NELCO CONTRACTING, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTI ON, 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		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL		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		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		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
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		SILVANO TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANOU, JR. A/K/A STEVE PAPASTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL	*****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		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	****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	1	TIMOTHY PERCY		29807 ANDREWS ROAD BLACK RIVER NY 13612	10/17/2023	10/17/2028

DOL	DA	****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA 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		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 MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. This Section is to be coordinated with and complementary to the General Conditions, wherever applicable to Mechanical and Electrical Work.
- B. Where items of the General Conditions are repeated in this Section of the Specifications, it is intended to qualify or to call particular attention to them; it is not intended that any other parts of the General Conditions shall be assumed to be omitted if not repeated herein.
- C. This Section applies equally and specifically to all Contractors and Subcontractors supplying labor and/or equipment and/or materials as required under the Heating, Ventilating and Air Conditioning, Plumbing, Sprinkler and Electrical Sections of the Specifications.

1.02 DEFINITIONS

- A. "The Contractor" or "Each Contractor" means specifically, the Contractor or Subcontractor working under his respective Section (Heating, Ventilating and Air Conditioning, Plumbing, Sprinkler or Electrical) of this Specification.
- B. "Provide" means to supply, erect, install, and connect up in complete readiness for regular operation, the particular work referred to.
- C. "Furnish" means to supply and deliver to the job.
- D. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories related to such piping.
- E. "Concealed" means hidden from sight as in chases, furred spaces, shafts, hung ceilings, or embedded in construction.
- F. "Exposed" means "not concealed" as defined above. Work in trenches, crawl spaces, and tunnels shall be considered "exposed" unless otherwise specifically noted. Work located in mechanical rooms, accessible attics, open storage rooms, janitor's closets, on the roof or anywhere outdoors shall be considered "exposed".
- G. "Approved equal" means any equipment or material which, in the opinion of the Architect, is equal in quality, durability, appearance, strength, design, performance, physical dimensions, and arrangement to the equipment or material specified, and will function adequately in accordance with the general design.
- H. "Governmental" means all municipal, state and federal governmental agencies.
- I. Where any device or part of equipment is herein referred to in the singular number (such as "the pump"), such reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the Drawings.
- J. "HVAC" means Heating, Ventilating and Air Conditioning.

- K. "Plumbing Contractor" means the Contractor doing Plumbing and Fire Protection Work including Sprinkler Work.
- 1.03 CODES AND STANDARDS
 - A. NY State Building Code, Fire Code, Mechanical Code, Plumbing Code, Fuel Gas Code, Energy Conservation Construction Code
 - B. New Jersey Uniform Construction Code (UCC)
 - C. NFPA National Fire Protection Association
 - D. ASME American Society of Mechanical Engineers
 - E. ANSI American National Standards Institute
 - F. ASTM American Society for Testing Materials
 - G. AWWA American Water Works Association
 - H. IBR Institute of Boiler and Radiator Manufacturers
 - I. NEMA National Electrical Manufacturers Association
 - J. ASHRAE American Society of Heating, Refrigeration and Air Conditioning Engineers
 - K. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.
 - L. ARI Air Conditioning and Refrigeration Institute
 - M. UL Underwriters' Laboratories
 - N. AMCA Air Movement Control Association
 - O. AABC Associated Air Balance Council
 - P. Local Water Company Rules and Regulations
 - Q. National Electric Code
- 1.04 INTENT
 - A. It is the intention of the Specifications and Drawings to call for finished work, tested, and ready for operation. All materials, equipment, and apparatus shall be new and of first-class quality.
 - B. Any apparatus, appliance, material, or work not shown on Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories, or minor details not shown but necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner.

1.05 DRAWINGS

- A. The Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of equipment, ducts, conduits, piping, and fixtures.
- B. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect before being installed. Do not scale Drawings.
- C. Follow Drawings in laying out work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom and space conditions appear inadequate, Architect shall be notified before proceeding with installation.
- D. If directed by the Architect, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- E. Piping or ductwork connected to equipment may require different size connection than indicated on the Drawings. The Contractor shall provide transition pieces as required at the equipment.

1.06 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. Any questions or disagreements arising as to the true intent of this Specification or the Drawings or the kind and quality of work required thereby shall be decided by the Architect, whose interpretations thereof shall be final, conclusive, and binding on all parties.
- B. In case of disagreement between Drawings and Specifications, or within either document itself, the better quality, greater quantity, or more costly work shall be included in the Bid Price and the matter referred to the Architect's attention for decision and/or adjustment prior to the Contractor's submission of their Bid. If such ambiguity is identified by the Contractor during construction (after bid period), then the Architect shall be consulted merely to decide on the proper technical approach; the more costly work's value shall be included.
- C. Maintain an awareness to avoid space conflict with other trades.
- D. Purchase the equipment and material required in accordance with field measurements taken at the proper time during the construction progress.
- 1.07 VISITING THE SITE
 - A. Before submitting the final proposal, examine the site of the proposed work to determine the existing conditions that may affect the work, as this Section will be held responsible for any assumptions in regard.
- 1.08 EQUIPMENT AND MATERIALS
 - A. All pipe, fittings and valves shall be manufactured in the United States of America.

- B. Substitutions of material and equipment of makes other than specifically named on the Drawings and in the Specifications and as provided for in the above paragraph will be approved for the following reasons only:
- C. The material or equipment proposed for substitution is equal to or superior to that specified; and that the material or equipment called for on the Drawings or in the Specifications cannot be delivered to the job in time to complete the work in proper sequence to the work of other trades, due to conditions beyond control.
- D. The words "or approved equal" shall be understood to apply only to those items of equipment and material listed under the paragraph "List of Approved Manufacturers" or as otherwise indicated on the Drawings or in the Specifications.
- E. Within twenty (20) working days after the acceptance of the proposal, and prior to the submission of any shop drawings for review, a complete list of manufacturers shall be submitted to the Architect of all equipment and materials proposed for the work. No reviews will be rendered on shop drawings submitted before the complete list of manufacturers is reviewed.
- F. The materials, workmanship, design, and arrangement of all work installed under the Contract shall be subject to the approval of the Architect.
- G. If material or equipment is installed before the Contractor obtained "No Objections" comment from the Architect, trade installing same shall be liable for the removal and replacement at no extra charge to the Owner if, in the opinion of the Architect, the material or equipment does not meet the intent of the Drawings and Specifications.
- H. The words "or approved equal" are understood to follow:
 - 1. The name of any manufacturer, vendor, equipment or materials.
 - 2. Any trade name, plate number, or catalog number.
 - 3. Any detailed description used to define equipment or material; except where otherwise indicated on the Drawings or in the Specifications.
 - 4. It is the intent of these Specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "or approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claim that the substituted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, etc.) Performance as delineated in schedules and in the Specifications shall be interpreted as minimum performance.
- I. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect. All electrical equipment shall bear labels attesting to Underwriters' Laboratories approval. Where no specific indication as to the type or quality of the material or equipment is indicated, a first class standard article shall be furnished.
- J. Where it is proposed to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring, or of any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefore shall, with the review of the Architect and subsequent comments by the Architect "No Exception" or "Exception as Noted" on the shop drawings, be prepared at no additional cost to the Owner.

- K. Where such deviation from contract documents requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the Drawings, furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.
- L. All equipment of one type (such as fan, coils, etc.) shall be the product of the same manufacturer.
- M. Note that the comments "No Exception" or "Exception as Noted" marked on the shop drawings or other information submitted in accordance with the requirements herein before specified does not assure that the Engineer, Architect, or any other Owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the mechanical performance of equipment. Comments on the shop drawings does not invalidate the Plans and Specifications if the shop drawings are in conflict with the Plans and Specifications.

1.09 SHOP DRAWINGS AND SUBMITTALS

- A. Prior to delivery to job site, but sufficiently in advance of requirements necessary to allow Architect ample time for review, submit copies (as stated in "General Conditions") of shop drawings of all equipment, materials, piping, sleeves, conduit, ductwork, and wiring diagrams, and further obtain written comments "No Exception" or "Exception as Noted" for same from the Architect, before installing any of these items.
- B. All shop drawings shall be prepared using AutoCAD. Manually drafted shop drawings are prohibited. If a Contractor is incapable of developing CAD drawings in-house, then they shall engage the services of an external drafting service in order to do so. The cost for such service shall be borne by the Contractor and included as part of their bid. Shop drawing submittals shall be on paper as described herein. While shop drawings are being developed and revised throughout the construction process, the Contractor shall continually update the CAD files. As construction approaches completion, these shop drawing CAD files shall be developed by the Contractor(s) into "As-Built" drawings. As part of standard project close-out documents, in addition to providing conventional paper copies of As-Built Shop Drawings, the Contractor must also provide CD's containing electronic AutoCAD versions of same.
- C. Shop drawings shall consist of manufacturer's certified scale drawings, cuts, or catalogs, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing, as indicated on the Drawings or Specifications.
- D. Certified performance curves for all pumping and fan equipment shall be submitted for review.
- E. Shop drawings submitted with insufficient information shall be rejected without review.
- F. All shop drawings and submittals shall be sent electronically in PDF format. Other electronic file formats will be rejected without review.
- G. Samples of materials or equipment, when requested by the Architect, shall be submitted for review.

- H. Provide a detailed Transmittal with all shop drawings, via email. Any Transmittal, Shop drawing, sample, specification, etc. which is not labeled with all of the following information shall be rejected without review:
 - 1. Project name
 - 2. Project location
 - 3. Contractor's name and address, Subcontractor's name and address
 - 4. Applicable section and article number of specifications
 - 5. Contractor's approval stamp and signature
 - 6. Submission number
 - 7. Specific service for which material is to be used.
- I. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested, shall be specific and shall include clear identification in such catalog, pamphlet, etc., of item submitted, with identification clearly made in ink and highlighted. Data of a general nature such as tabulated charts will not be accepted and will be rejected without review.
- J. Shop drawings indicating an unsuitable manufacturer shall be rejected without review.
- K. The HVAC Subcontractor shall prepare ductwork shop drawings at ³/₈"=1'-0" scale and submit to the Architect for their approval to prepare the coordination drawings as called for in paragraph 1.14. Ductwork shop drawings shall be drawn with double line ductwork and shall indicate the elevation above finished floor of all ducts, location and height of building structure (beams, etc.), lengths of fabrication pieces and fittings. Show new and existing work. Shop drawings submitted shall be ready for sheet metal fabrication.
- L. The comments "No Exception" or "Exceptions as Noted" rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, said review does not in any way relieve responsibility, or necessity, of furnishing material or performing work as required by the Contract Drawings and Specifications.
- M. "EXCEPTIONS, AS NOTED" means, unless otherwise noted on the drawings to approved for construction, fabrication and/or manufacture subject the provision that the work shall be carried out in compliance with all annotations and/or corrections indicated on the shop drawings and in accordance with the requirements of the Contract Documents. If also marked "RESUBMIT", "EXCEPTIONS AS NOTED" is invalid and a corrected submittal of the drawing is required.
- N. If a shop drawing is resubmitted and does not comply with all of the comments indicated on the previous submission(s), and does not reflect specific reasons for such non-compliance, it shall be rejected without review.
- O. Label resubmitted shop drawings with a stamp indicating the submittal number, for example: SECOND SUBMISSION; THIRD SUBMISSION, etc. and send separate transmittals for each item being submitted so that one transmittal does not cover more than one specific item or group of items from one manufacturer.
- P. Failure to submit shop drawings in ample time for checking shall not entitle an extension of Contract time, and no claim for extension by reason of such default will be allowed.
- Q. Prior to submission of shop drawings, thoroughly check each shop drawing, reject those not conforming to the Specifications, and indicate (by signature) that the shop drawings submitted

meet Contract requirements. Deviations and/or exceptions to the contract documents should be clearly noted as being deviations and/or exceptions. The Contractor will later be required to correct such deviation and/or exceptions at his own expense, if they have not been noted and approved on the shop drawing.

- R. All shop drawings showing routing of ductwork, piping and conduit, shall be not less than $\frac{3}{8}$ " = 1'-0" scale.
- S. Incorporate a numbering system to help keep track of shop drawing submittals as follows:
 - 1. H or M.....HVAC shop drawings
 - PPlumbing shop drawings
 FP......Sprinkler / Standpipe shop drawings
 - 4. E......Electrical and Fire Alarm shop drawings
- T. Concurrent numbers shall follow the prefix letter. Example: H-1, H-2, etc. In addition, shop drawings requiring resubmission should bear the number of the original submission and bear a suffix as follows: H-1A (second submission), H-1B (third submission), etc.
- U. Before request for acceptance and final payment for the work, write a letter to the Architect stating that all shop drawings are brought to a condition "No Exception" or "Exception as Noted". Any outstanding shop drawings must be cleared with the Engineer.

1.10 RECORD DRAWINGS

- A. The Contractor shall furnish, coordinate, produce and distribute record drawings as stated within the General Conditions of the Contract.
- B. During construction keep an accurate record of all deviations between the work as shown on the Drawings and that which is actually installed.
- C. On certain projects where Record Drawings must be on Mylar, secure from the Architect, a complete set of Drawings and note thereon all changes. Make a complete record of all changes and revisions in the original design which exist in the complete work. Furnishing of these transparencies and preparing these Record Drawings shall be at no additional cost to the Owner. When all revisions showing the work as finally installed are made, the corrected Mylar transparencies shall be submitted for review by the Architect. After review of the Record Drawings by the Architect, provide the Owner with one set of black-line prints and Mylar transparencies, at no additional cost to the Owner.
- D. Where record drawings are CAD type, provide CD's containing AutoCAD files of these drawings to the Architect, the Engineer and the Owner.

1.11 LAWS, ORDINANCES, PERMITS AND FEES

A. Give all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs in connection with the work; file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required Certificates of Inspection for the work and deliver to the Architect before request for acceptance and final payment for the work. File for and obtain all required equipment use permits, Special

Inspections, submission of fire alarm as-built drawings, backflow prevention device (BFP) signoffs, boiler and domestic hot water heater filings with DEP and all other required filings.

- B. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, (in addition to Contract Drawings and Documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with all requirements of local utility companies, with the recommendations of the fire insurance rating organization having jurisdiction, and with the requirements of all governmental departments having jurisdiction.
- D. Include in the bid, without extra cost to the Owner, retaining the service of a licensed professional engineer to obtain equipment use permits, filing of sprinkler drawings with hydraulic calculations, DEP BFP sign-off, all DEP chimney and boiler submissions, preparation of fire alarm as-built drawings, testing of all fire and fire smoke dampers, and approvals and all other required filings.

1.12 INDEMNIFICATION

- A. Pay all royalties and defend all suits or claims for infringement of any patent rights and save the Owner harmless from loss on account thereof.
- B. If process or article specified is an infringement of a patent, promptly notify the Architect in writing, and any necessary changes shall be as provided in the Contract for changes in the work. If the Contractor performs any work specified knowing it to be an infringement of patent, he shall bear all costs arising therefrom.
- C. Take out all necessary insurance, free of extra charge, and agree to indemnify and save harmless the party contracting for services against loss or expense, by reason of the liability imposed by law upon such party for damages because of bodily injuries, including death at any time resulting therefrom, accidentally sustained by any person or persons or on account of damage to property arising out of or in consequence of the performance of this Contract, whether such injuries to persons or damage to property are due or claimed to be due to any negligence in the performance of the Contract, the party contracting for services, employees or agents, or any other person.

1.13 ORGANIZATION OF WORK

- A. The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, Owners and Architects, who will jointly interpret the meaning of the Drawings and Specifications, and shall have the power to reject any work and materials which, in their judgment, are not in full accordance therewith.
- B. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Furnish promptly to other trades involved at the project, all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.

- C. Furnish and install all work as expeditiously as possible in order to meet all construction schedules.
- D. Keep a competent superintendent in charge of the work at all times. Such superintendent shall be replaced if deemed unsatisfactory to the Owner.
- E. Upon award of contract, consult with the Architect and negotiate with subcontractors and manufacturers, and within thirty (30) days submit a preliminary list of major equipment for approval, complete with name of manufacturer, dates of purchase orders, and delivery dates to the site. Also submit within thirty (30) days, a preliminary schedule of installation of the various systems. This list shall be revised monthly and resubmitted. The second submittal shall contain the names of manufacturers of scheduled equipment (with names, addresses, and telephone numbers of local representatives).
- F. Maintain a complete file of shop drawings at all times available to the Owner's representative.
- G. Every facility shall be provided to permit inspection of the work by the Owner's representative during the course of construction.
- H. Where items of equipment and/or materials are indicated in the Specifications as being furnished by other trades for installation, assume responsibility for the unloading of such equipment and/or materials from the delivery trucks, and for providing safe storage for same as required pending installation.
- I. Where the work is to be installed in close proximity to work of other trades, or where there is evidence that the work is to interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment.
- J. If so directed by the Architect, prepare composite working drawings and sections at a suitable scale not less than $\frac{3}{8}$ " = 1'-0" clearly showing how the work is to be installed in relation to the work of other trades. If the installation is made before coordinating with other trades, make all necessary changes in the work without extra charge to the Owner.
- K. Before submitting shop drawings for sleeves, piping and ductwork, the Heating, Ventilating and Air Conditioning Subcontractor shall prepare a combined ³/₈" = 1'-0" scale shop drawing for piping and ductwork indicating location of piping and ductwork with dimensions for each floor and Mechanical Rooms. A digital version of these shop drawings shall be given to the Electrical Contractor. The Electrical Contractor shall indicate the location of all lighting fixtures and conduit runs on these shop drawings. The Electrical Contractor shall provide a digital version of the updated shop drawings, with lighting fixtures and conduit runs indicated to the Plumbing Contractor. The Plumbing and Sprinkler Contractor shall indicate his piping on these digital shop drawings.
- L. The Heating, Ventilating and Air Conditioning Contractor shall arrange a Coordination Meeting for each floor and Mechanical Equipment Room with Plumbing and Electrical Contractors under the supervision of the General Contractor. After coordination, each Contractor shall digitally sign the a copy. The Heating, Ventilating and Air Conditioning Contractor shall submit these drawings to the Architect for review and he shall call any conflicts that could not be resolved in the coordination meetings, and/or deviation from original design, to the Architect's attention. After

receiving written review from the Architect, each Contractor shall prepare the shop drawings as required under the paragraph "Shop Drawings" in the Specifications.

1.14 PROTECTION OF WORK AND PROPERTY

- A. Maintain and protect all equipment, materials and tools from loss or damage from all causes until final acceptance by the Owner.
- B. Assume responsibility for the protection of any finished work or other trades from damage or defacement by the operations and remedy any such injury or damages.

1.15 SHUTDOWNS

- A. When installation of a new system requires the temporary shutdown of an existing operating system, the connection of the new system shall be performed at such regular time or at overtime when designated by the Owner at no additional cost to the Owner.
- B. The Owner shall be notified of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.
- C. Work shall be arranged for continuous performance, including overtime, when approved by the Owner, if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections.

1.16 ACCESS DOORS IN FINISHED CONSTRUCTION

- A. Install all work so that all parts required are readily accessible for inspection, operation, maintenance and repair. Minor deviations from the Drawings may be made to accomplish this, but changes of magnitude shall not be made without prior written review from the Architect.
- B. Wherever mechanisms requiring access for maintenance, reading of instruments, or for operation are concealed in the structure and wherever else indicated on the Drawings, supply access doors of sizes necessary to provide ready access to the concealed items. Group together valves, controls, dampers, traps, expansion joints, cleanouts, gauges, switches, and other equipment requiring access in walls and furred spaces to reduce the number of access doors.
- C. Access doors shall be Milcor Style A, B or K, L or M, as manufactured by Inland Steel Products Co. or approved equal. Minimum access door shall be 12" x 12". For installation in plastered wall or ceiling, provide Style "K" or "L" as required. For installation in masonry walls, provide Style "M". For installation in acoustical tile surfaces, provide Style "AT". For installation in acoustical plaster surfaces provide Style "AP". Fire resistive access doors for suspended dry wall ceiling shall be Style ATC's. Provide fire rated access doors at fire rated shafts, stairwells, corridors and at all other walls with Fire Rating.
- D. Provide 24" x 24" access door for each duct or pipe shaft. Provide at least one (1) per floor, or as indicated on the drawings. Provide 18" x 24" access door in each outside air and exhaust air plenum.

- E. All plumbing, electric and heating and ventilating access doors etc., shall be provided with Corbin #2722-1/2 master keyed cylinder locks. These locks shall be supplied and installed by the respective Contractor. These cylinder locks shall be purchased through the General Contractor's subcontractor for hardware after submission and review of the panel schedule as hereinafter specified.
- F. Prepare a schedule showing location of all panels, cabinets, etc. to receive the Corbin lock. This schedule shall designate, by building and room number, the panel or cabinet location and shall be submitted to the Architect. This schedule is required for use in preparation of keying information. Locks shall not be purchased prior to review of this schedule.
- G. Access doors for fire and smoke dampers shall be permanently identified on the exterior by a label having letters not less than 0.5 inch in height and reading: smoke damper or fire damper or fire/smoke damper. This shall include ceiling tiles which provide access to these dampers.

1.17 PIPE EXPANSION

A. All pipe connections shall be installed to allow for freedom of movement of the pipe during the expansion and contraction without undergoing damage due to excessive stress. Proper anchors and guides shall be provided where necessary and/or when shown on the Drawings. Anchors and guides shall be subject to the review of the Architect. Refer to Section 23 20 00 and provide pipe support and expansion calculations by an independent Professional Engineer, using the project's piping shop drawings.

1.18 SCAFFOLDING, RIGGING, HOISTING

- A. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of all equipment and materials furnished under this Section of the Specifications, and remove same from premises when no longer required.
- B. In the event that supplementary bracing of the basic building structure is required to assure a secure rigging procedure and a secure route for the equipment being handled, assume full responsibility for such supplementary bracing.

1.19 BASES AND SUPPORTS

- A. Provide all bases and supports not part of the building structure of required size, type and strength, as approved by the Architect, for all equipment and materials furnished by him. All equipment, bases, and supports shall be adequately anchored to the building structure to prevent shifting of position under operating conditions.
- B. The Section furnishing the equipment shall provide not less than six-inch high concrete bases for all pumps, refrigeration machines, compressors, fans, humidifier units, air handlers, boilers, etc. and rotating machinery. Bases shall extend six inches beyond machinery base in all directions, with top edge chamfered. Provide ½" x 6" steel dowels into floors to anchor bases. Provide anchor bolts set in pipe sleeves, two sizes larger than anchor bolts for securing machinery. After anchor bolts are aligned with equipment bases, fill sleeves with concrete and allow to set.
- C. Concrete pads shall also be provided below any floor-mounted duct support, pipe support and electrical panel support (including switchboards, power panels, starters, VFDs, pull boxes, etc.).

Provide six inch high concrete pads below the mounting feet of any of the above duct, pipe or equipment support legs. Provide connection hardware (anchor bolts) as described above for rotating equipment.

- D. Concrete bases are specified under other Sections of the Specification. Each Contractor shall furnish dimensioned drawings to the General Contractor. Steel dowels, sleeves and anchor bolts shall be furnished and set by the Contractor.
- E. New concrete pads shall be doweled into the existing concrete with ½" rods at corners, drilled 6" deep and grouted. An epoxy bonding agent shall be applied between the old and new concrete. Concrete shall be 3000 psi reinforced with one middle layer 4 x 4 w2.9 x w2.9.

1.20 SLEEVES, PIPE AND CONDUIT INSERTS AND ANCHOR BOLTS

- A. Provide and assume responsibility for the location and maintenance in proper position of all sleeves, inserts, and anchor bolts required for the work. In the event that failure to do so requires cutting and patching of finished work, it shall be done without additional cost to the Owner.
- B. All pipes and conduits passing through all walls or partitions shall be provided with sleeves having an internal diameter larger than the outside diameter of the pipe or insulation enclosing the pipe or conduit. Sleeves through masonry walls and partitions shall be Schedule 40 black steel pipe. Sleeves through non-masonry partitions may be 22 gauge galvanized steel sheet metal, set flush with finished surfaces of partitions.
- C. Sleeves through foundation walls shall be James B. Clow & Sons № F-1430 or F-1435 cast iron wall sleeve with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The space between sleeve and pipe shall be packed with a mechanical rubber seal, such as "Link Seal" manufactured by Thunderline Corp., (VICO) and then with oakum to within 2" of each face of the wall. The remaining space shall be packed and made watertight with a waterproof compound.
- D. Sleeves through concrete floors shall be Schedule 40 black steel pipe and extending 1" above finished floors. The open sleeve space shall be packed with non-combustible materials.
- E. Inserts shall be preset concrete inserts with steel reinforced rods through the insert and both ends hooked over the reinforced mesh. Inserts shall be of individual type of malleable iron construction with accommodation for removable nuts and threaded rods up to ³/₄" diameter, permitting lateral adjustment, except as otherwise noted. Individual inserts shall be Grinnell Fig. 279 up to 5" pipe and conduit, Fig. 282, 6" and up to 8" pipe and conduit, Fig. 152 above 8" and up to 12" pipe and conduit. For figures 282 and 152, they shall come with an opening at the tip to allow reinforcing rods up to ¹/₂" diameter to be passed through the insert body. Rods shall extend a minimum of 4" on either side of the insert. Pipes larger than 12" shall be suspended from steel members only.
- F. In general, all piping and conduit shall be supported from structural steel building members only or approved malleable steel inserts imbedded in concrete pours. Concentrated loads up to 200 lbs. may use inserts in concrete in buildings having poured concrete floors whose thickness is 6" or more. All other loads shall be supported from steel building members. Inserts shall not be

located in any corrugated deck flute as ceiling tabs nor within 2 feet in any direction from ceiling tabs. Inserts shall not be spaced closer than 4 feet on center in all directions.

- G. Where layout revisions are required, and are approved after concrete deck is poured, piping conduit 3" and smaller may be supported at Intermediate Points by Phillips' ³/₄" expansion bolts with lead shields, provided main supports are welded to structural steel and are not more than twenty feet on centers.
- H. Piping and conduit 3" and smaller shall be supported from existing slab by "Phillips" ³/₄ expansion bolts with lead shields. Piping 4" and larger shall be supported by means of 4" x 4" x ³/₈" clip knee angle with ³/₄" expansion bolt in shear and supporting rod at 90° from another bolt or using two expansion bolts per hanging post pipes 8" and larger shall be supported from steel building members. In concrete buildings, add supplementary steel tied into the concrete structural members. Support such piping, conduits and ductwork from the supplementary steel.
- I. Provide sleeves for pipes passing through roofs. Sleeves passing through roofs shall be as detailed on drawings extending min. 12" above finished roof. All pipes passing through roof shall be minimum of 10" from walls or other construction to permit proper flashing. Provide counter flashing.
- J. Where sleeves pass through waterproofed floors, they shall be IPS brass pipe sleeves of the required diameter, brazed at the bottom to 18" x 18", 16-ounce copper flashing for bond with waterproofing. The tops of the sleeves shall extend 1" above finished floor.
- K. No ductwork, piping, conduit or equipment shall be supported from corrugated decking construction. For this area provide supplementary steel to support ductwork, piping, conduit or equipment. Supplemental steel members shall be welded to building structural steel.
- L. All hangers, rods and supports shall be installed prior to construction fireproofing.
- M. The required fire resistance rating of floor or floor/ceiling assemblies and walls shall be maintained where a penetration is made for electrical, mechanical, plumbing pipes, conduits, ducts and systems. Fire stopping shall be provided at openings around vents, pipes, ducts, conduits at floor levels and walls with non-combustible materials. For openings around pipes and conduits and/or sleeves, 3M product Caulk CP 25 and Putty 303 or approved equal shall be provided.
- N. Owner shall retain the services of a NYS Licensed Professional Engineer and under his direction shall inspect the existing spray or fire proofing of existing structural members exposed during the renovation. Provide a report of deficiencies.

1.21 ESCUTCHEONS

- A. Provide escutcheons on pipes wherever they pass through ceilings, walls, or partitions.
- B. Escutcheons or pipes passing through outside walls shall be Ritter Pattern and Casting Co., № 1, solid, cast brass, flat type secured to pipe with set screw.

- C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Co., № 36A, split-hinged, cast brass type, designed to fit pipe on one end and cover sleeve projecting through floor on the other end.
- D. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., № 3A, split-hinged, cast brass chromium plated type.

1.22 MANUFACTURERS' IDENTIFICATION

A. Manufacturer's nameplate, name or trademark, shall be permanently affixed to all equipment and material furnished under this Specification. Where such equipment is in a finished occupied space, the nameplate shall be in a concealed but accessible location. The nameplate of a Subcontractor or Distributor will not be acceptable.

1.23 EQUIPMENT NAMEPLATES

A. Provide for each item of equipment, including panelboards, disconnects, breakers, starters, switches, and all control devices, pumps, fans, compressors, boilers, etc., a permanently attached nameplate made of black surface, white core laminated plastic with incised letters. Subcontractor furnishing equipment shall provide nameplate. Pneumatic, electric and mechanically actuated gauges shall have a brief, but complete description of their function. Stating the air pressure or voltage range alone is not acceptable. Nameplates shall be a minimum of 3" long by 1½" wide and shall bear the equipment name and item number (tag number) in ½" high white letters as designated in the equipment schedule. Nameplates shall be attached to their respective equipment by screws or rivets.

1.24 TAGS AND CHARTS

- A. Furnish and attach to each valve as hereinafter specified, a 1¹/₂" diameter brass tag with ¹/₂" indented numerals filled with durable black compound. Tags shall be securely attached to stems of valves with chain and "S" hooks.
- B. Valve charts shall consist of schematic drawings of piping layouts, showing and identifying each valve and describing the function. Upon completion of the work, one (1) copy of each chart, sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung in a conspicuous location in the main equipment room, unless otherwise directed by the Architect. Two (2) additional unmounted copies in 8½" x 11" leather ring binders shall be delivered to the Architect. Also furnish three (3) copies of schematic flow chart with corresponding valve numbers noted on chart.
- C. Provide tags for the following valves:
 - 1. Zone control, bypass, shut-off, check and balancing valves.
 - 2. Building and area shut-off and balancing valves.
 - 3. Control, by-pass, shut-off, balancing and drain valves for major pieces of equipment such as boilers, domestic hot water heaters, heat exchangers, refrigeration machines, pumps, heating, ventilating and air conditioning units, cooling towers, etc.
 - 4. System drain valves, safety and relief valves. Vacuum breakers.

D. Tags on control valves shall bear the valve tag numbers shown on the ATC shop drawings. These shall be brass 1¼" diameter tags, with ½" indented numerals filled with durable black compound. Tags shall be securely attached to steams of valves with chain and "S" hooks.

1.25 IDENTIFICATION

- A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.
- B. Markers shall be snap-on type as manufactured by Craftmark, Fort Worth, TX or Seton Nameplate Corp., New Haven, CT (Setmark System), or Bunting Stamp Co. Inc., Pittsburgh, PA or approved equal. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of U.L. approved, self-extinguishing plastic. When the pipe, including insulation (if any), is 4 inches diameter and larger, markers shall be strap-on type. For piping located outdoors, all markers shall be strap-on type for <u>all</u> pipe diameters, and straps shall be of stainless steel. Markers for medical gas piping shall be by means of metal tags, stenciling, stamping or with adhesive markers, in a manner which is not readily removable. *
- C. Provide identification for piping, ductwork and electrical conduits.
- D. All piping and ductwork shall be labeled, whether concealed above ceilings or exposed. Labels shall be installed at intervals no greater than 15 feet (unless noted otherwise) and shall be installed after every turn or elbow, and in every room. Where concealed above ceilings, a minimum of one (1) label shall occur above each room. Due to various above ceiling visual obstructions, the Engineer reserves the right to request additional labels in order to ensure visibility, at no additional cost to the Owner.
- E. Pipe shall be lettered and valves tagged in accordance with the schedule below. Lettering shall be located near each valve and branch connection and at intervals of not over 20 feet (10 feet on fire lines, and at least once in each room and in each story traversed for medical gas piping*) on straight runs of pipe. Provide flow arrows on all piping and ductwork labels. Adjacent to the legend, stencil the size of the pipe, conduit or ductwork. Letter Colors are as follows: Yellow with black letters, green with white letters, blue with white letters and red with white letters.

LABEL AND VALVE TAG SCHEDULE					
Service	Label Designation	Color	Tag Designation		
Cold Water	Cold Water	Green	C.W.		
Fire Standpipe	Fire Standpipe	Red	FSP		
Sprinkler	Sprinkler	Red	SP		
Safety Valve Discharge	Safety V. Disch.	Yellow	S.V.D.		
Relief Vent	Relief V.	Yellow			

F. Tanks, pumps, fans and other equipment shall be labeled to show the number, if any, and service.

- G. Exposed conduits for alarm and communication systems shall be banded at intervals of not over 10 feet. Bands shall be of the following colors:
- H. HIGH VOLTAGE" in black letters two inches high, stenciled at 10-foot intervals over a continuous painted orange background.
- I. Except where other means of identification are specified, electric cabinets, switchboards, motor control centers, transformers, system control boards, disconnecting switches, remote control switches, individual motor starters and motor control pushbutton stations shall be stenciled to show the service and number, if any, of the equipment controlled, as appropriate. Panelboards and other electrical equipment located in finished areas, such as offices, shall have the identification placed on the inside of the cabinet doors.
- J. Cabinets housing 460Y/265 Volt panelboards shall have "460/265 volt" stenciled in 2-inch high yellow letters on the inside of the cabinet doors.
- K. Cabinet housing emergency lighting panelboards shall have the word "EMERGENCY" stenciled in 2-inch high red letters on the outside of the cabinet, in addition to other lettering required above.
- L. The bolted covers of housings for disconnecting switches or links in bus ducts between network transformers and switchboards shall be lettered to identify the equipment within.
- M. Serial numbers shall be stenciled on the tanks and covers of transformers having their nameplates attached to the high voltage switch chamber covers.
- N. Signs for Equipment Controlled through the BAS: For all fans, pumps and other motor driven equipment with start/stop control through the BAS provide a red surface, white core laminated plastic sign with incised letters, permanently mounted on the equipment indicating, "Warning. This Equipment Is Started and Stopped Automatically from the Building Automation System."

1.26 COORDINATION OF MECHANICAL AND ELECTRICAL EQUIPMENT LOCATIONS

- A. The space equal to the width and depth plus 6" on either side of the electrical equipment and extending to a height of 6 feet above the equipment or the structural ceiling, whichever is lower, shall be dedicated to the electrical installation and shall not contain piping ducts or other equipment foreign to the electrical installation. Electrical equipment shall include switchboards, panelboards and motor control centers.
- B. Examine the drawings, and in cooperation with the Electrical Work confirm the final location of all electrical equipment to be installed in the vicinity of piping and ductwork. Plan and arrange all overhead piping no closer than three feet, and ductwork no closer than one foot from a vertical line to electric switchboards, panelboards, motor control centers or similar equipment.

- C. Where the installation of piping or ductwork does not comply with the requirements of foregoing paragraphs, where feasible, the piping and ductwork shall be relocated. Installation of a barrier between piping and ductwork and electrical equipment below will be considered if located more than six feet above the electrical equipment. Refer to NEC Article 110. If piping ductwork and foreign equipment cannot be located outside of the space dedicated to electrical installation, a drip pan as described below can be considered to protect the electrical equipment from condensation, leaks or breaks, but shall be approved by the Engineer after the Contractor has demonstrated that piping, ductwork and/or equipment cannot be installed to avoid this space.
- D. Provide galvanized steel gutters as follows:
 - 1. Provide a gutter of 18 gauge galvanized steel under every pipe and roof drain which is within 2'-0" (two feet) of being vertically over any motor, transformer, electrical controllers, switchboards, panelboards, generator or the like.
 - 2. Also provide drip pans below any drain piping located above the ceiling in food preparation or storage areas. In such areas, if piping also runs vertical through the floor slab above, then fully enclose the vertical portion with an extension of said drip pan and fully seal this enclosure to the underside of the floor slab above.
 - 3. Each gutter shall be made watertight, properly suspended; and carefully pitched to a convenient point for draining. Provide a ³/₄ inch drain, to nearest floor drain or slopsink.
 - 4. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 3'-0" in all directions beyond the motor, over which such piping has to run.

1.27 TOOLS

A. All special tools for proper operation and maintenance of the equipment shall be delivered to the Owner's representative and a receipt requested for same at no additional cost to the Owner.

1.28 QUIET OPERATION

A. All equipment and material shall operate under all conditions of load without any sound or vibration which in the opinion of the Architect is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Architect, eliminate same in a manner reviewed by the Architect.

1.29 RUBBISH REMOVAL

- A. See to it that the project is at all times maintained free of all rubbish, rubble, waste material, packaging materials, etc. accumulating as a result of his work. Assume responsibility for the cleaning up of packaging removed from materials and equipment furnished by other trades for the installation. Note that final acceptance of the work is contingent upon the project being free of all excess and waste materials resulting from the work.
- B. Clean all parts of the building exterior spaces and adjacent roads, sidewalks, and pavement, free from material and debris resulting from the execution of the work. Debris resulting from interior construction shall be neatly stacked on each floor near elevators, material hoists and rubbish chutes, as directed by the Architect or his representative. Debris resulting from exterior construction shall be similarly stacked. All debris so stacked will be removed under other

Sections. Excess material will not be permitted to accumulate either on the interior, exterior or on sidewalk.

1.30 CLEANING, PIPING, DUCTS AND EQUIPMENT

- A. Clean all piping, ducts, and equipment of all foreign substances inside and out before being placed in operation.
- B. If any part of a system should be stopped by foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired when the system is reconnected at no additional cost to the Owner.
- C. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

1.31 DELIVERY OF MATERIAL

- A. Deliver the material and store same in spaces indicated by the Architect and assume full responsibility for damage to structure caused by any overloading of the material.
- 1.32 CUTTING AND PATCHING (IN EXISTING CONSTRUCTION)
 - A. All cutting and patching shall be done under another Section. Furnish the sizes and locations of all chases and openings required for the installation for his work before the walls, floors and partitions are built.
 - B. As a general rule, chases, shafts and wall openings as shown on the Drawings will be provided for most of the ducts and piping, but promptly arrange with the Construction Supervisor for additional openings should any be required for the work.
 - C. Provide the labor and materials for all work included under the Contract or Subcontract in ample time and sufficient quantities so that all of the work of the Contract or Subcontract may be installed in proper sequence to avoid unnecessary cutting of the floors and walls.
 - D. Any cutting and patching required due to the failure to comply with the above provisions, shall be done at no extra cost to Owner. Such cutting and patching shall be done under Division One, as approved by the Architect.
 - E. Where existing piping or ductwork insulation are damaged by the requirements of the work, replace all damaged insulation to match existing.
 - F. Refer to Paragraph: "Sleeves, Inserts and Anchor Bolts" for additional requirements.
 - G. Prior to performing any core drilling or cutting of existing floor or roof slabs, Contractor shall perform a scan of the slab using ground penetrating radar (GPR) to confirm that there are no existing conduits or pipes in area of core drill or cutting of slab.

1.33 ALTERATIONS

- A. When new work and alterations render equipment, piping and ductwork useless, such equipment, piping and ductwork when exposed to view, shall be removed and connections thereof to lines or ducts remaining shall be properly capped or plugged and left in construction. If construction, such as hung ceiling, furred beam, chase, etc., is opened up and removed during the course of the construction, the useless pipe and ducts therein shall be treated as though exposed to view. When required to accommodate new work, useless piping and ductwork concealed in construction shall be treated as though exposed to view.
- B. When existing piping and duct systems, at points of connection to new work or in rerouting are found defective, such defective portions shall be removed and replaced with new materials without cost to the Owner.
- C. Provide temporary supports where required.
- D. Where alterations reveal piping, ductwork, conduit circuits, wiring, and accessories that must necessarily remain in service, same shall be rerouted, replaced or altered as required to make same completely concealed in the new work at no additional cost to the Owner.
- E. Where existing pipig or ductwork insulation is damaged by the requirements of the work, replace all damaged insulation to match existing.

1.34 PAINTING

- A. All finish painting of MEP/FP work shall be provided as specified below.
- B. Painting Schedule
 - 1. No on-site painting is required on the following items unless specifically indicated otherwise:
 - a. Stainless steel or aluminum sheet metal.
 - b. Stainless steel piping.
 - c. Piping or ductwork to be insulated.
 - d. Insulation on piping or ductwork in unfinished spaces or concealed.
 - e. Insulated piping covered with stainless steel, aluminum or all service jacketing, unless otherwise specified.
 - f. Insulated piping in walk-in and non-walk-in tunnels.
 - g. Mechanical equipment with a factory applied baked-on enamel finish, not specified to be insulated or provided with an enameled steel insulated jacket.
 - h. Insulated equipment or smokestacks specified or noted on the Drawings to be covered with stainless steel or aluminum sheet metal jacketing.
 - i. Factory fabricated multi-wall metal smoke flue piping.
 - j. Concealed piping.
 - 2. Paint the following:
 - a. Uninsulated Black Steel Piping:
 - 1) Exposed in Finished Rooms or Finished Spaces: 1 coat of primer and 2 coats of latex semi-gloss enamel.
 - 2) Exposed in Unfinished Rooms, or Unfinished Spaces, or in Pipe Shafts: 1 coat of primer and 2 coats of finish.

- 3) Exposed Exterior to a Building: 1 coat of primer and 2 coats of exterior acrylic latex gloss enamel.
- b. Uninsulated Galvanized, Cast Iron, Brass or Copper Piping:
 - 1) Exposed in Finished Rooms or Finished Spaces: 1 coat of primer and 2 coats of latex semi-gloss enamel.
 - 2) Exposed Exterior to a Building: 1 coat of primer and 2 coats of exterior acrylic latex gloss enamel.
 - 3) Exposed in Unfinished Rooms or Unfinished Spaces: 1 coat of primer and 2 coats of finish.
- c. Piping in floor trenches after fabrication: primer and finish.
- d. Uninsulated Mechanical Equipment:
 - 1) Furnished with a Factory Applied Prime Coat Finish: 2 coats of acrylic latex semi-gloss enamel. No primer required.
- e. Vessels, Tanks, and Like Equipment Specified to be Insulated: 1 coat of corrosion resistant paint, prior to the application of insulation.
- f. Uninsulated Exposed Iron and Steel Surfaces of Boilers, Including the Steel Casing, Buck Stays, Boiler Fronts, Castings, Smoke Pipes, Breeching and the Exposed Surfaces of all Other Iron or Steel Installed in Conjunction with Boiler Work: 1 coat of primer and 2 coats of heat resistant enamel.
- g. Insulated exposed piping in Mechanical Rooms, Boiler Plants, Chiller Plants and Generator Rooms (except on segments of pipe which are clad in aluminum).
- h. Hangers, Supports and Accessories:
 - 1) Exposed: Paint to match adjacent piping, pipe insulation or ductwork insulation.
 - 2) All black steel or iron pipe hangers, rods, inserts, brackets and accessories for supporting piping systems and duct systems: 1 coat of primer and 2 coats of latex semi-gloss enamel. Paint black steel hanger rods, threaded on the job site, with a primer immediately after installation.
 - 3) Metal Fabrications in Finished Spaces: Paint over shop coat with 2 coats of alkyd gloss enamel.
- i. Sheet Metal Work:
 - Exposed Black Iron, Galvanized Iron, and Aluminum, including Hangers for Insulated and Uninsulated Ductwork, in Finished Rooms, Finished Spaces or Exterior to a Building: 1 coat of primer and 2 coats of latex semi-gloss enamel.
 - 2) Jacketing on Exposed Insulated Ductwork in Finished Rooms and Finished Spaces: 2 coats of latex semi-gloss enamel. No primer required.
- j. Uninsulated Exposed Valves, Flanges, Unions and Irregular Surfaces in Piping Systems Installed in Finished Rooms or Finished Spaces: 1 coat of primer and 1 coat of black heat resistant enamel.
- C. Color Coding:
 - 1. Apply finish paints of colors indicated opposite the various items listed below where such items are installed in Mechanical Equipment Rooms, Machine Rooms, Boiler Rooms, Penthouse Mechanical Equipment Rooms:
 - 2. Piping, Exposed Bare and Insulated on Unfinished Spaces and Rooms:
 - Piping Not Listed Above: Color code by classification as follows:
 a. Fire ProtectionRed
 - 4. Equipment Bare and Insulated (Except Factory Painted): Grey.

- D. The inside of all ductwork where visible through openings shall be painted with two prime coats of flat black paint.
- E. Nameplates on all equipment shall be cleaned and left free of paint. Where equipment is to be painted, the Contractor shall carefully mask of all equipment nameplates and data tags prior to application of paint. Such masking shall be removed after paint has dried.
- F. All flashing shall be painted with two coats of waterproof black asphaltum varnish.
- 1.35 LUBRICATION
 - A. Assume responsibility that all rotating equipment is properly lubricated as soon as it is connected by the Electrical Subcontractor before operation of this equipment is started. Assume responsibility for any damage to any equipment that is turned on without previously having been oiled or greased when connected up.
- 1.36 TESTS
 - A. All piping, wiring, and equipment shall be tested as specified under the various sections of the work. Labor, materials, instruments and power required for testing shall be furnished under the particular Section of the Specifications.
 - B. Tests shall be performed satisfaction of the Architect. The Architect will be present at such test, when he deems necessary and such other parties as may have legal jurisdiction.
 - C. Pressure tests shall be applied to piping only before connection of equipment and installation of insulation. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their rating.
 - D. All defective work shall be promptly repaired or replaced, and the tests shall be repeated until the particular system and component parts thereof receive the review of the Architect.
 - E. Any damages resulting from tests shall be repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Architect.
 - F. The duration of tests shall be as determined by all authorities having jurisdiction, but in no case less than the time prescribed in each Section of the Specifications.
 - G. Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning, and performance, the latter shall be operated simultaneously with the equipment or system being tested.
 - H. The electrical work shall include providing any assistance (such as removal of switchboard and panelboard trims and covers, pull and junction box covers, etc.) deemed necessary by the Architect to check compliance with the Drawings and Specifications.

1.37 OPERATING INSTRUCTIONS

- A. Two months prior to the completion of all work and the final inspection of the installation by the Owner, five (5) copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Architect for review. All written material contained in the manual shall be typewritten or printed.
- B. The Manual shall contain the following items:

Table of Contents (Plumbing, HVAC and Electrical)

- I. Introduction Explanation of Manual and its use.
- II. Description of Systems
 - 1. Complete schematic drawings of all systems.
 - 2. Functional and sequential description of all systems.
 - 3. Relationship of system where applicable to the supervisory data system.
- III. Systems Operation
 - 1. Start-up procedures.
 - 2. Shut-down procedures.
 - 3. Reset and adjustment and balancing procedures.
 - 4. Seasonal operation.
 - 5. All posted instruction charts.
- IV. Maintenance
 - 1. Cleaning and replacement lines, components, filters, strainers, ducts, fans, etc.
 - 2. Lubrication.
 - 3. Charging and filling.
 - 4. Purging and draining.
 - 5. Systems trouble shooting charts.
 - 6. Instruments checking and calibration.
 - 7. Procedures for checking out functions with remote (Supervisory Data Console) indication and control.
 - 8. Recommended list of spare parts.
- V. Listing of Manufacturers
- VI. Manufacturer's <u>Data</u> (Where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation).
 - 1. Description Literature, drawings, illustrations, certified performance charts, technical data, etc.
 - 2. Operation.
 - 3. Maintenance including complete trouble-shooting charts.
 - 4. Parts List.
 - 5. Names, addresses and telephone numbers of local recommended repair and service companies.
 - 6. Guarantee data.

7. Model No. and Serial No. of all equipment.

1.38 INSTRUCTION OF OWNER'S PERSONNEL

- A. After completion of all work and all tests and at such time as designated by the Architect, provide the necessary skilled personnel to operate the entire installation for a period of four (4) hours.
- B. During the operating period, fully instruct the Owner's representative in the complete operation, adjustment, and maintenance of the entire installation.

1.39 GUARANTEE

- A. The Contractor guarantees by his acceptance of the Contract that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified, and that if during a period of one year from date of completion and acceptance of work, one (1) entire heating and cooling season or eighteen (18) months from date of shipment, whichever is <u>later</u>, any such defects in workmanship, material or performance. He shall immediately replace, repair, or otherwise correct the defect or deficiency, including parts, labor and travel time, without cost to the Owner within a reasonable time. Notify the Architect in writing of the time required to do work.
- B. Replace or repair to the satisfaction of the Owner any and all damage done to the building or its contents or to the work of other trades in consequence of work performed in fulfilling guarantee.
- C. This Article is general in nature and will not waive stipulations of other claims which specify guarantee periods in excess of one (1) year.
- D. In the event default on this Guarantee, the Owner may have such work done as required and charge the cost to the Contractor.
- E. The date of acceptance shall be the date of final payment by the Owner or notice of acceptance by the Owner, whichever is later.

1.40 OPERATION PRIOR TO COMPLETION

- A. The Owner may require operation of parts or all of the installation for the beneficial occupancy prior to final completion and acceptance of the building.
- B. The operation shall not be construed to mean acceptance of the work by the Engineer for the Owner. The Owner will furnish supervisory personnel to direct operation of the entire system and the Contractor shall continue to assume this responsibility until final acceptance.

1.41 INSTALLATION OF MOTORS AND CONTROL EQUIPMENT

- A. The Electrical Contractor shall furnish and install power wiring for all electrical devices, individual motor starters furnished to him at the job site by other trades.
- B. The HVAC Contractor shall provide all wiring for the Automatic Temperature Controls, Combustion Control, Burner and Boiler Control, and condenser water treatment controls, except as otherwise specified herein. This shall include low voltage wiring and 120 VAC power wiring unless electrical drawings show 120 VAC feed for the ATC panels.

- C. The Electrical Contractor shall, except where otherwise noted, provide wiring for all Plumbing and Sprinkler Control and Alarm Systems. The Plumbing Contractor shall provide all devices in connection with same.
- D. The Electrical Contractor shall provide all low voltage wiring and 120 VAC power to all auto smoke and combination fire/smoke dampers, which shall be controlled from the Fire Alarm Panel.
- E. For single phase motors which are not interlocked with other motors and which have temperature control or motor control devices in the power circuit, furnishing of control devices, installation and wiring shall be by the Electrical Contractor.
- F. For all HVAC 3-phase motors or HVAC equipment, temperature control wiring, motor control wiring and associated interlocks shall be provided by the HVAC Contractor, including the installation of all control devices. For all plumbing and sprinkler 3-phase motors, equipment control wiring, motor control wiring and associated interlocks shall be provided by the electrical Contractor, including the installation of all control devices.
- G. All wiring between fire/smoke dampers and fire alarm panel shall be by the Electrical Contractor. All wiring between the fire alarm panel and air handling equipment for automatic fire alarm shutdown shall be by the Electrical Contractor. All wiring for operation of smoke purge fan and associated floor dampers shall be by the Electrical Contractor.
- H. Electrically operated equipment supplied by other trades, which are to be installed and wired by the Electrical Contractor, shall be delivered with detailed instructions for their installation and wiring in sufficient time and proper sequence to meet the work schedule.
- I. Each contractor shall furnish all electrical motors, starters and other motor control devices for motor driven equipment required for the work. In his work, the Electrical Contractor shall provide the code required disconnect switches for all motors, except where otherwise noted. The setting of all motors, required for mechanical equipment, including unmounted motors, shall be done as part of the mechanical work.
- J. If a motor is replaced (even with the same horsepower) a new starter shall be provided for that motor.
- K. Equipment which includes a group of electrical control devices mounted in a single enclosure or on a common base with equipment, shall be supplied completely wired as a unit with terminal boxes or leads ready for external wiring.
- L. All electrical items furnished and/or installed as part of the mechanical work shall conform to NEMA Standards, to the requirements of the National Fire Protection Association, and to the requirements of any local authority having jurisdiction. Any field modifications required to insure such conformance shall be included as part of the mechanical work.
- M. The furnishing of floor mounted motor starting equipment shall include the purchase and delivery of channel sills for mounting.
- N. Whether or not shown on the drawings, the Electrical Contractor shall furnish and install a local disconnect switch at each motor which is not in sight from the controller location.

- O. The supplying of any and all "field instruction" diagrams deemed necessary by the Architect for the complete delineation of electrical wiring for mechanical equipment shall be included as part of the mechanical work.
- P. The drawings describing the electrical or the mechanical work may include explanatory wiring diagrams indicating the function intended for the motor control circuits of certain motors. The "field instructions" wiring diagrams required as part of the mechanical work shall conform to these intended functions.
- Q. Electric power required for control circuits shall be taken by the HVAC Contractor (Subcontractor) from the electric circuits in the junction boxes left by the Electrical Contractor (Subcontractor) for ATC use as indicated on the electrical drawings. Where junction boxes are not indicated on the electrical drawings, the HVAC Contractor (Subcontractor) shall run power wiring to the nearest electrical panel with spare circuits and provide required circuit breaker. The ATC Contractor (Subcontractor) shall provide and wire all required transformers for the ATC system.
- R. The HVAC Contractor (Subcontractor) shall coordinate the control systems with unit ventilator and VAV terminal box manufacturers. The HVAC Contractor (Subcontractor) shall provide all necessary control equipment which is not provided by the unit manufacturer to complete the sequence of operation as specified herein. The HVAC Contractor (Subcontractor) shall provide all field wiring.

1.42 ELECTRIC MOTORS

- A. Each Contractor shall provide all electric motors required for driving all motor driven equipment required to be furnished under his Section of the Specification.
- B. All motors shall be designed for 3-phase, 60 cycle alternating current operation with 200 volts across the motor terminals, except that, unless otherwise specified herein, all motors ¹/₃ HP and smaller shall be designed for single phase, 60 cycle alternating current at 120 volts across the terminals. Before ordering motors, ascertain the actual voltages and other current characteristics that will be available and permissible for each motor. Report the same in writing to the Architect and obtain approval before ordering motors. The designation of current characteristics in these Specifications does not relieve the responsibility for ascertaining the actual conditions of electric service available for each motor or for the proper operation of all motors under the actual conditions.
- C. The speed, horsepower, type and other essential data for each motor, if not given under paragraphs describing the various motor driven apparatus, or in schedules on the drawings shall be obtained from the manufacturer of the respective apparatus and shall be submitted to the Architect for his review. All two speed motors shall be single winding type.
- D. Provide oversized motor junction box for 2 speed motors.
- E. All motors shall be built in accordance with the latest rules of NEMA, of the Institute of Electrical and Electronic Engineers and also as hereinafter specified.
- F. Motors ½ HP and larger shall have Class B insulation. All motors shall be rated for continuous duty and shall be designed for temperature rises not to exceed 55°C for fully enclosed type, 55°C

for splashproof types and 40°C for all other motors excepting as otherwise specified herein. Motors shall be capable of withstanding momentary overloads of fifty (50%) without injurious heating. They shall operate without excessive heating, flashing or sparking under any conditions within the specified capacity of load and speed. All motors shall operate quietly and shall be replaced if, in the Architect's opinion, they do not do so. All motors which are in the airstream of air conditioning units, shall be totally enclosed type.

- G. Motors ¹/₂ HP and larger shall have ball or roller bearings with pressure grease lubrication, except where otherwise noted.
- H. Direct connected motors shall be furnished without an adjustable base. All motors connected to driven equipment by belt shall be furnished with adjustable sliding bases, except fractional motors with slotted mounting holes.
- I. All motor leads shall be permanently identified and supplied with connectors.
- J. Motors shall have nameplates giving manufacturer's name, serial number, horsepower, speed, voltage, phase and current characteristics.
- K. The insulation resistance between stator conductors and frames of motors at the time of final inspection shall be not less than one-half megohm.
- L. All motors shall be of the proper type for the duty and shall have sufficient torque to start and run the equipment to which they are connected and starting currents and running currents shall not exceed the limits imposed by the laws or rules and regulations of the public authorities having jurisdiction or of the electrical utility company. All motors shall have sufficient horsepower capacity and rated duty to operate the apparatus to which they are connected so as to give the speeds and performances specified, but the horsepower shall be in no case less than that stated herein or shown on the drawings. A schedule giving the characteristics of the motors proposed for each type of service shall be submitted to the Architect for approval.
- M. The maximum full load speed of each direct connected motor shall be suitable for the equipment it drives.
- N. Except where V-belt drive is specified, the fan wheels for ventilating fans shall be mounted on the motor shafts, which shall be designed for this duty.
- O. All motors except motors furnished as an integral part of equipment and factory installed on the equipment, shall be of same manufacture.
- P. Polyphase motors shall be squirrel cage induction high efficiency energy saver type, suitable for the starting torque and current requirements.
- Q. Single phase motors shall be of the capacitor start induction run or split phase type as required for proper operation of the driven equipment.
- R. Where used with VFD equipment, motor shall be rated for inverter service without excessive noise, vibration, hum or damage.

- S. All motors operated on variable frequency drives (VFD) shall be equipped with a maintenancefree, conductive microfiber, shaft grounding ring with a minimum of two rows of circumferential microfibers to discharge electric shaft currents within the motor and/or its bearings. Motors up to 100 HP shall be provided with a minimum of one shaft grounding ring installed either on the drive end or non-drive end. Motors over 100 HP shall be provided with an insulated bearing on the non-drive end and a shaft grounding ring on the drive end of the motor. Grounding rings shall be provided by the motor manufacturer or Contractor and shall be installed in accordance with the manufacturer's recommendations.
- T. The efficiency of energy efficient motors shall be verified in accordance with NEMA standard MG1-12.53a. Submittals and shop drawings for all equipment shall state the motor efficiency and shall meet or exceed that listed in the table below. Minimum acceptable efficiency shall be as follows:

Minimum Electric Motor Efficiencies									
Open Drip-Proof (ODP)				Totally Enclosed Fan Cooled (TEFC)					
Motor		Speed (rpm)			Speed (rpm)				
Size (hp)	1200	1800 3600 Size (hp)		1200	1800	3600			
1	82.5%	85.5%	77.0%	1	82.5%	85.5%	77.0%		
1.5	86.5%	86.5%	84.0%	1.5	87.5%	86.5%	84.0%		
2	87.5%	86.5%	85.5%	2	88.5%	86.5%	85.5%		
3	88.5%	89.5%	85.5%	3	89.5%	89.5%	86.5%		
5	89.5%	89.5%	86.5%	5	89.5%	89.5%	88.5%		
7.5	90.2%	91.0%	88.5%	7.5	91.0%	91.7%	89.5%		
10	91.7%	91.7%	89.5%	10	91.0%	91.7%	90.2%		
15	91.7%	93.0%	90.2%	15	91.7%	92.4%	91.0%		
20	92.4%	93.0%	91.0%	20	91.7%	93.0%	91.0%		
25	93.0%	93.6%	91.7%	25	93.0%	93.6%	91.7%		
30	93.6%	94.1%	91.7%	30	93.0%	93.6%	91.7%		
40	94.1%	94.1%	92.4%	40	94.1%	94.1%	92.4%		
50	94.1%	94.5%	93.0%	50	94.1%	94.5%	93.0%		
60	94.5%	95.0%	93.6%	60	94.5%	95.0%	93.6%		
75	94.5%	95.0%	93.6%	75	94.5%	95.4%	93.6%		
100	95.0%	95.4%	93.6%	100	95.0%	95.4%	94.1%		
125	95.0%	95.4%	94.1%	125	95.0%	95.4%	95.0%		
150	95.4%	95.8%	94.1%	150	95.8%	95.8%	95.0%		
200	95.4%	95.8%	95.0%	200	95.8%	96.2%	95.4%		

1.43 INDIVIDUAL MOTOR STARTERS

A. For single-phase motors ¹/₃ HP or smaller, starters shall be manual, 120 volts, single-pole or 240 volts, 2-pole with thermal overload protection and pilot light. Where interlocking or automatic

control (other than for unit and cabinet heaters) is required, starters shall be combination circuit breaker and magnetic starter with pilot light.

- B. For 3-phase motors ½ HP and over, starters shall be full-voltage combination circuit breaker and magnetic across-the-line contactor, rated 208 or 480 volts, 3-pole. All magnetic starters shall have three thermal overloads.
- C. Unless otherwise specified, motors 25 HP and over, rated 200 volts and motors 50 HP and over, rated 460 volts shall be furnished with reduced voltage starters of the autotransformer closed transition type.
- D. For motors requiring electric interlocks, or automatic control features, starters shall be equipped with the necessary auxiliary relays and contacts to provide the control features desired. All starters shall be provided with "hand-off-auto" twist type switches mounted in cover. For two-speed motors, provide "high-low-off-auto" four position selector switch. Furnish adjustable 20-second time delay between high and low speeds for motors 10 HP and above.
- E. Electrical Control Devices
 - 1. Allen-Bradley[®] Electrical Control Devices are the basis of design,
 - 2. The electrical control devices shall include:
 - a. Pilot Devices
 - b. Relays and Timers
 - c. Miniature Circuit Breakers
 - d. Terminal Blocks and Fuse Blocks
 - e. Alarms and Signals
 - f. Power Supplies
 - g. Panel-mounted disconnect switches.
 - 3. The electrical control devices shall be interoperable with standard electrical equipment.
- F. Pilot Devices
 - 1. 30.5 MM Push Buttons, Selector Switches and Pilot Lights
 - a. 30.5 mm push buttons, selector switches and pilot lights shall be Allen-Bradley heavy industrial Type 4/13 watertight/oiltight metal [Bulletin 800T].
 - b. 30.5 mm push buttons, selector switches and pilot lights shall provide EN/IEC 60529 IP66/65 degree of protection.
 - c. 30.5 mm push buttons, selector switches and pilot lights shall have electrical ratings of:
 - 1) Dielectric strength 2200V for 1 minute [or 300V for 1 minute (Logic Reed)]
 - 2) Electrical design life cycles 10,000,000 at max. rated load [200,000 at max rated load (Logic Reed)]
 - d. 30.5 mm push buttons, selector switches and pilot lights shall have an operating range of -40 to 131°F (-40 to 55°C).
 - e. Illuminated devices shall offer universal LED that accepts 12 to 130 VAC/VDC voltage input.
 - f. 30.5 mm push buttons shall have a diaphragm seal for protection from liquids, particles, and corrosive agents.
 - g. 30.5 mm selector switches shall incorporate a positive detent to prevent the switch from hanging up between positions.
 - 2. Potentiometer Devices

- a. 30.5 mm potentiometer devices shall be Allen-Bradley heavy industrial Type 4/13 watertight/oiltight metal [Bulletin 800T].
- b. Potentiometer devices shall be rated for 300 VAC/VDC, 2 W maximum (6 VDC minimum):
 - 1) Mechanical design life Min. 25,000 cycles
 - 2) Rotational torque -3 to 12 in-oz
 - 3) Stopping torque Min. 12 in-lb
- c. Potentiometer devices shall have single-turn operation, 312 degree rotation.
- d. Potentiometer devices shall be finger safe.
- 3. Control Stations
 - a. Control stations shall provide Allen-Bradley heavy industrial 30.5 mm push button(s) or selector switch with appropriate contact action, button/lever type and color/legend marking. Devices shall be Type 4/13 watertight/oiltight metal [Bulletin 800T].
 - b. Control stations shall be constructed of diecast aluminum.
- G. Relays And Timers

1.

- Relays Time Delay
 - a. Allen-Bradley time delay relays [Bulletin 700-HT] shall mount on tube-type bases with pin-style socket mounting.
 - b. Time delay relays shall have 10A, B300, DPDT contact ratings and coil voltages as shown on drawings.
 - c. Time delay relays shall have adjustable timing ranges [or fixed timing ranges to avoid tampering]. Timing ranges shall be as shown on drawings.
- 2. Relays General Purpose
 - a. Allen-Bradley general purpose relays [Bulletin 700-HA] shall have tube-base/Octal 8-pin [or 11-pin] terminals and ON/OFF flag indicators.
 - b. General purpose relay contacts shall be silver nickel [or silver nickel bifurcated or gold-plated bifurcated] and have 10A, B300, DPDT [or 3PDT] ratings. Coil voltages shall be as shown on drawings.
 - c. General purpose relays shall have an electrical schematic on the faceplate, a clear cover for visual inspection and snap-in marker ability.
 - d. General purpose relays shall have LED status indicators, push-to-test and manual override.
- 3. Relays Miniature
 - a. Allen-Bradley miniature relays [Bulletin 700-HC] shall be square-base, 4-pole, plug-in type with blade-style terminals and ON/OFF flag indicators.
 - b. Miniature relay contacts shall be silver nickel [or gold-plated silver nickel] and have 7A [or 10A], DPDT [or 4PDT] ratings. Coil voltages shall be as shown on drawings.
 - c. Miniature relays shall have an electrical schematic on the faceplate and a clear cover for visual inspection.
 - d. Miniature relays shall have LED status indicators and push-to-test button with incorporated manual override lever.
- 4. Relays Industrial-Type
 - a. Allen-Bradley industrial-type relays [Bulletin 700-P] shall be ruggedly constructed (10 million operation mechanical life), 2-pole [or 4-pole, 8-pole, 12-pole], configured N.O./N.C. as shown on drawings, and panel- [or strip-, DIN rail-] mounted.

- b. Industrial-type relays shall be finger-safe.
- c. Industrial-type relay contacts shall be silver nickel with a double-break and bifurcated design and 10A, A600 rating for AC [5A, P600 rating for DC].
- d. Accessories shall include adder decks, time delay, latching, surge suppressors and/or mounting strip.
- 5. Timers Solid-State
 - a. Allen-Bradley solid-state timers [Bulletin 700-FS] shall be DIN rail-mounted.
 - b. The solid-state timer contacts shall be available as SPDT or DPDT, 8A.
 - c. Solid-state timers shall be available with On-Delay, Off-Delay, On- and Off-Delay, One-Shot and Flasher operating modes as required on the drawings.
 - d. Solid-state timers shall have coil surge protection and adjustable timing ranges of 0.05 seconds to 60 hours as shown on drawings.
- 6. Timers Programmable
 - a. Allen-Bradley programmable timers [Bulletin 700-HX] shall be digital timing relays with LCD display and shall be socket- [or panel-] mounted.
 - b. Programmable timer contacts shall be SPDT, rated 5A, B300.
 - c. Programmable timer panel surface shall offer Type 4X/IP66 protection.
 - d. Programmable timers shall be configurable for Signal On-Delay, Power On-Delay, Off-Delay, Repeat Cycle, One-Shot and Cumulative operating modes as required on the drawings.
 - e. Programmable timers shall have timing ranges of 0.000 seconds to 9999 hours, depending on selected mode and as shown on drawings.
- H. Miniature Circuit Breakers
 - 1. Miniature circuit breakers shall be Allen-Bradley Circuit Breakers [Bulletin 1489-M].
 - 2. Miniature circuit breakers shall be thermal-magnetic, current-limiting type, sized as specified on the drawings:
 - a. 0.5A to 63A current rating
 - b. 1-, 2- or 3-pole
 - c. Type C or Type D tripping characteristic
 - 3. Miniature circuit breakers shall be UL Listed (E197878), CSA Certified (259391), CE Marked, VDE and CCC Certified and RoHS Compliant. Standards compliances shall include:
 - a. UL 489
 - b. CSA C22.2, No. 5.1
 - c. EN 60947-2
 - d. GB 14048.2
 - 4. Miniature circuit breakers shall be rated for:
 - a. Voltage Max. 480Y/277 VAC (UL/CSA); U_e 230/400 VAC (IEC)
 - b. Interrupting capacity 10 kA (UL/CSA); 15 kA (IEC)
 - 5. Housing shall satisfy Insulation Group II/RAL 7035, shall have IP20 finger-safe design, shall be suitable for DIN rail mounting and shall include status indicator window and scratch- and solvent-resistant printing.
 - 6. Miniature circuit breakers shall support reversible line and load connections and shall have dual terminals that:
 - a. Connect up to 4 wires, or 2 wires and a bus bar.
 - b. Clamp from both sides.
 - c. Have a unique design that directs wires into openings to prevent wiring misses.

- 7. Miniature circuit breakers shall be compatible with UL 508 Listed bus bars, auxiliary contacts, signal contacts, shunt trips and toggle-mount lockout attachments.
- I. Terminal Blocks And Fuse Blocks
 - 1. Terminal Blocks Control, #22 to #8 AWG
 - a. Control terminal blocks shall be Allen-Bradley screw-type, feed-through [Bulletin 1492-J].
 - b. Control terminal blocks shall be certified:
 - 1) UR/CSA #22 to #8 AWG wire range, 50A maximum current, 600 VAC/VDC voltage rating
 - 2) IEC 6 mm² wire range, 41A maximum current, 800 VAC/VDC voltage rating
 - 3) ATEX 6 mm² (#20 to #10 AWG) wire range, 36A maximum current, 550 VAC/VDC voltage rating
 - c. Control terminal blocks shall have a snap-in card marking system.
 - 2. Terminal Blocks Power
 - a. Power terminal blocks shall be Allen-Bradley [Bulletin 1492-PD]:
 - 1) Open-style power distribution block with aluminum or copper connectors 3-pole [or 1-pole], rated at 600 VAC/VDC, 175 to 760A
 - b. Power terminal blocks shall be certified by UR, CSA and CE.
 - c. Wire ranges and tightening torques shall be labeled on the block.
 - d. Power terminal blocks shall have a write-on marking surface or marker retention feature.
 - 3. Fuse Blocks
 - a. Allen-Bradley fuse block kits [Bulletin 1491] shall be used for protection of transformers and control circuits capable of delivering no more than 200,000 RMS symmetrical amps, 600V maximum.
 - b. Fuse block kits shall be 1-pole, 2-pole or 3-pole.
 - c. Each pole shall have a fuse cover.
- J. Alarms and Signals
 - 1. Alarm Horn
 - a. The alarm horn shall be an Allen-Bradley High Performance Electronic Horn [Bulletin 855H] and shall have up to 4 stages and low current consumption.
 - b. The alarm horn shall have a UV-stable plastic housing and non-moving parts.
 - c. The alarm horn shall have an on-board microphone, 45 alarm tones selectable by DIP switch and fine volume control via potentiometer.
 - d. The alarm horn shall allow synchronized output in multi-horn installations and shall have the ability to replicate content to other devices (master/slave).
 - 2. Alarm Beacon
 - a. The alarm beacon shall be an Allen-Bradley [Bulletin 855B] with high-intensity, minimum 5-Joule Xenon, minimum 20-Watt Halogen or LED illumination as required on the drawings.
 - b. The alarm beacon shall have polycarbonate housing and lens, available in square or round configuration, and Type 4/4X/13, IP65/IP66 ingress rating as required on the drawings.
 - c. Flashing frequency shall be 1 Hz.
 - d. Alarm beacon lens colors shall be red, green, amber, blue, yellow or clear as required on the drawings.

3. Alarm Light Tower

- a. The alarm light tower shall consist of Allen-Bradley Control Tower[™] Stack Lights [Bulletin 854J or K], stacked 1 [or 2, 3, 4, 5] module(s) high and shall be surface-[or vertical-, quick-release-, pole-] mounted.
- b. The alarm light tower shall be 40 mm [or 60 mm] size and the terminal block shall be top-mounted on the base.
- c. The light modules shall be Type 4/4X/13, IP65 and are:
 - 1) LED (steady, flashing or strobe)
- d. The alarm light tower shall include a continuous (or pulsing) piezo [or transducer] sound module.
- e. The alarm light tower shall have a DeviceNet base.
- 4. Signal Alarm (Panel Mount)
 - a. The signal alarm shall be an Allen-Bradley Panel Mount Signaling Alarm [Bulletin 855P] in a 30 mm [or 45 mm, 65 mm] size, that mounts in a standard 22.5 mm hole.
 - b. The signal alarm shall have polycarbonate base and lens.
 - c. The signal alarm shall be combination sounder and LED
 - d. The signal alarm shall be rear-securing and finger-safe.
- K. Power Supplies
 - 1. Control Power Transformer
 - a. The control power transformer shall be an Allen-Bradley Global Control Transformer [Bulletin 1497], single-phase and sized as shown on drawings.
 - b. The control power transformer shall be epoxy encapsulated and shall offer EN 60-529 finger-safe protection.
 - c. The control transformer shall have a dual primary and secondary fuse block, prewired and top-mounted.
 - 2. 24 VDC Power Supplies
 - a. 24 VDC power supplies shall be Allen-Bradley [Bulletin 1606-XL] with active or passive PFC choke and input as shown in drawings [or auto-select input].
 - b. 24 VDC power supplies shall have low inrush current, and power supplies with greater than 100-Watt output shall incorporate a minimum 120% Power Burst design.
 - c. 24 VDC power supplies shall have NEC Class 2 "Limited Power" output.
 - 3. UPS
 - a. The UPS shall be an Allen-Bradley Industrial Uninterruptible Power Supply [Bulletin 1609-B/D] with 120 VAC input voltage and output power as shown on drawings.
 - b. The UPS shall be back-of-panel- [or DIN rail-] mounted.
 - c. The UPS shall provide:
 - 1) Surge protection to 380 Joules
 - 2) Overload protection, resulting in delayed shutdown at 110 to 130% and immediate shutdown at 130%
 - 3) Protection against output short on line over-current protection from premises branch circuit
 - 4) Protection against output short on battery, resulting in shutdown
 - 5) Thermal protection
 - d. The UPS shall have USB communications and software, integrated remote on/off and dry I/O contacts.

- e. The UPS shall have EtherNet/IP communications, expandable battery capacity and/or pure sine wave output.
- f. The UPS shall perform to 40°C [50°C, with hi-temp battery].
- L. Disconnect/breakers shall be external flange mounted type, all metal construction with painted handle, lockable, similar to Allen Bradley Model 1494F-M1-412. Plastic switches and twist type disconnects and breakers shall not be used.
- M. In addition to any auxiliary contacts required for interlocking purposes, each magnetic starter shall be equipped with one normally open auxiliary control circuit contact either for "sealing in" or as a spare for future use.
- N. Indicating lights shall be transformer or series resistor type. There shall be one red light for each single speed motor to indicate when motor is running. For multiple speed motors one indicating light for each speed shall be provided.
- O. The starter disconnecting means shall be circuit breakers. The external operating handle shall clearly indicate "ON" or "OFF" position of the switch and shall be interlocked with the door to require throwing the handle to the "OFF" position to open the door. The handle shall be arranged for locking both the door closed and the disconnect in the "OFF" position with up to 3 padlocks. Provide defeat device in cover to permit opening door in "ON" position.
- P. Circuit breakers in combination starter units shall be of the magnetic trip type with an adjustable trip setting for selecting instantaneous trip points of fault protection (motor circuit protector). Field adjustment of the instantaneous trip shall be performed by the Electrical Contractor. Select the trip setting at approximately 10 times the motor nameplate full-load current. If the circuit breaker trips on starting, incrementally increase the settings. In no case shall the trip setting exceed 13 times the motor full-load current.
- Q. Overload heaters shall be furnished for all starters and shall be sized in range of 115 to 125 percent of full load current. The motor starters shall be shipped with the overload heaters inside the compartment but not installed. The Electrical Contractor shall verify the ratings of the heater coils based on the motor nameplate data before installing the overloads. The Contractor supplying the starter shall replace any improperly selected heaters.
- R. A transformer shall be supplied in each starter unit for 120 volt control voltage. Transformer capacity shall be adequate to supply the holding coil requirements plus the solenoids, e-p switches, relays and other devices required to be controlled from the starter. A fuse shall be supplied in one secondary terminal of the control transformer. The other terminal shall be grounded to the housing of the starter. Fuses shall be also provided in the transformer primary leads per the National Electrical Code.
- S. All enclosures shall be NEMA Type 1 steel with hinged cover for general purpose indoor application, unless otherwise indicated. Enclosures shall be arranged for equipment or wall mounting. Weather resistant NEMA 3R steel enclosures shall be provided for all outdoor starters. All devices mounted on the outside of all enclosures shall be NEMA 4.
- T. Each starter shall be clearly identified by engraved nameplates after installation. The nameplates shall be plastic black plates with $\frac{1}{2}$ " high white letters and shall be securely fastened to starter with mounting screws made of non-corrosive metals.

- U. Stainless steel flush mounted starter and enclosures shall be provided for all starters located in the kitchen and dishwasher areas.
- V. All starters, except those furnished as an integral part of equipment and factory installed on the equipment, shall be of the same manufacturer.
- W. Starters shall be as manufactured by Westinghouse, General Electric, Square D, Eaton/Cutler-Hammer, or Allen-Bradley.
- X. Shop drawings shall be provided with dimensions, ratings, wiring diagrams and schedule of nameplates for approval prior to fabrication.
- Y. If a motor is replaced (even with the same horsepower), a new starter shall be provided for that motor.

1.44 MOTOR CONTROLLERS

- A. Motor controllers shall be defined as control devices such as pushbuttons, switches, etc. which are not mounted in starter cover, required for remote control of motors.
- B. Unless otherwise noted, motor controllers shall be housed in NEMA Type 1 general purpose steel enclosures. Outdoor controllers shall be provided with weather resistant NEMA Type 3R steel enclosures. Provide nameplate to indicate the motor with which they are associated.
- C. Provide reduced voltage starters for all motors 10 HP and larger and provide time delay for restart.
- D. The controllers to be installed in finished area shall be flush mounted.
- E. The Electrical Contractor shall install and provide wiring for motor controllers. The contractor providing the motor shall furnish the controllers.
- F. Unless otherwise noted, pushbuttons shall be of the normal duty, spring return momentary type.
- G. Selector switches and pushbuttons shall be equipped with nameplates indicating the function of each of their positions as noted in the list of electric motors and motor controls or shown on the drawings.
- H. Pilot light shall be transformer or series resistor type for operation at 120 V.
- I. Pilot lights shall be equipped with nameplates indicating the operating conditions they annunciate as noted in the list of electric motors and motor controls or shown on the drawings.
- J. Electrical Control Devices
 - 1. Allen-Bradley[®] Electrical Control Devices are the basis of design,
 - 2. The electrical control devices shall include:
 - a. Pilot Devices
 - b. Relays and Timers
 - c. Miniature Circuit Breakers
 - d. Terminal Blocks and Fuse Blocks
 - e. Alarms and Signals

- f. Power Supplies
- g. Panel-mounted disconnect switches
- 3. The electrical control devices shall be interoperable with standard electrical equipment.
- K. Pilot Devices
 - 1. 30.5 MM Push Buttons, Selector Switches And Pilot Lights
 - a. 30.5 mm push buttons, selector switches and pilot lights shall be Allen-Bradley heavy industrial Type 4/13 watertight/oiltight metal [Bulletin 800T].
 - b. 30.5 mm push buttons, selector switches and pilot lights shall provide EN/IEC 60529 IP66/65 degree of protection.
 - c. 30.5 mm push buttons, selector switches and pilot lights shall have electrical ratings of:
 - 1) Dielectric strength 2200V for 1 minute [or 300V for 1 minute (Logic Reed)]
 - 2) Electrical design life cycles 10,000,000 at max. rated load [200,000 at max rated load (Logic Reed)]
 - d. 30.5 mm push buttons, selector switches and pilot lights shall have an operating range of -40 to 131°F (-40 to 55°C).
 - e. Illuminated devices shall offer universal LED that accepts 12 to 130 VAC/VDC voltage input.
 - f. 30.5 mm push buttons shall have a diaphragm seal for protection from liquids, particles and corrosive agents.
 - g. 30.5 mm selector switches shall incorporate a positive detent to prevent the switch from hanging up between positions.
 - 2. Potentiometer Devices
 - a. 30.5 mm potentiometer devices shall be Allen-Bradley heavy industrial Type 4/13 watertight/oiltight metal [Bulletin 800T].
 - b. Potentiometer devices shall be rated for 300 VAC/VDC, 2 W maximum (6 VDC minimum):
 - 1) Mechanical design life Min. 25,000 cycles
 - 2) Rotational torque -3 to 12 in-oz
 - 3) Stopping torque Min. 12 in-lb
 - c. Potentiometer devices shall have single-turn operation, 312 degree rotation.
 - d. Potentiometer devices shall be finger-safe.
 - 3. Control Stations
 - a. Control stations shall provide Allen-Bradley heavy industrial 30.5 mm push button(s) or selector switch with appropriate contact action, button/lever type and color/legend marking. Devices shall be Type 4/13 watertight/oiltight metal [Bulletin 800T].
 - b. Control stations shall be constructed of die-cast aluminum
- L. Relays And Timers
 - 1. Relays Time Delay
 - a. Allen-Bradley time delay relays [Bulletin 700-HT] shall mount on tube-type bases with pin-style socket mounting.
 - b. Time delay relays shall have 10A, B300, DPDT contact ratings and coil voltages as shown on drawings.
 - c. Time delay relays shall have adjustable timing ranges [or fixed timing ranges to avoid tampering]. Timing ranges shall be as shown on drawings.
 - 2. Relays General Purpose

- a. Allen-Bradley general purpose relays [Bulletin 700-HA] shall have tube-base/Octal 8-pin [or 11-pin] terminals and ON/OFF flag indicators.
- b. General purpose relay contacts shall be silver nickel [or silver nickel bifurcated or gold-plated bifurcated] and have 10A, B300, DPDT [or 3PDT] ratings. Coil voltages shall be as shown on drawings.
- c. General purpose relays shall have an electrical schematic on the faceplate, a clear cover for visual inspection and snap-in marker ability.
- d. General purpose relays shall have LED status indicators, push-to-test and manual override.
- 3. Relays Miniature
 - a. Allen-Bradley miniature relays [Bulletin 700-HC] shall be square-base, 4-pole, plug-in type with blade-style terminals and ON/OFF flag indicators.
 - b. Miniature relay contacts shall be silver nickel [or gold-plated silver nickel] and have 7A [or 10A], DPDT [or 4PDT] ratings. Coil voltages shall be as shown on drawings.
 - c. Miniature relays shall have an electrical schematic on the faceplate and a clear cover for visual inspection.
 - d. Miniature relays shall have LED status indicators and push-to-test button with incorporated manual override lever.
- 4. Relays Industrial-Type
 - a. Allen-Bradley industrial-type relays [Bulletin 700-P] shall be ruggedly constructed (10 million operation mechanical life), 2-pole [or 4-pole, 8-pole, 12-pole], configured N.O./N.C. as shown on drawings, and panel- [or strip-, DIN rail-] mounted.
 - b. Industrial-type relays shall be finger-safe.
 - c. Industrial-type relay contacts shall be silver nickel with a double-break and bifurcated design and 10A, A600 rating for AC [5A, P600 rating for DC].
 - d. Accessories shall include adder decks, time delay, latching, surge suppressors and/or mounting strip.
- 5. Timers Solid-State
 - a. Allen-Bradley solid-state timers [Bulletin 700-FS] shall be DIN rail-mounted.
 - b. The solid-state timer contacts shall be available as SPDT or DPDT, 8A.
 - c. Solid-state timers shall be available with On-Delay, Off-Delay, On- and Off-Delay, One-Shot and Flasher operating modes as required on the drawings.
 - d. Solid-state timers shall have coil surge protection and adjustable timing ranges of 0.05 seconds to 60 hours as shown on drawings.
- 6. Timers Programmable
 - a. Allen-Bradley programmable timers [Bulletin 700-HX] shall be digital timing relays with LCD display and shall be socket- [or panel-] mounted.
 - b. Programmable timer contacts shall be SPDT, rated 5A, B300.
 - c. Programmable timer panel surface shall offer Type 4X/IP66 protection.
 - d. Programmable timers shall be configurable for Signal On-Delay, Power On-Delay, Off-Delay, Repeat Cycle, One-Shot and Cumulative operating modes as required on the drawings.
 - e. Programmable timers shall have timing ranges of 0.000 seconds to 9999 hours, depending on selected mode and as shown on drawings.
- M. Miniature Circuit Breakers
 - 1. Miniature circuit breakers shall be Allen-Bradley Circuit Breakers [Bulletin 1489-M].

- 2. Miniature circuit breakers shall be thermal-magnetic, current-limiting type, sized as specified on the drawings:
 - a. 0.5A to 63A current rating
 - b. 1-, 2- or 3-pole
 - c. Type C or Type D tripping characteristic
- 3. Miniature circuit breakers shall be UL Listed (E197878), CSA Certified (259391), CE Marked, VDE and CCC Certified and RoHS Compliant. Standards compliances shall include:
 - a. UL 489
 - b. CSA C22.2, No. 5.1
 - c. EN 60947-2
 - d. GB 14048.2
- 4. Miniature circuit breakers shall be rated for:
 - a. Voltage Max. 480Y/277 VAC (UL/CSA); U_e 230/400 VAC (IEC)
 - b. Interrupting capacity 10 kA (UL/CSA); 15 kA (IEC)
- 5. Housing shall satisfy Insulation Group II/RAL 7035, shall have IP20 finger-safe design, shall be suitable for DIN rail mounting and shall include status indicator window and scratch- and solvent-resistant printing.
- 6. Miniature circuit breakers shall support reversible line and load connections and shall have dual terminals that:
 - a. Connect up to 4 wires, or 2 wires and a bus bar.
 - b. Clamp from both sides.
 - c. Have a unique design that directs wires into openings to prevent wiring misses.
- 7. Miniature circuit breakers shall be compatible with UL 508 Listed bus bars, auxiliary contacts, signal contacts, shunt trips and toggle-mount lockout attachments.
- N. Terminal Blocks and Fuse Blocks
 - 1. Terminal Blocks Control, #22 to #8 AWG
 - a. Control terminal blocks shall be Allen-Bradley screw-type, feed-through [Bulletin 1492-J].
 - b. Control terminal blocks shall be certified:
 - 1) UR/CSA #22 to #8 AWG wire range, 50A maximum current, 600 VAC/VDC voltage rating
 - 2) IEC 6 mm² wire range, 41A maximum current, 800 VAC/VDC voltage rating
 - 3) ATEX 6 mm² (#20 to #10 AWG) wire range, 36A maximum current, 550 VAC/VDC voltage rating
 - c. Control terminal blocks shall have a snap-in card marking system.
 - 2. Terminal Blocks Power
 - Power terminal blocks shall be Allen-Bradley [Bulletin 1492-PD]:
 - 1) Open-style power distribution block with aluminum or copper connectors 3-pole [or 1-pole], rated at 600 VAC/VDC, 175 to 760A
 - b. Power terminal blocks shall be certified by UR, CSA and CE.
 - c. Wire ranges and tightening torques shall be labeled on the block.
 - d. Power terminal blocks shall have a write-on marking surface or marker retention feature.
 - 3. Fuse Blocks

a.

- a. Allen-Bradley fuse block kits [Bulletin 1491] shall be used for protection of transformers and control circuits capable of delivering no more than 200,000 RMS symmetrical amps, 600V maximum.
- b. Fuse block kits shall be 1-pole, 2-pole or 3-pole.
- c. Each pole shall have a fuse cover.
- O. Alarms and Signals
 - 1. Alarm Horn
 - a. The alarm horn shall be an Allen-Bradley High Performance Electronic Horn [Bulletin 855H] and shall have up to 4 stages and low current consumption.
 - b. The alarm horn shall have a UV-stable plastic housing and non-moving parts.
 - c. The alarm horn shall have an on-board microphone, 45 alarm tones selectable by DIP switch and fine volume control via potentiometer.
 - d. The alarm horn shall allow synchronized output in multi-horn installations and shall have the ability to replicate content to other devices (master/slave).
 - 2. Alarm Beacon
 - a. The alarm beacon shall be an Allen-Bradley [Bulletin 855B] with high-intensity, minimum 5-Joule Xenon, minimum 20-Watt Halogen or LED illumination as required on the drawings.
 - b. The alarm beacon shall have polycarbonate housing and lens, available in square or round configuration, and Type 4/4X/13, IP65/IP66 ingress rating as required on the drawings.
 - c. Flashing frequency shall be 1 Hz.
 - d. Alarm beacon lens colors shall be red, green, amber, blue, yellow or clear as required on the drawings.
 - 3. Alarm Light Tower
 - a. The alarm light tower shall consist of Allen-Bradley Control Tower[™] Stack Lights [Bulletin 854J or K], stacked 1 [or 2, 3, 4, 5] module(s) high and shall be surface-[or vertical-, quick-release-, pole-] mounted.
 - b. The alarm light tower shall be 40 mm [or 60 mm] size and the terminal block shall be top-mounted on the base.
 - c. The light modules shall be Type 4/4X/13, IP65 and are:
 - 1) LED (steady, flashing or strobe)
 - d. The alarm light tower shall include a continuous (or pulsing) piezo [or transducer] sound module.
 - e. The alarm light tower shall have a DeviceNet base.
 - 4. Signal Alarm (Panel Mount)
 - a. The signal alarm shall be an Allen-Bradley Panel Mount Signaling Alarm [Bulletin 855P] in a 30 mm [or 45 mm, 65 mm] size, that mounts in a standard 22.5 mm hole.
 - b. The signal alarm shall have polycarbonate base and lens.
 - c. The signal alarm shall be combination sounder and LED
 - d. The signal alarm shall be rear-securing and finger-safe.
- P. Power Supplies
 - 1. Control Power Transformer
 - a. The control power transformer shall be an Allen-Bradley Global Control Transformer [Bulletin 1497], single-phase and sized as shown on drawings.
 - b. The control power transformer shall be epoxy encapsulated and shall offer EN 60-529 finger-safe protection.

- c. The control transformer shall have a dual primary and secondary fuse block, prewired and top-mounted.
- 2. 24 VDC Power Supplies
 - a. 24 VDC power supplies shall be Allen-Bradley [Bulletin 1606-XL] with active or passive PFC choke and input as shown in drawings [or auto-select input].
 - b. 24 VDC power supplies shall have low inrush current, and power supplies with greater than 100-Watt output shall incorporate a minimum 120% Power Burst design.
 - c. 24 VDC power supplies shall have NEC Class 2 "Limited Power" output.
- 3. UPS
 - a. The UPS shall be an Allen-Bradley Industrial Uninterruptible Power Supply [Bulletin 1609-B/D] with 120 VAC input voltage and output power as shown on drawings.
 - b. The UPS shall be back-of-panel- [or DIN rail-] mounted.
 - c. The UPS shall provide:
 - 1) Surge protection to 380 Joules
 - 2) Overload protection, resulting in delayed shutdown at 110 to 130% and immediate shutdown at 130%
 - 3) Protection against output short on line over-current protection from premises branch circuit
 - 4) Protection against output short on battery, resulting in shutdown
 - 5) Thermal protection
 - d. The UPS shall have USB communications and software, integrated remote on/off and dry I/O contacts.
 - e. The UPS shall have EtherNet/IP communications, expandable battery capacity and/or pure sine wave output.
 - f. The UPS shall perform to 40°C [50°C, with hi-temp battery].
- Q. Disconnect/breakers shall be external flange mounted type, all metal construction with painted handle, lockable, similar to Allen Bradley Model 1494F-M1-412. Plastic switches and twist type disconnects and breakers shall not be used.

1.45 SEMI-FINAL AND FINAL SITE VISITS FOR OBSERVATION

A. As the project approaches completion, the Engineer and Architect, at their discretion shall determine a period of time in which they shall perform a Semi-Final Site Visit to observe the Mechanical and Electrical installation. At the conclusion of this Semi-Final Site Visit, a Semi-Final Punchlist shall be issued to the appropriate Contractor for the deficiencies in the work of his trade. Complete all work and perform all corrective measures as required by the Semi-Final Punchlist. After this corrective and completion work has been accomplished, in writing, advise the Architect and the Engineer that every item on the Semi-Final Punchlist has been completed. After the Architect and Engineer make a Final Site Visit to observe the Mechanical and Electrical installation and make a Punchlist, a similar letter of Compliance shall be forwarded through the appropriate channels.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. The Contractor shall be responsible for the installation of all equipment in accordance with the Manufacturer's Installation/Operation & Maintenance Manuals and instructions. If other requirements of this Specification contradict what is stated in the Manufacturer's instructions, the matter shall be brought to the attention of the Architect and Engineer for clarification. Any and all of the Manufacturer's requirements for utilities (electrical power and control wiring, piped water, drain, gas, fuel oil, steam, condensate, etc.), ducted supply or exhaust air, mounting and support shall be provided by the Contractor, regardless of how, or whether or not stated elsewhere in the Contract/Bid Documents.

END OF SECTION 013146

SECTION 078400 FIRESTOPPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire resistance rated construction by maintaining an effective barrier against the spread of flame, smoke and/or hot gases through penetrations, fire resistive joints, and perimeter openings in accordance with the requirements of the Building Code for this project.
- B. Firestop systems shall be used in locations including, but not limited to, the following:
 - 1. Penetrations through fire resistance rated floor and roof assemblies including both empty openings and openings containing penetrants.
 - 2. Penetrations through fire resistance rated wall assemblies including both empty openings and openings containing penetrants.
 - 3. Membrane penetrations in fire resistance rated wall assemblies where items penetrate one side of the barrier.
 - 4. Joints between fire resistance rated assemblies.
 - 5. Perimeter gaps between rated floors/roofs and an exterior wall assembly.
- C. Related Sections include, but are not limited to, the following:
 - 1. Division 21 Fire Suppression
 - 2. Division 26 Electrical
 - 3. Division 28 Electrical Safety and Security

1.03 REFERENCES

- A. New York City Building Code
- B. National Fire Protection Association (NFPA)
 - 1. NFPA 101 (Life Safety Code)
- C. American Society For Testing and Materials Standards (ASTM):
 - 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E814: Standard Test Method for Fire Tests of Through-Penetration Firestops.
 - 3. ASTM E1966: Test Method for Resistance of Building Joint Systems.

- 4. ASTM E1399: Test Method for Cyclic Movement and Measuring Minimum and Maximum Joint Width.
- 5. ASTM E119: Methods of Fire Tests of Building Construction and Materials.
- 6. ASTM E2174: Standard Practice for On-Site Inspection of Installed Fire Stops
- 7. ASTM E2307: Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA)
- 8. ASTM E2393-04 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL Qualified Firestop Contractor Program.
 - 2. UL 263: Fire Tests of Building Construction and Materials.
 - 3. UL 723: Surface Burning Characteristics of Building Materials.
 - 4. UL 1479: Fire Tests of Through-Penetration Fire Stops.
 - 5. UL 2079: Tests for Fire Resistance of Building Joint Systems.
- E. UL Fire Resistance Directory -Volume 2:
 - 1. Through-Penetration Firestop Devices (XHJI)
 - 2. Fire Resistive Ratings (BXUV)
 - 3. Through-Penetration Firestop Systems (XHEZ)
 - 4. Fill, Void, or Cavity Material (XHHW)
- F. Omega Point Laboratories (OPL)
 - 1. Building Products, Materials & Assemblies Volume II
- G. Factory Mutual Research (FM):
 - 1. FM 4991: FM Approval Standard of Firestop Contractors Class 4991

1.04 DEFINITIONS

- A. Firestopping: The use of a material or combination of materials in a fire-rated structure (wall or floor) where it has been breached, so as to restore the integrity of the fire rating on that wall or floor.
- B. System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or floor construction type and a specific penetrant(s).
- C. Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.
- D. Through-penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.
- E. Membrane-penetration: Any penetration in a fire-rated wall or floor/roof-ceiling assembly that breaches only one side of the barrier.

- F. Fire Resistive/Construction Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.
- G. Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire rated floor assembly and an exterior wall assembly.
- H. Approved Testing Agencies: Not limited to: Underwriters Laboratory (UL), Factory Mutual (FM), Warnock Hersey, and Omega Point Laboratory (OPL).

1.05 PERFORMANCE REQUIREMENTS

- A. Penetrations: Provide through-penetration and membrane-penetration firestop systems that are produced and installed to resist the spread of fire, passage of smoke and other hot gases according to requirements indicated, to restore the original fire-resistance rating of assembly penetrated.
 - 1. Provide and install complete penetration firestopping systems that have been tested and approved by nationally accepted testing agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
 - 2. F-Rated Systems: Provide firestop systems with F-ratings indicated, as determined per ASTM E814 or UL 1479, but not less than one (1) hour or the fire resistance rating of the assembly being penetrated.
 - 3. T-Rated Systems: Provide firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E814 or UL 1479, and where required by the Building Code for floor penetrations which are not located within the cavity of a wall.
 - 4. L- Rated Systems: Provide firestop systems with L- ratings less than 5cfm/sf.
 - 5. W-Rated systems: Provide firestop systems that are resistant to water. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 6. For penetrations involving non-metallic, CPVC, PVC, or plastic piping, tubing or conduit, provide firestop systems that are chemically compatible in accordance with Manufacturer requirements.
 - 7. For penetrations involving insulated piping, provide firestop systems not requiring removal of insulation.
 - 8. For penetrations involving fire or fire/smoke dampers, only firestop products approved by the damper manufacturer shall be installed in accordance with the damper installation instructions.
- B. Fire Resistive Joints: Provide joint systems with fire resistance assembly ratings indicated, as determined by UL 2079 (ASTM E1399 and E1966), but not less than the fire resistance assembly rating of the construction in which the joint occurs. Firestopping assemblies must be capable of withstanding anticipated movements for the installed field conditions.
 - 1. For firestopping assemblies 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.

- 2. For floor penetrations exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means, as specified by the Architect.
- 3. L- Rated Systems: Provide firestop systems with L- ratings less than 5cfm/sf.
- C. Firestopping products shall have flame spread ratings less than 25 and smoke-developed ratings less than 450, as determined per ASTM E 84. Note: Firestop products installed in plenum spaces shall have a smoke developed rating less that 50.
- D. Engineering Judgment (EJ): Where there is no specific third party tested and classified firestop system available for an installed condition, the Contractor shall obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Design Professional and where required the Authority Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines. Note: Tested and Listed firestop systems are to be used before an Engineering Judgment (EJ). Engineeing Judgments (EJ) shall not be utilized as an alternative to proper construction or coordination.

1.06 SUBMITTALS

- A. Product Data: For each type of firestopping product selected. Manufacturers certification must verify that firestopping materials are free of asbestos, lead and contain volatile organic compounds (VOCs) within limits of the local jurisdiction.
- B. Design Listings: Submit system design listings, including illustrations, from a qualified testing and inspecting agency that is applicable to each firestop configuration.
- C. Installation Instructions: Submit the manufacturer's installation instruction for each firestop assembly.
- D. Where there is no specific third party tested and classified firestop system available for a particular configuration, the Contractor shall obtain from the firestopping material manufacturer an Engineering Judgment (EJ) for submittal.
- E. Material Safety Data Sheet (MSDS): Submit for each type of firestopping product selected.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Submit documents as per 1.7.
- G. A quality control manual approved by FM or UL (if applicable).
- H. Firestop Schedule: Submit schedule (see appendix A) itemizing the following:
 - 1. Manufacturer's product reference numbers and/or drawing numbers.
 - 2. Listing agency's design number.
 - 3. Penetrating Item Description/Limits: Material, size, insulated or uninsulated, and combustibility.
 - 4. Maximum allowable annular space or maximum size opening.
 - 5. Wall type construction.
 - 6. Floor type construction.
 - 7. Hourly Fire resistance rating of wall or floor.

- 8. F rating.
- 9. T rating for floor penetrations not in a cavity of a wall. The F and T ratings shall be equal.
- 10. L and W rating, if applicable.
- I. Firestop Application Log: A separate binder shall be prepared and kept on site for use by the Inspection Agency and the Authority Having Jurisdiction. The binder shall contain the following:
 - 1. The binder shall be a three (3) ring binder.
 - 2. Firestop Schedule (see appendix A)
 - 3. All approved firestopping assemblies including engineering judgments shall be provided and organized by trade.
 - 4. Copy of manufacturer's installation instruction for each firestop assembly.
 - 5. A matrix or table of contents listing each assembly shall be provided.
 - 6. The binder shall be updated as new firestop assemblies or EJ's are added.
 - 7. The binder shall be kept on-site at a location approved by the Owner.
 - 8. Qualifications or Certification of each Installer

1.07 QUALITY ASSURANCE

- A. Provide firestopping system design listings from UL, FM, Warnock Hersey or OPL in accordance with the appropriate ASTM Standard(s) per article 1.5.
- B. Contractor Qualifications: An acceptable Firestop Contractor shall be:
 - 1. Licensed by State or Local Authority where applicable, or
 - 2. FM Research approved in accordance with FM Standard 4991, or
 - 3. UL Qualified Firestop Contractor, or
 - 4. Meet the following requirements
 - i. Installation personnel shall be trained by the approved firestop manufacturer.
 - ii. The installation firm shall be experienced in installing firestop systems and fire resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.
 - iii. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified tested and listed system requirements.
 - iv. Minimum of three (3) years experience and shown to have successfully completed not less than 5 comparable scale projects and provide references.
- C. Single Source Limitations: Obtain firestop systems for all conditions from a single manufacturer. The only exception is where a listed firestop system is available for a specific opening from another manufacturer, it shall be utilized before an Engineering Judgment.
- D. Materials from different firestop manufacturers shall not be installed in the same firestop system or opening.

- E. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
- F. Firestopping sealants must be flexible, allowing for normal movement.
- G. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces such that a void is created.
- H. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.
- I. Materials used shall be in accordance with the manufacturer's written installation instructions.
- J. Identify installed firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. In addition, for perimeter or joint firestop systems attach labels at locations every 20 feet or at least each section where separated. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and provide a label material that will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning Firestop System Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Firestop system designation of applicable testing and listing agency.
 - 4. Date of installation.
 - 5. Firestop system manufacturer's name.
 - 6. Installer's name.
 - 7. Inspector's name (if applicable)
- K. Inspection of penetrations through fire rated floor and wall assemblies shall be in accordance with ASTM E2174, Standard Practice for On-Site Inspection of Installed Fire Stops and ASTM E2393-04 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers. The Owner shall engage a qualified, independent inspection agency, or material testing agency to perform these inspections
- L. In high-rise buildings or in buildings assigned to Risk Category III or IV, Special inspection for through-penetrations, membrane penetration firestops, fire-resistant joint systems and perimeter fire barrier systems shall be conducted by an approved agency.
- M. Field Mock-up Installations: Prior to installing firestopping, erect mock-up installations for each type firestop system indicated in the Firestop Schedule to verify selections made and to establish standard of quality and performance by which the firestopping work will be judged by the Owner or Owner's Representative. Obtain acceptance of mock-up installations by the Owner or Owner's Representative before start of firestopping installation. Provide at least 72 hours notice to Owner or Owner's Representative prior to inspection.

1.08 DELIVERY, STORAGE, AND HANDLING

FIRESTOPPING

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture/expiration, lot number, listing agency's classification marking, and mixing instructions for multi-component materials.
- B. Store and handle materials per manufacturer's instructions to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. All firestop materials shall be installed prior to expiration date.

1.09 PROJECT CONDITIONS

- A. Environmental Limitations: Install firestopping when ambient or substrate temperatures are within limits permitted by the manufacturer's written instructions. Do not install firestopping when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate per the manufacturers written instructions on the product's Material Safety Data Sheet.
- C. Verify the condition of the substrates before starting work.
- D. Care should be taken to ensure that firestopping materials are installed so as not to contaminate adjacent surfaces.

1.10 COORDINATION

- A. Coordinate areas prior to firestopping installation with the Owner, Construction Manager and/or all other Contractors.
- B. Coordinate construction of openings and penetrating items to ensure that firestopping assemblies are installed according to specified requirements. Opening shall not exceed maximum restrictions allowable for annular spacing per listing or acceptable Engineering Judgments.
- C. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- D. Do not conceal firestopping installations until the Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.
- E. Schedule firestopping after installation of penetrants and joints but prior to concealing or obstructing access to areas requiring firestopping.
- F. Preinstallation Conference: This conference should be a joint meeting attended by the Owner's Representative and all prime contractors, respective firestopping sub-contractors and firestopping company field advisor to review project requirements. The agenda for the conference should include the following topics:
 - 1. Review scope of work.
 - 2. Review shop drawings and firestop application log.
 - 3. Review mock-up requirements.
 - 4. Discuss identification labels and locations.
 - 5. Review schedule, coordination and sequencing with all trades.

- 6. Review any engineering judgments or other special requirements.
- 7. Function and frequency of inspections and testing labs.
- G. Destructive testing shall be performed at mock up and at pre determined intervals according to ASTM E 2174 and ASTM E 2393-04 by the inspector and with the installing Contractor present. Inspector to test for in place installation conformance to tested and listed system or engineering judgment details. Non conformances will result in additional destructive testing, at the cost of the installer.

PART 2 - PRODUCTS

2.01 FIRESTOPPING, GENERAL

- A. Firestopping products specified in system design listings by approved testing agencies may be used providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate assembly.
- B. Manufacturer of firestopping products shall have been successfully producing and supplying these products for a period of not less than three years and be able to show evidence of at least ten projects where similar products have been installed and accepted.
- C. Accessories: Provide components for each firestop system that is needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by the firestopping manufacturer and by the approved testing agencies for the firestop systems indicated. Accessories include, but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - i. Slag wool fiber insulation.
 - ii. Foams or sealants used to prevent leakage of fill materials in liquid state.
 - iii. Fire-rated form board.
 - iv. Polyethylene/polyurethane backer rod.
 - v. Rigid polystyrene board.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Steel sleeves
- D. All firestopping products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.

2.02 MIXING

A. For those products requiring mixing before application, comply with firestopping 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.

2.03 MANUFACTURERS

- A. Subject to compliance with the requirements, provide products by one of the following or equivalent manufacturers:
 - 1. Grace Construction Products.
 - 2. Nelson Firestop Products.
 - 3. Hilti Firestop Products.
 - 4. A/D Fire Protection Systems Inc.
 - 5. RectorSeal Corporation (The).
 - 6. Specified Technologies Inc.
 - 7. 3M; Fire Protection Products Division.
 - 8. Tremco; Sealant/Weatherproofing Division.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions 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.
- C. Verify that all pipes, conduits, cables, and/or other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing firestop systems to comply with written recommendations of firestopping manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

3.03 FIRESTOP SYSTEMS INSTALLATION

A. General: Install firestop systems to comply with "Performance Requirements" article in Part 1 and firestopping manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Installation of firestopping shall be performed by an applicator/installer qualified as described in article 1.7.
- C. Apply firestopping in accordance with approved testing agencies listed system designs or manufacturer's EJ per the manufacturer's installation instructions.
- D. Verify that environmental conditions are safe and suitable for installation of firestop products.
- E. Install forming/damming/backing materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire resistance ratings required.
- F. Install joint forming/damming materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths of installed firestopping material relative to joint widths that allow optimum movement capability and achieve fire resistance ratings required.
- G. Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the system design.
- H. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids, joints and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they fully 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.
 - 4. Tool non-sag firestop materials after their application and prior to the time skinning begins. Use tooling agents approved by the firestopping manufacturer.
- I. On vertical pipe penetrations, lift riser clamps to permit the installation of firestopping around the entire pipe penetration. For penetrations involving fire or fire/smoke dampers, only firestop products approved by the damper manufacturer shall be installed in accordance with the damper installation instructions.

3.04 FIELD QUALITY CONTROL

- A. Inspecting Agency: Authorities Having Jurisdiction, the Owner, or Owner's Representative shall be allowed to perform random destructive testing during inspection of firestop systems to verify compliance per listings or manufacturer's installation instructions. All areas of work must be accessible until inspection by the applicable Authorities Having Jurisdiction and inspection agencies. The contractor shall be responsible to repair all tested assemblies with no cost to the owner.
- B. Proceed with enclosing firestop systems with other construction only after inspections are complete.
- C. Where deficiencies are found, repair or replace firestop systems so they comply with requirements.

3.05 CLEANING AND PROTECTION

FIRESTOPPING

- A. Clean off excess fill materials adjacent to openings, as Work progresses by methods and with cleaning materials that are approved in writing by firestopping manufacturer(s) and that do not damage materials in which openings occur. Leave finished work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.
- B. Provide final protection and maintain conditions during and after installation that ensure 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 firestop systems immediately and install new materials to produce firestop systems complying with specified requirements.

END OF SECTION 078400

Project No:	Contractor Name and Address:	Date Submitted:
Project Title:	Supplier/Installer Name and Address: Manufacturer Name and Address:	Company Field Advisor Name and Address:

Manufacturer's Product Reference Numbers and/or Drawing Numbers	U.L., FM, Warnock Hersey or Omega Point Lab Penetration Design Nos.	Penetrating Item Material, Size Insulated, Combustible, Join Perimeter, etc Description:	e, Allowable Annular c, Space or	Wall Const	type ruction	Floor Type Construct ion	Fire Resistance Rating of Wall or Floor (Hourly)	F Ratin g	T Ratin g (floor s Only)	L Rating (if availabl e)	W Rating (if availabl e)
				DE S.	CONS T.						
Example No. 1 DCFSS-130	UL #130	Maximum 4" Stee Pipe Non-Insulated	-1	P4	6" CMU	N.A.	1 Hour	1 Hour	N.A		
Example No. 2 5300-ICF88.01	UL #591	Maximum 4" PV Pipe	2	N.A	N.A.	UL # D916	3 Hour	1 Hour	2 Hour		
Exmple No. 3	CW-S-2006	Curtain Wall/Perimeter	6" to 12"	NA	NA	4 ¹ / ₂ " Reinforc ed LW concrete	2 Hour	2 Hour	NA	1 CFM/ Lin Ft.	

Manufacturer's Product Reference Numbers and/or Drawing Numbers	U.L., FM, Warnock Hersey or Omega Point Lab Penetration Design Nos.	Material, Insulated,	Item: Size, Joint, etc.	Maximum Allowable Annular Space or Maximum Size Opening	Wall type Construction		Floor Type Construct ion	Fire Resistance Rating of Wall or Floor (Hourly)	F Ratin g	T Ratin g (floor s Only)	L Rating (if availabl e)	W Rating (if availabl e)
					DE S.	CONS T.						

END OF SECTION 078400

SECTION 210000

GENERAL REQUIREMENTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

- A. Division 21 of the specifications requires the furnishing and installing of all items, including every article, device or accessory reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the Work include, but are not limited to, materials, labor, supervision, supplies, equipment, transportation, rigging, storage, utilities, and all required permits and licenses.
- B. Before submittal of bid, examine all drawings, specifications, addenda, alternates, special conditions, and all other bidding documents of all sections of this project, verify all governing conditions at the site, and become fully informed as to the extent and character of the work required, as well as its relation to other work in the building. Submittal of a bid is an agreement to all requirements of the Contract Documents, and no consideration will be granted for any claimed misunderstanding thereof.
- C. Submittal of a bid is a representation by the bidder that it is qualified in all respects properly to perform the work for which it is bidding and has experience with similar work. Bidders are deemed to be aware, on the basis of their background and experience, materials which may be required in their responsibilities, even though unspecified.

1.2 ABBREVIATIONS

ADA Americans with Disabilities Act	
AHJ Authority Having Jurisdiction	
AISC American Institute of Steel Construction	
ANSI American National Standards Institute	
ASA Acoustical Society of America	
ASME American Society of Mechanical Engineers	
ASPE American Society of Plumbing Engineers	
ASSE American Society of Sanitary Engineers	
ASTM American Society for Testing and Materials	
AWS American Welding Society	
AWWA American Water Works Association	
BSA New York City Board of Standards & Appeals	
ETL Electric Testing Laboratory	
FM Factory Mutual	
IEEE Institute of Electrical and Electronic Engineers	
IRI Industrial Risk Insurers	
MSDS Materials Safety Data Sheet	
MSS Manufacturers' Standardization Society Standar	ds.
NEBB National Environmental Balancing Bureau	
NEC National Electrical Code (NFPA 70)	

GENERAL REQUIREMENTS FOR FIRE SUPPRESSION

Pomerantz Center Fire Pump Replacement January 18, 2024

Project 8969-76 C1591

NEMA	National Electrical Manufacturers Association
NETA	National Electrical Testing Agency
NFPA	National Fire Protection Association
NYCEC	New York City Electrical Code
OSHA	Occupational Safety Health Administration.
OTCR	New York City Office of Technical Certifications and Research
TEMA	Tubular Exchangers Manufacturers Association
UL	Underwriters Laboratories

1.3 DEFINITIONS

- A. For purposes of these specifications the following definitions apply:
 - 1. ARCHITECT: The Architect of record.
 - 2. ENGINEER: The Engineer of record.
 - 3. CONTRACTOR: The individual, partnership or corporation to whom has been awarded the contract for providing the fire protection work.
 - 4. SUBCONTRACTOR: The individual, partnership, or corporation to whom has been awarded the contract for providing assistance to the Contractors work.
 - 5. GENERAL CONTRACTOR: An individual or group that contracts with another organization or individual (Owner) for the construction of a building or other structure. They may or may not do any actual construction of a portion of the project.
 - 6. CONSTRUCTION MANAGER: An individual or group that contracts with another organization or individual (Owner) for the scheduling and coordination of all design and construction processes, including the selection, hiring and oversight of specialty Trade Contractors, for a building or other structure.
 - 7. PROVIDE: To "furnish" and "install".
 - 8. INSTALL: To join; unite; fasten; link; attach; set up or otherwise connect together; complete, tested and ready for normal satisfactory operation.
 - 9. FURNISH: To supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application.
 - 10. AS DIRECTED: As directed by the Engineer.
 - 11. CONCEALED: Embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings or accessible raised floor cavities.
 - 12. SUBMIT: Submit to the Engineer for review.

- 13. FINISHED SPACES: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- 14. EXPOSED: Exposed to view.
- 15. SUPPLY: To purchase, procure, acquire, and deliver complete with related accessories.
- 16. WORK: Includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation of complete systems.
- 17. PIPING: Includes pipe, tube, fittings, flanges, valves, controls, strainer, hangers, supports, unions, traps, drains, insulation, and all related accessories.
- 18. WIRING: Includes raceway, fittings, wire, boxes, and all related accessories.
- 19. INDICATED: As shown or noted on the drawings or specifications.

1.4 RELATED DOCUMENTS

- A. The General Conditions and Supplementary Conditions accompanying these specifications are hereby made a part of the requirements for the work under this section of the specifications.
- B. No General Conditions and/or Supplementary General Conditions clause referring to the work of this section shall be considered waived unless specifically stated herein.
- C. Refer to Owner's "Commissioning Requirements" for the scope of work related to systems furnished and installed under Division 21.

1.5 REFERENCE STANDARDS

- A. Comply with the currently enforced versions of all applicable laws, rules, regulations, codes and ordinances of New York City and shall be BSA approved or have an OTCR approval. Modifications required by the Authorities Having Jurisdiction shall be made without additional cost to the Owner.
 - 1. Secure and pay for necessary approvals, permits, inspections, carting, legal dumping, etc., and deliver the official records of the granting of permits to the Owner without additional cost to the Owner.
 - 2. The drawings have been filed. Contractor shall pay all fees to obtain release of approved plans and shall complete and file all forms, tabulations, plans, etc., required for Special Inspections.

- 3. Where so required by the Building Code of the City of New York, the Owner shall employ the services of a Special Inspector to perform inspections of materials, installations, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and reference standards.
- B. All equipment, materials, and methods to be furnished and/or installed by this division shall comply with all applicable requirements of laws, codes, ordinances, legislation, standards, etc., of all federal, state, and local authorities, whether indicated on the Contract Documents or not.
- C. Where Contract Drawing and specification requirements are in excess of rules, regulations and code requirements, and are permitted under the code, the Contract Drawings and specifications shall govern. In the event of a conflict between the Contract Documents and the applicable laws, rules, regulations, codes, and ordinances of federal, state, and local Authorities Having Jurisdiction, the latter shall govern.
- D. Where alterations to and/or deviations from the Contract Drawings and specifications are required by the Authorities listed above, report the requirements to the Engineer and secure his written approval before starting the required modifications.
- E. Pay royalties or fees required in connection with the use of patented devices, or systems, and save the Owner, the Engineer and the General Contractor harmless from any claims or lawsuits arising from such use and indemnify each thereof against attorneys' fees in connection therewith.

1.6 QUALITY ASSURANCE

- A. All materials and equipment shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products of the type specified herein. The manufacturer shall have been in continuous operation in the manufacture of the products specified for a minimum of ten (10) years.
- B. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports are in compliance with the design requirements for this project.
- C. Make every effort to furnish all equipment of any equipment type (such as pumps, hot water heaters, storage tanks, etc.) from one manufacturer.
- D. After completion of installation, but prior to Final Completion, this Contractor shall certify in writing in a format acceptable to the Owner those products and materials installed, and processes used, do not contain asbestos, or polychlorinated biphenyls (PCB's) or other hazardous materials as determined by the Owner. A "Materials Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

- E. All adhesives specified herein or utilized in the manufacture of equipment or components which are specified herein shall meet or exceed the volatile organic compound (VOC) limits of South Coast Air Quality Management District Rule No. 1168.
- F. All sealants specified herein or utilized in the manufacture of equipment or components which are specified herein shall meet or exceed Bay Area Resources Board Reg. 8, Rule 51. Submit as part of the shop drawing process for review by the Engineer and/or Owner, supporting documentation which demonstrates conformance with these requirements.
- G. In the event that products, materials and/or processes are not available that do not contain asbestos, PCB's, VOC's formaldehyde formulations, hazardous materials or may result in hazardous out-gassing as determined by the manufacturer a "Materials Safety Data Sheet", as described above, shall be submitted as part of the shop drawing process for review by the Engineer and/or Owner.
- H. Furnish all equipment, materials and accessories new and free from defects.

1.7 ENGINEERING REFERENCE POINTS

- A. The General Contractor shall provide benchmarks, monuments, and other reference points on the job which will be available for this Contractor's use.
- B. Maintain all existing benchmarks, monuments and other reference points and perform all field engineering required to ensure that work under this section shall conform with grades, elevations and lines required.

1.8 INDEMNIFICATION

- A. Covenant and agree that this Contractor and his Subcontractors and his and their agents, servants and employees will provide and maintain a safe place to work and that he and they will comply with all laws and regulations of any governmental Authority Having Jurisdiction thereof.
- B. This Contractor agrees to indemnify, defend and hold harmless the Owner, Owner's agents and Engineer from and against any liability, loss, damage or expense, including attorneys' fees, arising from a failure or alleged failure on the part of this Contractor, his Subcontractors and his and their agents, servants and employees to provide and maintain a safe place to work or to comply with all laws and regulations of any governmental Authority Having Jurisdiction thereof.
- C. This Contractor agrees to indemnify, defend and hold harmless the Owner, Owner's agents and Engineer from and against any liability, loss, damage or expense, including attorneys' fees, arising from a failure or alleged failure on the part of this Contractor, his Subcontractors and his and their agents, servants and employees to discharge the obligations assumed by him or them in the performance of the work, including any act or omission allegedly resulting in death or personal injury or property damage, or due to improper construction, construction techniques, or the use of improper or inappropriate material or tools.

1.9 COMPLETE PERFORMANCE OF WORK

- A. Work shall be executed in strict accordance with the best practice of the trades in a thorough, workmanlike manner by competent, skilled technicians and trade personnel.
- B. This Contractor shall provide a competent, experienced, full-time Superintendent who is authorized to make decisions on behalf of the Contractor.
- C. All labor, materials, apparatus, and appliances essential to the complete and proper functioning of the systems described and/or indicated herein, or which may be reasonably implied as essential, whether mentioned in the Contract Drawings and specifications or not, shall be provided by the Contractor. The entire installation shall be ready in every respect for the satisfactory and efficient operation when completed.
- D. In cases of doubt as to the work intended, or in the event of need for explanation thereof, request supplementary written instructions in the form of a Request for Information (RFI) from the Engineer.
- E. Coordinate the work specified herein and shown on the Contract Drawings with all other trades.
- F. Be responsible for material and workmanship until completion and final acceptance. Replace any of same which may be damaged, lost or stolen, without additional cost to Owner. Guard the building and its contents against damage by this Contractor, his employees or Subcontractors, and make good any damage free of charge.
- G. Where, due to union regulations or trade agreements, any of the work shown on the drawings or specified herein is not considered this trade's work, subcontract the work in question, but assume full responsibility for the complete installation. Except for such changes as may be specifically approved by the Architects and Consulting Engineers, in accordance with alternates or options stated hereinafter, all work must be in full accordance with the intent of the plans and specifications, complete in every way and ready for satisfactory and efficient operation when delivered to the Owner.
- H. Provide signs required by the Authorities Having Jurisdiction.
- I. Provide all rigging required for complete installation and furnish drawings showing necessary points of support, reactions and supplementary bracing. This shall be submitted for approval by the Owner. Should any shoring be required, provide same after Owner's approval.
- J. Become thoroughly acquainted with the work involved, obtain and verify at the building all measurements necessary for the proper installation of work. Furnish to other Contractors any information relating to work of this division necessary for the proper installation of their contracts. Coordinate with other Contractors for finish adjacent to work of this section and arrange to have visible portions of the work (such as access doors, escutcheons, etc.) fit in with the finish in a manner satisfactory to the Architects.

- K. Transmit to trades doing work of other sections all information required for work to be provided under their respective sections (such as foundations, electric wiring, access doors, and the like) in ample time for installation.
- L. Wherever this Contractor's work interconnects with work of other Contractors, this Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary so that they may properly install all the necessary connections and equipment. Identify all work items (valves, dampers, pull boxes, etc.) in an approved manner in order that the other trades may know where to install such items such as access doors, panels, etc.
- M. Provide required supports and hangers for piping and equipment, so that loading will not exceed allowable loadings of structure. Submittal of a bid shall be deemed a representation that the Contractor submitting such bid has ascertained allowable loadings and has included in his estimates the costs associated with furnishing required supports.
- N. Field drilling, cutting and/or reinforcing of holes in structural metal deck required for work under this section shall be coordinated through the General Contractor and approved by the Structural Engineer. All such drilling, cutting and reinforcing costs shall be borne by this Contractor.
- O. At the conclusion of each day's work, clean up and stockpile on site, at a location designated by the General Contractor, all rubbish, debris and trash, which may have accumulated during the day as a result of work of this Contractor and of his presence on the job.
 - 1. Sidewalks and streets adjoining the property shall be kept broom-clean and free of debris, rubbish, trash and obstructions of any kind caused by work of this Contractor, which will affect the condition and safety of streets, walks, utilities and property.
- P. Due to the nature of the alteration work, which requires the building to be kept operable at all times, except for those floors being actively altered, this Contractor shall coordinate his activities with the General Contractor and the building Owner. Any interruption of building services must be done at the convenience of the building Owner. If temporary connections to maintain services are required or if the work must be performed after hours, this work shall be so arranged with all parties involved.
- Q. If this Contractor must perform work in occupied areas, he shall make arrangements with the General Contractor and the Owner as to the time and method by which this work shall be performed. He shall arrange for all adjacent areas to be properly protected against damage, dirt and dust.

1.10 DESCRIPTION OF BID DOCUMENTS

A. Specifications, in general, describe quality and type of materials and equipment.

- B. The drawings show the various systems schematically, no added compensation shall be permitted for variations due to field conditions.
- C. Where disagreements occur between the plans and the specifications or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the Base Bid.
- D. Work not shown on the drawings but called for in the specifications, or vice versa, shall be provided by the Contractor without additional expense to the Owner.
- E. Where a variance occurs between the drawings and specifications, or within either document itself, the Contractor shall request through the General Contractor, clarification in writing from the Engineer on which item and manner in which the work shall be installed.
- F. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- G. Equipment shown on the drawings with particular manufacturers identified has been coordinated for structural penetrations, electrical connection, operating and service (maintenance) requirements, and physical size with regard to the space where the equipment is shown. If they comply with the project specifications, these and the other specified manufacturers of this equipment will be acceptable contingent on the Contractor providing a complete installation and maintaining full responsibility to provide, at no additional cost, any modifications to the structure or electrical service that are required to properly install, operate, and service the equipment being used. These modifications shall not include additional area for equipment unless approved by the Architect.
 - 1. The Contractor shall note these changes on the equipment submittal and shall show all differences in equipment being supplied from that shown on the drawings. Failure of the Contractor to provide this information with the submittal will indicate that the submitted equipment meets or exceeds the equipment shown on the drawings in performance and is physically no larger in housing size.
 - a. Failure of the Contractor to comply with the above and any discrepancies found shall result in the Contractor providing equipment equal to that specified at the Contractor's expense.

1.11 SUBMITTALS

A. No part of the work shall be started in the shop or in the field until the Engineer have reviewed the shop drawings and samples for that portion of the work. Thereafter, the work shall be executed in accordance with the Contract Documents and the indicated status of the reviewed shop drawing.

- B. All shop drawings and samples shall be identified as follows:
 - 1. Date of submittal.
 - 2. Title of project (including floor and room designations).
 - 3. Name of Contractor and date of his approval.
 - 4. Name of Subcontractor or supplier and date of submittal to Contractor.
 - 5. Number of submission.
 - 6. Any qualification(s), departure(s) or deviation(s) from the requirements of the Contract Documents.
 - 7. Federal specification, FM Approval, OTCR number, UL Listing, or ASTM number or any local listing or approval where required.
 - 8. Such additional information as may be required by the specifications for the particular material being furnished.
 - 9. When the submitted materials modify components, styles, etc., on the same drawing, or alternate or options available for the intended material, the material shall be appropriately annotated in a manner to avoid any misunderstanding of the submission.
- C. Shop drawings and samples shall be submitted for review sufficiently in advance of the scheduled start of the work in the shop or in the field to allow ample time, in consideration of the number and complexity of the drawings in the submittal, for the Engineer to make an orderly review. No extension of the time to complete the work shall be granted to the Contractor by reason of his failure in this respect.
- D. The Contractor shall carefully check shop drawings and samples, including those received by him from Subcontractors and manufacturers, for accuracy, completeness of required information, and conformance with the Contract Documents. Shop drawings found to be inaccurate, incomplete or not in conformance with the Contract Documents shall be corrected before being submitted to the Engineer for review.
- E. Within three (3) weeks after award of the Contract, the Contractor shall submit for the Architect's and/or Engineer's review, a list of the manufacturers and Subcontractors whose products and services he proposes to use for the work. Proposed substitutions for material and equipment required by the Contract Documents shall be submitted to the Engineer for review during this period. Submittals proposing or requesting substitutions shall be expressly identified as such in a letter of transmittal, with the reasons for requesting the substitution stated. Submittals for this purpose shall be complete in every respect, shall conform to all the information requirements for shop drawing and sample submittals, and shall include, at no cost to the Owner, the necessary revisions to other related work required by the Contract Documents. The judgment of the Engineer with

respect to the adequacy and acceptability of a proposed substitution shall be final and binding on the Contractor and shall not be subject to question in any other place. After the expiration of this period, substitutions for material or equipment shall not be proposed or requested in shop drawing and sample submittals, and the Contractor shall be required to execute the work in accordance with the provisions of the Contract Documents.

- F. Within six (6) weeks after award of the Contract, the Contractor shall submit a schedule listing all shop drawings and samples with the projected date that each item will be submitted to the Engineer for review.
- G. Prior to Final Acceptance, the following data shall be furnished in accordance with the Conditions of the Construction Contract, Section 01 31 46 Specifications, and Division 21 Specifications, and shall include, but not be limited to:
 - 1. Record Drawings.
 - 2. Operating and Maintenance Books.
 - 3. Contract or Coordination Drawings.

1.12 PRODUCT DATA

A. Submit the following manufacturers' shop drawings and data for approvals:

Fire Pumps Fire Pump Controllers

1.13 SAMPLES

- A. Samples shall be identical in all respects to the material which is to be installed or applied in the execution of the work and shall be of sufficient size or quantity to permit proper evaluation and review. Manufacturer's descriptive labels and printed application instructions which are normally attached to the material, or its packaging shall be furnished with the sample. Samples shall he submitted for review when requested by the Engineer.
- B. Submit names, sizes, catalog numbers and/or samples of the following materials for approval:

Fittings	Sleeves and Escutcheons	
Hangers	Tamper Switches	
Pipe	Valve Tags	
Pressure Gauges	Valves	

1.14 SHOP DRAWINGS

- A. The term "shop drawings" shall include layout, detail, and assembly drawings, diagrams, schedules, catalog sheets, printed descriptive matter, and tabular and graphical presentations of operating and performance data that describe work required by the Contract Documents. Catalogs and catalog sheets shall be clearly annotated indicating the specific items being proposed.
- B. In addition, during the installation period, submit detailed shop layout drawings for each floor of the project, including all the Mechanical Equipment Rooms, showing equipment and piping work and other distribution services described herein, including locations and sizes of all openings in cellular steel floor decks, walls and floors. Shop drawings with multiple parts shall be submitted as a package. Shop drawings will be 3/8 inch equal to 1 ft. 0 in. scale. Piping shop drawings shall also indicate the point loading and spacing of each hanger and the method of support. Drawings shall include full coordinated plans and sections for Mechanical Equipment Rooms, floor plans and risers. In addition, required detail drawings, such as anchor and guide details, etc., shall be submitted.
- C. Shop drawings for Equipment Rooms, and for piping and similar distribution services shall show by dimension the exact size and location of each element of the system in both the horizontal and vertical plane, as well as relationship to the building structure, architectural construction, equipment, and the work of other trades. Where new work is added to an existing structure, the shop drawings shall show the location of all existing services and equipment. Pads, foundations, anchorages, supports and attachments to the building structure where required for the installation of the work shall be shown in layout and detail with sizes, dimensions, materials and methods of construction noted. The work described in any shop drawing submission shall be carefully checked by this Contractor for all clearances field conditions, maintenance of architectural conditions and proper coordination with all trades on the job.
- D. Each submitted shop drawing shall include a certification by the General Contractor that all related job conditions have been checked and that no conflict exists. No shop drawing submission shall be reviewed without such certification.
- E. The Contractor shall submit shop drawings of the following work for review:
 - 1. Construction details for piping.
 - 2. Control and alarm systems.
 - 3. All items of manufactured material and equipment.
 - 4. Other specific items of work as required by the provisions of the technical sections of the Contract Documents should be included in Submittal section.
- F. Submit piping details for the following equipment installations:

Fire Pumps

1.15 CERTIFICATION

A. Any certifications required by the specifications, in addition to those required for shop drawings, product data, equipment and other items, shall be so certified by the Owner, a Partner, or a Corporate Officer of the firm required to provide the Certification, or by another person duly authorized to sign binding agreements for and in behalf of the Owner, Partner, or Corporation.

1.16 ARCHITECT'S AND ENGINEER'S REVIEW

- A. The Engineer shall review shop drawings and samples for conformance with the design concept of the project and the information contained in the Contract Documents. The review of shop drawings and samples shall be only for the convenience of the Owner in following the work and shall not relieve the Contractor of responsibility for deviations from the requirements of the Contract Documents. The review shall not be construed as a complete or detailed check of the work submitted, nor shall it relieve the Contractor of responsibility for errors of any sort in the shop drawings and samples, or from the necessity of furnishing any work required by the Contract Documents which may have been omitted from the shop drawing submittals. The review of a separate item shall not indicate review of the complete assembly in which it functions. Nothing in the Engineer's review of shop drawings and samples shall be considered as authorizing a departure from Contract Documents or specifications; additional cost to the Owner; or increased time for completion of the work.
- B. Engineer's review is for general compliance with the design concept and Contract Documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications, nor departing therefrom. The Contractor remains solely responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for coordination with other work, whether new or existing and other trades, for selecting fabrication processes, for techniques of construction, for performing his work in a safe manner.
- C. The Engineer shall review shop drawings and samples with reasonable promptness and shall return them to the Contractor stamped to indicate the appropriate action as follows:
 - 1. "NO EXCEPTION TAKEN" means that fabrication, manufacture or construction may proceed, providing the submittal complies with the Contract Documents.
 - 2. "EXCEPTIONS AS NOTED" means that fabrication, manufacture or construction may proceed, providing the submittal complies with the Engineer's notations and the Contract Documents. A copy of the corrected submittal shall be returned to the Engineer for record. If, for any reason, the Contractor cannot comply with the notations, the Contractor shall resubmit as described for submittals stamped "REVISE AND RESUBMIT".
 - 3. "REVISE AND RESUBMIT" means that the Contractor must comply with the Architect's and/or Engineer's notations and resubmit before fabrication,

manufacture or construction may proceed. Submittals stamped in this manner shall not be permitted on the job site.

- 4. "REJECTED" means that the submittal does not comply with the Contract Documents and that fabrication, manufacture or construction shall not proceed. Submittals stamped in this manner shall not be permitted on the job site.
- D. Each submitted shop drawing shall bear the Contractor's stamped and signed certification that the work has been checked for all related job conditions, for maintenance of architectural conditions, and has been coordinated with the shop drawings of other affected trades for interrelated work, as required for the proper and complete performance of the work. No shop drawing submittal shall be reviewed without this certification.
- E. Shop drawings for manufactured material and equipment shall include model numbers, dimension drawings, operating weights, material specifications, operating features and controls, wiring diagrams, performance characteristics, service procedures, including clearance requirements for maintenance work, and conformance to specified codes and code ratings. Note that in addition to these requirements, other specific submittal data, and forms of data submission, are required by the Contract Documents for particular items of equipment and material.
- F. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein shall be the minimum standards acceptable. The Engineer shall retain the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require that the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

1.17 MANUFACTURER'S RECOMMENDATIONS

- A. With the exceptions as specified and/or indicated on the drawings or in the specifications, the Contractor shall apply, install, connect, erect, use, clean, commission and condition manufactured articles, materials, and equipment per manufacturer's current printed instructions and recommendations. Copies of such printed recommendations shall be kept at the project site and made available as required.
- B. Where the manufacturer's recommendations conflict with the Contract Documents, the conflict shall be brought to the Engineer's attention immediately.

1.18 SPACE LIMITATIONS

- A. The equipment selections used in the preparation of the Contract Documents shall fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts. Adequate space shall be allowed for clearance in accordance with code requirements, the requirements of the Local Authorities Having Jurisdiction, and the equipment manufacturer's recommendations.
- B. In the preparation of drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements

and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code-required access, and proper fit rests with the Contractor.

- C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Engineer's review.
- D. Coordinate the installation of piping and equipment with lighting fixtures, special ceiling construction, air distribution equipment and the structure. Provide additional risers, drops and offsets as required. If, after installed, new piping or equipment is found to be in conflict with the architecture, structure, or other trade work which is either existing or shown on the Contract Documents, the piping or equipment shall be relocated without additional cost to the Owner.
- E. No piping or equipment shall be installed in the eight (8) inch high zone directly above the finished ceiling in Tenant areas to allow for Tenant build-out and flexibility unless otherwise specifically shown on the drawings or prior written authorization is received from the Engineer.
- F. The Contractor shall follow the drawings in laying out the Work and check drawings of all trades to verify spaces in which Work will be installed. Maintain maximum headroom and, where space conditions appear inadequate, the Engineer shall be notified before proceeding with the installation.

1.19 RECORD DRAWINGS

- The Contractor shall maintain on a daily basis at the project site a complete set of A. "Record Drawings". The "Record Drawings" shall consist of a set of blue-line prints and AutoCAD files of the Contractor Coordination Drawings for this division. The prints shall include the updated AutoCAD files, which shall be periodically electronically updated to show the precise location of all buried or concealed work and equipment, including embedded piping and valves, and all changes and deviations in the mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without written definite instructions from the Engineer. Prior to commencing work, the Contractor shall obtain from the Engineer a set of AutoCAD format Architectural and Engineering Drawings on CD-ROM, to be used only to produce the Contractor's Coordination Drawings. The continuously updated coordination drawings shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format upon project completion. The Contractor shall give to the Engineer a written release signed by a corporate officer of the Contractor prior to receipt of the Engineer's disks.
- B. Dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.
- C. Upon completion of the Work, the Contractor and his Subcontractors shall certify all "Record Drawings" on the front lower right-hand corner adjacent to the above marking

with a rubber stamp impression or an AutoCAD image that states the Project name, the Contractor's name, the area covered, and the date.

- D. Prior to final acceptance of the work of this division, the Contractor shall submit properly certified "Record Drawings" to the Engineer for review and shall make changes, corrections, or additions as the Engineer may require to the "Record Drawings". Submit four (4) prints of each version until accepted.
- E. After the Engineer's review, and any required Contractor revisions, the "Record Drawings" shall be delivered to the General Contractor in AutoCAD format for the Owner's use. Upon acceptance, provide electronic versions within sixty (60) days of Final Acceptance.

1.20 ELECTRICAL EQUIPMENT AND ELECTRICAL ROOM PRECAUTIONS

- A. In general, the Contractor shall not install piping or equipment in any switchboard, switchgear, transformer, elevator equipment, telephone, telecommunications, or electrical equipment rooms unless this piping or equipment serves only these rooms. Installation is strictly prohibited where it violates the requirements of the applicable Electrical Code.
- B. No piping or other equipment foreign to the electrical installation shall be installed within the dedicated zone above switchboards, panelboards, distribution boards, and motor control centers to a height of six (6) feet above the equipment or the structural ceiling, whichever is lower. The area above the dedicated space shall be permitted to contain foreign systems, provided protection is installed to avoid damage to the electrical equipment from condensation, leaks or breaks in such foreign systems.
- C. Caution workers both verbally and in writing as to the dangers involved in doing work within or adjacent to electrical equipment within electrical closets on various floors, the Mechanical Rooms and the Switchgear Rooms, Elevator Machine Rooms, due to dangers caused by the presence of high voltages and currents in these spaces.
- D. Provide all necessary personal protective equipment meeting OSHA requirements when working in areas within live electrical equipment.

1.21 EQUIPMENT PADS AND MOUNTING

- A. Concrete pads for various pieces of equipment will be furnished under another division. Pads shall be provided in all Equipment Rooms. This shall include floor-mounted equipment, equipment mounted on legs, and pipe support stands. Equipment pad shall generally conform to the shape of the piece of equipment it serves with a minimum 3 in. margin around the equipment and supports. Pads shall be a minimum of 3-1/2 in., except pads for fire pumps shall be a minimum of 12 in. high. All pads shall have all external corners bull-nosed to a tooled radius. Provide equipment pad layouts to the division furnishing the pads. Shop drawings stamped "REVIEWED" shall be used for dimensional guidance in sizing the pads, anchor bolt locations, etc.
- B. Furnish and install galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs. Anchor bolts shall be located and of

the size and number recommended by the manufacturer of the equipment and as required for seismic restraint. When equipment is placed on vibration isolators, the equipment shall be secured to the isolator and the isolator secured to the floor or pad or supported as recommended by the vibration isolation manufacturer.

C. Where allowed by this specification, equipment is mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and be securely attached to the partition studs or framework. At the Contractor's option, the mounting screws may pass through the gypsum board and be securely attached to 8 in. high, continuous length, 16 gauge galvanized metal backplates which are attached to a minimum of three (3) metal studs. Toggle bolts installed in gypsum board partitions shall not be acceptable.

1.22 CUTTING AND PATCHING

- A. In general, cutting and patching will be done under other divisions of the specifications.
- B. Furnish to the General Contractor necessary information so that openings for this work can be built into the floors and walls in time. Such cooperation is required to keep cutting of walls and floors to a minimum.
- C. Set sleeves for pipes accurately before concrete floors are poured or set boxes on the forms to leave openings in the floors and subsequently set required sleeves in the openings.
- D. Should Contractor neglect to perform preliminary work and should cutting be required in order to install equipment, the expense of this cutting and restoring of surfaces to their original condition shall be borne by this Contractor.

1.23 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Protect from damage, water, dust all material and equipment provided under this division, both in storage and installed in accordance with manufacturer's recommendations until Notice of Completion has been filed and accepted.
- B. Arrange with General Contractor for storage facilities for materials and equipment.
- C. All products stored off site and delivered to the site must be kept in factory packing with positioning devices in place until installation. Equipment which is subject to damage from moisture shall be stored indoors in a suitably controlled environment with factory covering in place.
- D. Material, equipment or apparatus damaged because of improper storage or protection shall be rejected.
- E. Protect equipment from damage due to moisture, water, spray-on fireproofing, and construction debris during construction.

- F. Cover and protect all openings left in floor for passage of pipes. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting and conduits with caps to prevent obstruction and damage.
- G. Protect the system against freezing in cold weather.
- H. Prior to starting equipment, remove all protective materials, shipping bars, retainers, positioning devices.

1.24 CONSTRUCTION REVIEW

- A. Work may be reviewed at any time by the Engineer.
- B. Advise the Engineer that work is ready for review at the following times:
 - 1. Prior to backfilling buried work.
 - 2. Prior to concealment of work in walls and above ceilings.
 - 3. Testing of systems and equipment.
 - 4. When all requirements of the Contract have been completed.

1.25 EQUIPMENT NOISE AND VIBRATION

- A. Equipment and systems, as defined herein, shall be quiet and free of apparent vibration while in operation.
- B. Vibration shall not be apparent to the senses in occupied areas of the building. To this end, both the balancing of rotating machinery and the installation of vibration isolation at various locations are required.
- C. It shall be the responsibility of this Contractor to obtain equipment that is quiet in operation as compared to other available equipment of its size, capacity, and type; to install equipment so that a minimum amount of noise and/or vibration is transmitted to the building; and to fabricate the piping systems so that noises generated in the systems are held to an absolute minimum.
- D. Any additional precautions deemed necessary to provide a quiet installation shall be done as part of the work of this division, subject to review by the Engineer and without additional cost to the Owner. After the systems are in operation, it shall be the responsibility of the Contractor to make any changes to equipment or Work installed that may be required to provide systems which are quiet in operation and comply with the acoustic requirements as specified herein.
- E. Except in various special areas listed herein, the system noise level, in occupied spaces, shall be equal to or less than the "lowest value in the range" of the noise criteria curves for the particular space in accordance with the current edition of Applications Volume of

the ASHRAE Handbook. The noise criteria curves shall be based on ANSI Standard S1.6-1984 (R-1990) octave bands and a sound pressure level in decibels referenced to 0.002 microbars. Sound levels within the occupied spaces must meet the criteria described above and with all building, wall partition, floor, ceiling plenum depth, and ceiling construction in place as they exist for the individual spaces. The attenuation through boundary construction of Equipment Rooms must be considered in selecting equipment for acceptable noise level as described herein.

1.26 FINAL REVIEW

- A. At a time designated, the entire installation shall be reviewed for compliance with the Contract Drawings and specifications. The Contractor shall be available at all times during this Review.
- B. The Contractor shall demonstrate prior to the Final Review that all systems and all equipment have been properly balanced and adjusted and are in compliance with the requirements of the Contract Documents. After these demonstration tests are completed satisfactorily, but prior to the Final Review field visit by the Engineer, the Contractor shall submit to the Engineer a written certification that attests to Contract Document compliance for this project.
- C. Certificates and documents required herein shall be in order and presented to the Engineer at least two (2) weeks prior to the Final Review.
- D. After the Final Review, any changes or corrections noted as necessary for the Work to comply with these specifications and the drawings shall be accomplished without delay in order to secure final acceptance of the Work.

1.27 EARLY OCCUPANCY

- A. All Contractors and Subcontractors shall be responsible for completing those systems which are necessary to allow partial occupancy of the building(s) even if the systems in the unoccupied areas are incomplete. Partial or early occupancy schedules shall be developed by the General Contractor Specific attention is necessary for any areas involving special spaces such as Technology Areas which will require early operation to allow the final occupancy to be arranged on a schedule consistent with the needs of the project. The Contractor should refer to the construction schedule for this project for the schedule of completion dates assigned to the various portions of the project and schedule his work accordingly.
- B. Requirements for temporary occupancy shall be verified with the Authorities Having Jurisdiction.

1.28 DATE OF COMPLETION AND TESTING OF SYSTEMS

A. The date for the final performance and acceptance testing shall comply with the project construction schedule and shall be sufficiently in advance of the Contract completion date to permit the execution of the testing by the Contractor prior to occupancy and the close-

out of the Contract. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper and satisfactory functioning of all equipment and systems shall be completed prior to the close-out of the Contract. Re-tests shall not relieve the Contractor of completion date responsibility.

B. The Contractor shall provide a detailed schedule of completion indicating when each system component and entire system is to be completed and outlining when tests will be performed. Completion schedule shall be submitted to the Engineer, and Owner for review at a time requested by the General Contractor after the notice to proceed has been given by the General Contractor to the respective Division 21 Subcontractors. This schedule shall be updated periodically by the Contractor as the project progresses. Each update shall be submitted to the General Contractor, Engineer, and Owner for review.

1.29 OPERATING INSTRUCTIONS

- A. The Contractor shall provide the services of a factory-trained specialist to supervise the commissioning, startup, and operation of all equipment specified herein and to instruct the Owner's operators during a five (5) day operating instruction period at or near the project site. The operating instruction period shall be defined as straight-time working hours and shall not include nights, weekends, or travel time to and/or from the project and shall include a period for videotaping of the operating instructions. See individual sections of these specifications for additional instructions by manufacturer-trained specialists.
- B. The Owner shall be notified in writing at least two (2) weeks before each operating instruction period begins. The Contractor shall commence no instruction period until the Owner has issued his written acceptance of the starting time.

1.30 WARRANTY PERIOD

- A. The warranty period shall be for the period from beneficial use by the Owner, in accordance with the construction schedule.
- B. During the warranty period, the Contractor shall guarantee the following in a form satisfactory to the Owner:
 - 1. All work installed will be free from any and all defects in workmanship and/or materials.
 - 2. All apparatus will develop capacities and performance characteristics specified.
 - 3. The systems shall operate without malfunction.
- C. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

- D. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion" by the Owner or the Owner's Representative for each item of material, equipment, or system.
- E. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.
- F. Provide complete documentation of all component and system tests prior to Owner acceptance and turnover of components or systems. In addition, the Owner reserves the right to review all test objectives, test plans and test cases, and witness all preoperational tests. Provide the Owner with a comprehensive schedule detailing the preparation of testing documentation and the conduct of all component or system tests.
- G. Warrant that all components, subsystems and systems will perform their specified functions from the date of turnover and commercial operation through the useful life of the system, as determined by the various equipment manufacturers and installing Contractor. In the event components fail for any reason, be responsible to repair/replace said components, and reimburse the Owner for all costs associated with the component, subsystem or system that failed to perform the specified function.

1.31 GUARANTEE

- A. Submit a single guarantee stating that all portions of the work are in accordance with Contract requirements. Guarantee all work against faulty and improper material and workmanship for a period of one year from date of final acceptance by the Owner; except that where guarantees or warranties for longer terms are specified herein, such longer term shall apply. At no additional cost to Owner, within 24 hours after notification, correct any deficiencies which occur during the guarantee period, all to the satisfaction of the Owner and Architect. Require similar guarantees from his Subcontractors.
- B. Guarantee that the materials and workmanship supplied under these specifications will be of the best grade, that the apparatus will be erected in a practical and first class manner, that it will be complete in operation, nothing being omitted in the way of labor and material required to make this so, although not specifically shown or mentioned herein and that it will be delivered in well working order, complete and perfect in every respect without additional cost whether or not shown in detail on the drawings or described in detail in this specification.
- C. Be responsible for all damage to or caused by the work performed under this division for a period of one year from date of the acceptance of work under this Contract. Repair at no cost to Owner all such damage which occurs within 24 hours' notice thereof by the Owner. Damage which occurs prior to the completion of this Work shall be repaired at once. Be responsible for any damage and repair thereof and reimburse Owner for all expense incurred thereby. Indemnify the Owner, the Architect, the Consulting Engineers and the General Contractor against loss, liability, damage or expense, including

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reasonable attorneys' fees, in connection with any claim resulting from such leaks which may be asserted by tenants or any other third person.

1.32 DELIVERY, STORAGE AND HANDLING

- A. Include all delivery, hauling, hoisting, shoring, and placement in the building of equipment and materials specified herein, including any equipment pre-purchased by the General Contractor for installation by this Contractor. The Contractor shall be responsible for the timely delivery and introduction of equipment to the Project as required by the construction schedule for this Project. If any item of equipment is received prior to the time it is required, the Contractor shall be responsible for its proper storage and protection until such time as it may be required. The Contractor shall pay for all costs of demurrage or storage in a bonded warehouse.
- B. If any item of equipment is not delivered to or installed at the project site in a timely manner as required by the project construction schedule, the Contractor shall be solely responsible for disassembly, re-assembly, manufacturer's supervision, shoring, general construction modifications, delays, overtime costs, etc. No additional cost or delays shall be incurred by the Owner.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB's) or other hazardous materials identified by the Owner.

2.2 GENERAL

A. Refer to specific specification sections for addition equipment and system piping requirements.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with the specification section pertaining to the individual equipment and system piping.

END OF SECTION 210000

SECTION 210500

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Contractor and his Subcontractors shall provide all labor, materials, tools, scaffolding, machinery, equipment, appliances, and services necessary to complete the fire suppression work under this Contract. All systems and equipment shall be complete in every respect and all items of material, equipment and labor shall be furnished and installed for a fully operational system. This Contractor shall coordinate his work with the work of the other trades so as to resolve conflicts without impeding job progress or the project construction schedule. Provide notice with the bid proposal of any concrete work required by this division that is not indicated on the Structural or Architectural drawings or drawings of other trades.
- B. This Contractor shall examine all Contract Documents for all divisions of the specifications in order to determine the extent of work required to be completed under this division. Failure to examine all the Contract Documents for this project will not relieve this Contractor of the responsibility to perform all the work required for a complete, fully operational and satisfactory installation.
- C. Provide all miscellaneous common fire suppression products required for a complete fire suppression installation as indicated, in accordance with the requirements of the Contract Documents.
- D. Section includes:
 - 1. Sleeves.
 - 2. Access doors.
 - 3. Formed steel channel.
 - 4. Escutcheons.
 - 5. Protective pans.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Each product required for the common fire suppression work shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. ASTM International
 - 1) ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 21 00 00 and shall include, but not be limited to:
 - 1. Product cut sheets and schedule of sleeves and mechanical sleeve seals used for the project. The schedule shall include the material, diameter, length, number of links, location, and service; the sleeve and sleeve seal will be provided.
 - 2. Product cut sheets and schedule of access doors used for the project. The schedule shall include the material, size, finish type, location and purpose of installation the access door will be provided.
 - 3. Product cut sheets of formed steel channel.
 - 4. Product cut sheets of escutcheons. The cut sheets shall indicate the size, finish and location, which the escutcheons will be installed.
- B. Product Data: Submit manufacturer's literature, including general assembly.
- C. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for each product and system that is installed.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 21 00 00 shall apply to all work specified herein.
- B. All materials and equipment shall be fabricated by companies, whose primary business expertise is the manufacturing of commercial and industrial products of the type specified herein. The manufacturer shall have been in continuous operation in the manufacture of the products specified for a minimum of ten (10) years.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all materials of any type from one manufacturer.
- A. Furnish all equipment, materials and accessories new and free from defects.

1.6 WORK INCLUDED

- A. The work includes, but is not limited to, the following systems, equipment and services:
 - 1. Fire suppression system consisting of all items indicated on the drawings and/or specified herein, such as:
 - a. Automatic fire pumps and controllers.
 - b. Alarm tamper and flow switches.
 - 2. Furnish and install all miscellaneous supports for Division 21 work and equipment.
 - 3. Furnishing of shop drawings, product data and samples.
 - 4. Furnishing of "Record Drawings".
 - 5. Furnishing of Contractor "Coordination Drawings".
 - 6. Furnishing of operating and maintenance books.
 - 7. Miscellaneous items as required for complete and functioning systems as specified herein and as indicated on the drawings.
 - 8. All systems, equipment and services specified herein shall be furnished and installed complete and ready for use.
 - 9. Furnish and install all sleeves for the fire protection work complete with seals and firestop as specified herein and as required by the Authority Having Jurisdiction.

- 10. Patching or replacement of all fireproofing if it is damaged or removed during the installation of the work.
- 11. Participate in and assist in the operation of the fire safety ventilation equipment as required during the performance testing and startup of the Division 28 fire detection, alarm and communication systems. Refer to Division 28 - Fire Detection, Alarm and Communication System for additional requirements.
- 12. Instruments as required for operating and testing the various systems shall be furnished and installed completely as specified herein.
- 13. Hydrostatic testing, operational testing and adjusting of all systems.
- 14. Complete flushing and chemical treatment and initial water treatment for all water systems.
- 15. Complete all tests required by all rules, regulations, etc., of all Authorities Having Jurisdiction and prepare, complete and file all forms, tabulations, plans, etc., pertinent thereto with the referenced authorities, and accomplish such work with personnel of proper caliber, in particular, Professional Engineers, where so required.
- 16. Participate in and provide all labor as required for "off-hour" testing of equipment and systems if required by job conditions or by Authorities Having Jurisdiction and as required to obtain the "Temporary Certificates of Occupancy (TCO)."
- 17. Participate in and provide all labor as required for system commissioning including any time required for a detailed review of the commissioning process as requested by the Engineer or the Owner.
- 18. Sprinkler systems shall be hydraulically calculated to the following hazard classification parameters:
 - a. Office Areas: Light Hazard, 0.10 gpm/sq.ft. over 1,500 sq.ft.
 - b. Storage, Mechanical Equipment Rooms: Ordinary Hazard Group 1, 0.15 gpm/sq.ft. over 1,500 sq.ft.
 - c. Fuel Oil Storage and Emergency Generator Room: Ordinary Hazard Group 2, 0.20 gpm/sq.ft. over 1,500 sq.ft.
 - d. Dry Pipe Sprinkler Systems: Ordinary Hazard Group 1, 0.15 gpm/sq.ft. over 1,950 sq.ft.

1.7 WORK OF OTHER DIVISIONS

A. Electrical connections for motors and mounting of loose motors.

- B. Individual motor controllers except motor controllers furnished as integral parts of pieces of equipment.
- C. Wiring for automatic controls and interlocks.

VERIFYING EXISTING CONDITIONS

- D. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship according to the intent of this specification, and report to the Owner any condition, which prevents performance of first-class work. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.
- E. Become thoroughly familiar with actual existing conditions at the building of the present installations to which connections must be made or which must be changed or altered. The intent of the work is shown on the drawings and described hereinafter, and no consideration shall be granted by reason of lack of familiarity on the part of the Contractor with actual physical conditions at the site. Inspect each and every area affected by the total alteration of the building before submitting bid.

1.8 SUBCONTRACTS

A. Where Contract Documents require manufacturers' services, and wherever the staff of this Contractor performing the work of this section cannot adequately perform such services, this Contractor shall stipulate such performance in its contracts with its Subcontractors or Sub-Subcontractors, vendors, manufacturers, and the like, or else subsequently pay them any additional fees required therefor.

1.9 FACTORY TESTING

A. All mechanical sleeve seals and access doors shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's installation instructions.
- C. Protect all components from physical damage, including effects of weather, water and construction debris.

1.11 COORDINATION

A. Coordinate the installation of work in this section with the following:

1.12 UNIT PRICES

- A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.
 - 1. Sleeves

\$____/each

1.13 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Access Doors
 - 1. Karp Associates, Inc.
 - 2. Milcor.
 - 3. Williams Brothers Corp.
- D. Escutcheons
 - 1. Chicago Specialty.
 - 2. Producers Specialty.
 - 3. Sanitary-Dash.
- E. Formed Steel Channel
 - 1. Allied Tube & Conduit Corp.
 - 2. B-Line Systems.
 - 3. Unistrut Corp.
- F. Sleeves

- 1. Metraflex Co.
- 2. Pipeline Seal & Insulator Inc. (Link-Seal)
- 3. Calpico, Inc.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment, which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair including, but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 SLEEVES

- A. Furnish sleeves for all pipes passing through floors, walls and concrete, or concrete fireproofed beams.
- B. Sleeves in Concrete Beams, Through Concrete Walls, and Exposed Pipes Penetrating Floors: Schedule 40 steel pipe.
- C. Provide sleeves in foundation walls and in concrete pits with anchor flange.
- D. Sleeves within Furred-out Enclosures in Floors, Through Partitions, Steel Beams and Walls: 18 gauge (1.2 mm) thick galvanized steel.

2.4 ACCESS DOORS

- A. Provide access doors as required for all concealed valves, cleanouts and other elements requiring access above ceilings or behind walls or as indicated on the drawings. The installation of all doors will be performed under the work of another section. Coordinate the work and assume responsibility for the accessibility of all valves.
- B. Provide access doors factory-made, completely flush, heavy metal access doors as manufactured by Karp Associates, Inc.
- C. Frames shall be a 14-gauge steel, welded with mitered corners ground smooth, anchors.

- D. Doors shall be 14-gauge steel, heavy hinges flush with frame, invisible when closed, wing-type airplane catches; no bolts, screws, nuts or other loose devices required for opening of door.
- E. All access doors and frames shall be given a prime coat of corrosion-resistant paint at the factory.
- F. Furnish the following access doors as manufactured by Karp Associates, Inc.
 - 1. In plaster ceilings, KARP DSC 210-PL.
 - 2. In 3-hour masonry enclosures (pipe or duct shafts), KARP DSC-211-FRT with 1-1/2 inch vermiculite plaster fill. Metal lath lining for plaster shall be self-furring type, tack-welded to pan.
 - 3. In nonrated masonry, KARP DSC-211.
 - 4. In drywall construction, KARP DSC-214M.

2.5 FORMED STEEL CHANNEL

- A. Provide formed steel channel as required to sufficiently support piping and equipment in accordance with the Contract Documents.
- B. Formed steel channel shall be galvanized 12 gauge (2.8 mm) thick steel, with holes 1-1/2 inches (38 mm) on center.

2.6 ESCUTCHEONS

- A. Provide escutcheons as required to sufficiently enclose penetrations in fire and smoke rated walls and partitions in accordance with the Contract Documents.
- B. Where pipes penetrate fire or smoke rated walls provide metal escutcheons on both sides of the wall penetration.
- C. Escutcheons shall be either one-piece or two-piece construction, chrome-plated brass or stainless steel.

2.7 **PROTECTIVE PANS**

- A. Provide protective pans under individual or rack of pipes passing over critical equipment, high voltage (440V) electrical bus duct, switchgear or starting equipment.
- B. Protective pans shall be 12 gauge black iron it with a 6 inch lip, the corners being welded to make the pans watertight. Give each pan three (3) coats of Rust-Oleum paint and support with pipe hangers, and drain clear of the equipment below.

PART 3 - EXECUTION

- 3.1 EXAMINATION
 - A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and returned to the manufacturer for replacement.
- 3.2 INSTALLATION
 - A. Installation shall be in accordance with the specification section pertaining to the individual equipment.
 - B. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the drawings shall be followed as closely as possible, but the right is reserved by the Engineer to change locations and elevations to accommodate conditions which may arise during the progress of the work, prior to installation, without additional compensation for such changes. The responsibility for accurately laying out the work and coordinating the installation with other trades rests with this Contractor. Should it be found that any work is laid out so that interferences will occur, report that to the Engineer before commencing work.
 - C. Carry fixture connections, concealed in building construction, to points above floor, break out close to the underside or adjacent to fixture and continue exposed to fixture.
 - D. Piping Installation
 - 1. Install pipes approximately as shown on the drawings and as directed during installation, as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced. Erect pipe risers plumb and true, and parallel with walls and other pipes and neatly spaced.
 - 2. Keep all horizontal runs of piping, except where concealed in partitions, as high as possible and close to walls.
 - 3. Do not install pipes or other apparatus in a manner, which interferes with the full swing of the doors.
 - 4. Ream all pipe smooth before installation. Do not bend, flatten, split or otherwise injure pipe.
 - 5. Use reducing fittings, unless otherwise approved in special cases, in making reduction in size of pipe. Bushings shall not be allowed unless specifically approved.
 - 6. Do not install exterior piping in water or when trench or weather conditions are unsuitable for the work, as decided by the Architect.
 - E. Sleeves

- 1. Set sleeves in position in forms. Provide reinforcing around sleeves.
- 2. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- 3. Extend waterproof sleeves through floors 1 inch (25mm) above finished floor level. Caulk sleeves tight.
- 4. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with firestopping and caulk airtight. Provide close-fitting metal collar or escutcheon covers at both sides of penetration.
- 5. Sleeves passing through fire-rated floors or walls shall be sealed with an intumescent formulation similar to Metraflex Metraseal 120 FireSeal or approved.
- 6. Sleeves passing through foundation walls or pit walls shall be sealed utilizing a mechanical seal similar to Link-Seal or approved.
- 7. Install chrome-plated steel escutcheons at finished surfaces.
- 8. Set sleeves as construction progresses and secure in place during pouring of concrete.
- 9. Firestopping shall be installed as specified under Section 07 84 00.
- F. Access Doors
 - 1. Size access doors as required for the equipment being accessed, however access doors shall not be smaller than 16 inches by 16 inches. Install all valves to fit within the limit of the following size access doors; where two (2) or less valves are located with their bonnets within 12 inches of the face of the door and all portions of the valves are within the area defined by the opening in the door, 16 inch x 16 inch doors may be used. Where more than two (2) valves are served by a door and the bonnets are within 12 inches of the face of the door, the size of the door shall be increased so that all portions of the valves are within the area defined by the opening in the door. Where the bonnets of the valves are more than 12 inches from the face of the door, the doors shall be minimum of 20 inch x 20 inch clear opening.
 - 2. Furnish buttons or tabs to Ceiling Contractor for setting, as approved by Architect, to indicate location of valves, cleanouts or other equipment located above removable-type ceilings where access doors are not furnished.
- G. Protective Pans
 - 1. Install protective pans within 6 inches of the underside of piping or equipment.

- 2. Pans shall be sized a minimum 2 inches greater in each dimension around the piping and equipment, which it's being supported under.
- 3. Protective pans shall be supported by hangers and supports sized sufficient to carry the weight of the pan filled with water. All hangers and supports shall be attached to the structure. Hanging protective pans from the equipment or piping above shall not be acceptable.
- 4. Make drain connections to the side or bottom of pan by welding or brazing and drain clear of the equipment, which the pan is protecting.
- 5. Perform a standing water test on the pan by filling with water to within 1 inch of the top of the lip and let stand for 30 minutes with no leakage.
- H. Escutcheons
 - 1. Provide pipe escutcheons with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings, and pipe sleeve extensions, if any. Furnish pipe escutcheons with chrome finish for occupied areas, prime paint finish for unoccupied areas.
 - 2. Escutcheons for waterproof floors, and areas where water and condensation can be expected to accumulate shall be stainless steel or chrome plated cast brass, solid or split hinged.
 - 3. Escutcheons for dry areas shall be chrome plated cast brass or galvanized sheet steel, solid or split hinged.

3.3 CLEANING

- A. Before final connections are made and before operation of equipment and piping, thoroughly blow out, rod out, or wash out all piping at least twice, in a manner as directed and/or approved by the Architect, to remove all accumulation of dirt, chips or other deleterious material. Make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expense to the Owner.
- B. Clean up all equipment and leave in condition for finish painting before acceptance.

3.4 **PROTECTIVE PAINTING**

- A. Painting, except as specified herein or indicated otherwise, shall be done under another division. This division shall cooperate with the other divisions to determine the size of equipment, sizes and lengths of pipes, etc., to be painted.
- B. Equipment and materials furnished under this section shall be factory-finished as specified. If the factory finish is damaged during shipment, storage, installation, etc., it shall be repainted by this Contractor subject to the Engineer's approval. Touch-up painting is acceptable only for minor finish damage.

- C. Repair damaged and marred factory-painted finishes with materials and procedures to match original factory finish.
- D. Paint products for identification of fire suppression systems shall be exterior grade, alkyd-based products.
- E. Finish painting of the fire standpipe and sprinkler risers, cross-connections, handles of all fire protection valves and apparatus shall be in accordance with Local Law 58 of 2009.
- F. Provide a heavy field coat of paint on all fire standpipe and sprinkler piping in accordance with Local Law 58 of 2009, prior to the hydrostatic pressure test and whether the pipe will be encased, partially encased in building construction or exposed, as described herein:
 - 1. Fire Standpipe Systems
 - a. Main distribution piping, cross-connection and risers shall be painted red.
 - b. Handles of valves serving dedicated fire standpipe systems shall be painted red.
 - 2. Combination Fire Standpipe Systems
 - a. Main distribution piping, cross-connection and risers shall be painted red.
 - b. Handles of valves serving combination fire standpipe systems shall be painted yellow.
 - 3. Sprinkler Systems
 - a. Main distribution piping, cross-connection and risers shall be painted red.
 - b. Handles of valves serving dedicated sprinkler systems shall be painted green.

3.5 FIELD TESTS

- A. Test all systems in full accordance with applicable Underwriters' and Municipal requirements.
- B. Notify the Architects and Inspectors Having Jurisdiction at least 48 hours in advance of performing the required tests, so that arrangements may be made for their presence to witness the tests.
- C. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the

Architects, fire suppression and other Inspectors of the City, applicable Insurance Association and Public Utilities Inspectors Having Jurisdiction.

- D. Repair or, if required by the Architects, replace defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- E. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- F. Test the systems before any paint or insulation is applied.
- G. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.
- H. Performance Tests
 - 1. Prior to applying the hydrostatic test, the system shall be tested with 50 psig compressed air or dry nitrogen for a period of ten minutes with no loss in pressure.
 - 2. Apply a hydrostatic test to each fire standpipe and sprinkler system. Each system shall be tested to a pressure not less than 200 psig or 50 psig above the normal operating pressure, whichever is greater. Apply the test for a minimum of two (2) consecutive hours with no loss in pressure.
- I. Final Acceptance
 - 1. Prior to final acceptance the Contractor shall submit all performance test reports for each test performed. The reports shall be bound in a three-ring binder and submitted to the Engineer and Owner for review.
 - 2. Final acceptance testing shall comply with the project construction schedule and shall be sufficiently in advance of the Contract completion date to permit the execution of the testing by the Contractor prior to occupancy and the close-out of the Contract.
 - 3. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper and satisfactory functioning of all equipment and systems shall be completed prior to the closeout of the Contract. Re-tests shall not relieve the Contractor of completion date responsibility.

END OF SECTION 210500

SECTION 210513

COMMON MOTOR REQUIREMENTS FOR FIRE SUPPRESSION EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all electric motors, motor starters and controllers required for equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Alarm devices.
 - 2. Electric motors.
 - 3. Motor starters and controls.
 - 4. Fire pump motor controllers.
 - 5. Pressure maintenance pump motor controllers.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Each electric motor, motor starter and controller and all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - c. New York City Electrical Code.
 - 2. Reference Standards
 - a. American Bearing Manufacturing Association (ABMA)

	1)	ABMA - 4: Tolerance Definitions and Gaging Practices for Ball Bearings and Roller Bearings.	
	2)	ABMA - 9: Load Ratings and Fatigue Life for Ball Bearings.	
b.	International Code Council Evaluation Services (ICC ES)		
	1)	ICC ES: Acceptance Criteria 156.	
c.	International Electrical Testing Association (NETA)		
	1)	NETA Standard for Acceptance Testing Specifications.	
d.	National Electrical Manufacturers Association (NEMA)		
	1)	NEMA MG 1: Motors and Generators.	
	2)	NEMA 250: Enclosures for Electrical Equipment.	
e.	National Fire Protection Association (NFPA)		
	1)	NFPA 13: Standard for the Installation of Sprinkler Systems.	
	2)	NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.	
	3)	NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.	
	4)	NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.	
	5)	NFPA 70: National Electrical Code.	
	6)	NFPA 72: National Fire Alarm Code.	
	7)	NFPA 101: National Life Safety Code.	
f.	Underwriters Laboratories (UL)		
	1)	UL218: Standard for Fire Pump Controllers.	
	2)	UL508: Standard for Industrial Controls.	

 UL674: Standard for Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 21 00 00 and shall include, but not be limited to:

COMMON MOTOR REQUIREMENTS

- 1. Electric motors, motor starters and controllers for all equipment included under this section.
- 2. Electric Motors: Shop drawings shall state motor manufacturer, horsepower, RPM, voltage, frequency, full load amps, power factor and efficiency standards compliance, electrical ratings and characteristics, mechanical performance data, physical dimensions, weights and support points. In addition, special shaft or mounting detail requirements as well as shaft limitation details and any other special requirements shall be listed on these drawings.
- 3. Motor Starters and Controls: Shop drawings shall state the controller Manufacturer name, circuiting diagram, voltage, special options, enclosure details, transfer switches and any other special requirements listed herein.
- 4. Motor Controllers: Shop drawings shall state the controller manufacturer name, circuiting diagram, voltage, special options, enclosure details, transfer switches and any other special requirements listed herein.
- B. Product Data: Submit manufacturers literature including general assembly, motor operating curves showing performance characteristics with pump and system, operating point indicated, controls, wiring diagrams, and service connections.
- C. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspection.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for the system.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.
- B. All materials and equipment shall be fabricated by companies, whose primary business expertise is the manufacturing of commercial and industrial products of the type specified herein. The manufacturer shall have been in continuous operation in the manufacture of the products specified for a minimum of ten (10) years.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Certify that motor selection and performance have been coordinated with the equipment that is being supplied for the project.
- F. Furnish all equipment, materials and accessories new and free from defects.

G. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All electric motors, starters and controllers shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. Provide factory test reports for each electric motor indicating RPM, torque, electrical characteristics, motor efficiency, full load amperage and load factor.
 - 2. Provide factory test reports for all fire pump motor controllers in accordance with the manufacturer's requirements.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
 - B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
 - C. Protect all components from physical damage, including effects of weather, water and construction debris.
 - D. Handle motors with lifting lugs provided for this purpose.
 - E. Maintain the minimum temperatures required to prevent the formation of condensation on motor windings, motor controllers and starters.
 - F. For extended outdoor storage, remove motors from equipment and store separately in a weatherproof location.

1.8 COORDINATION

- A. Coordinate the installation of work in this section with the following sections:
 - 1. Section 01 31 46 Special Requirements
 - 2. Section 26 05 19 Low-Voltage Electrical Power Conductors and Cables
 - 3. Section 28 21 13 Fire Alarm and Smoke Detection System

1.9 WARRANTY

- A. Comply with the requirements of Section 21 00 00 unless specified herein.
- B. Furnish a three (3) year manufacturer's warranty for each electric motor, starter and associated accessories.
- C. Furnish a three (3) year manufacturer's warranty for each fire pump motor controller.
- D. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Electric Motors
 - 1. Baldor.
 - 2. Niedec Motor Corp (formely US Electric Motors).
 - 3. Weg.
- D. Motor Starters
 - 1. Allen Bradley.
 - 2. Cutler Hammer.
 - 3. General Electric.
 - 4. Siemens.
 - 5. Square "D".
 - 6. Westinghouse.
- E. Fire Pump and Jockey Pump Motor Controllers
 - 1. ASCO/Firetrol.
 - 2. Eaton.
 - 3. Master Control Systems, Inc

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 ALARM DEVICES

- A. Provide all alarm devices directly connected to each fire pump motor controller, equipment and piping required for the transmission of alarms to the building fire alarm system.
- B. Switches shall be normally open or closed type in order to conform with the alarm system to which they are connected.
- C. All interconnecting electrical wiring will be furnished under Division 26.
- D. Alarms transmitted from each fire pump motor controller shall be the following:
 - 1. Power failure.
 - 2. Fire pump operating indication.
 - 3. Phase reversal.

2.4 ELECTRIC MOTORS

- A. Provide UL Listed and approved electric motors for driving fire protection equipment of proper type, power and speed to suit the specified equipment.
- B. Motors shall comply in all respects with NFPA Standard No. 20, "Standard for the Installation of Stationary Pumps for Fire Protection".
- C. Motors shall be of sizes and types specified, of the proper power and speed to suit the specified makes of equipment. If other than the specified makes of equipment are accepted, the adjustment of motor horsepower, motor speed, and wire size, motor disconnect, and starter sizing must be included without additional cost.
- D. All motors 1/2 horsepower and larger shall operate on 208 volt, 3 phase, 60 hertz alternating current, except as otherwise noted on the equipment schedule.
- E. All motors less than 1/2 horsepower shall operate on 120-volt single phase, 60 hertz, alternating current, except as otherwise noted on the equipment schedule.
- F. Equipment manufacturer's standard motors may be provided when motors are less than 250 watts (0.06 kcal/s) or 1/4 hp (0.045 kcal/s).

- G. All motors shall be quiet-operating type, guaranteed to fulfill specified requirements without producing any sound audible outside of Machine Rooms. Supply motors made by one of the acceptable Manufacturer's.
- H. Wiring terminations, such as terminal lugs shall be furnished and coordinated with Division 26 to match branch circuit conductor quantities, sizes and materials indicated.
- I. Coordinate the electric motor with the torque and inertia load of the equipment served. Certify the coordination of the equipment at the time drawings are submitted for approval.
- J. Coordinate the inrush characteristics of the motor with the starter and branch circuit overcurrent protection selection, so that all items furnished constitute a properly related package.
- K. Motors shall not operate in the service factor range.
- L. All motors shall be sized to have sufficient starting torque to be able to accelerate the driven load from zero rpm to design speed rpm within 6 seconds maximum. Submit substantiating calculations.
- M. All motors mounted in the vertical position shall have drip covers.
- N. Horsepower, rpm, voltage, hertz, and phase shall be as scheduled.
- O. In general, except as otherwise specified, all horizontal motors for indoor operation in a clean environment shall be Open Drip Proof (ODP Motors shall be squirrel-cage induction type, guaranteed to fulfill the specified requirements without producing any sound audible outside of Machine Rooms.
 - 1. Motors shall be constructed in accordance with the following:
 - a. They shall be fitted with extra-heavy-duty grease-lubricated bearings having a minimum ABMA 9, L_{10} life of 200,000 hours (rated at continuous duty) and bearing housings fitted with self-sealing grease fittings and pressure-relief fittings.
 - b. Motors shall be of cast iron construction (aluminum is not acceptable). Conduit box shall be cast iron, diagonally split with threaded hole for conduit.
 - c. Each motor shall have a stainless steel or aluminum data-plate containing the following minimum information:

Manufacturer	RPM	UL Label
Туре	Voltage/Phase Frequency	Connection Diagram
Model	Enclosure Type	Motor Efficiency
Horsepower	Frame Size	Full-Load Current
Service Factor		

- d. Insulation system shall be rated minimum NEMA Class B (130°C).
- e. Maximum temperature rise by resistance at rated HP shall not exceed Class B limits (80°C).
- f. They shall operate within the 1.15 Service Factor the maximum temperature rise by resistance shall not exceed Class F limits (115°C).
- g. The speed/torque and speed/current characteristics shall comply with NEMA Design A or B, as specified.
- h. Motors shall be suitable for full voltage starting, unless otherwise specified.
- i. Sound Power Levels: Conform to NEMA MG 1
- P. 3-Phase Motors: Shall be NEMA MG 1, Design B, energy efficient squirrel cage induction motor, with windings to accomplish starting methods and the number of speeds as indicated on the drawings.
 - 1. The voltage shall be 208 volts, 3 phase, 60 Hz, as indicated on the drawings.
 - 2. Motor Frames: NEMA Standard T-frames made of cast iron with end brackets of cast iron with steel inserts.
 - 3. Motor frame sizes 254T and larger shall have PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay with wiring to terminal box.
- Q. Single-Phase Motors
 - 1. Provide permanent split capacitor types where available, otherwise use splitphase start/capacitor run or capacitor start/capacitor run motor.
 - 2. The voltage shall be 115 volts single phase, 60 Hz.
- R. All motors shall be adequately protected against, weather, water, and dirt damage until operational and final acceptance by Owner.

2.5 MOTOR STARTERS AND CONTROLS

- A. Furnish and turn over to the General Contractor who will coordinate the installation of the same, suitable starting and controlling equipment, all as specified. Starting equipment shall be arranged, generally, in control centers or, in certain cases, as isolated combination starters, as specified or indicated.
- B. Coordinate electrical equipment with the components furnished with each piece of equipment so that the entire assembly of electrical components and equipment components of an electrical nature comply with the National Electrical Code and governing local codes.

- C. Starters for motors less than 1/2 hp shall be 120 volts, single phase, 60 hertz, AC service. Manual starters with overload protection and lockout-type disconnect switch or breaker may be used to control such motors, except where interlocks or automatic controls are required. In such cases, magnetic across-the-line starters shall be furnished.
- D. Starters for motors 1/2 hp to 75 hp shall be magnetic across-the-line type with combination fusible switches. Such starters shall be 208 volt, 3 phase, 3 wire or 4 wire as required, 60 hertz, AC service.
- E. Starters for pump motors over 100 hp shall be part-winding (1/2-1/2) type. All starters for motors 100 hp and over shall be digital solid stated reduced-voltage type or digital soft starters as specified herein. These starters shall be for 208 volt, 3 phase, 3 wire or 4 wire as required, 60 hertz, AC service, and they shall be combination lockout fusible-switch type.
- F. Starter assemblies for 208 volt service shall be rated for 100,000 A.I.C.
- G. Each starter shall be equipped with one sealing contact for momentary contact start buttons and auxiliary contact for control of pilot lights.
- H. All pushbuttons shall be heavy duty, oiltight, one-hole mounting, momentary contact, either normally open or closed contacts as required. Pilot lights shall be red and ganged in same enclosure with pushbuttons. Pilot lights shall be suitable for 120 volt service.
- I. All magnetic starters subject to manual start shall have momentary contact start and stop buttons built into cover. All magnetic starters subject to electrical interlock or automatic control shall have Hand-Off-Automatic switches built into cover.
- J. All starters shall have control power transformers built into the starter cubicle or casings with a secondary voltage of 120 volt. The primary voltage of the control power transformer shall match the motor voltage, which it serves.
- K. Transformers with fuses in the primary and secondary circuits shall serve all control circuits, including auxiliary devices. Each starter subject to electrical interlock and/or automatic control shall have the necessary auxiliary contacts. One set of terminals shall be provided for each control circuit. Control centers shall be provided with control terminal blocks with an individual terminal for each external connection. No more than one external connection shall be made to any terminal.
- L. All wiring, starters, switches, etc., shall be in full accordance with all local and Underwriters Code requirements.
- M. All starters shall be enclosed in NEMA Type 2 enclosures unless otherwise specified.
- N. Hereinafter specified control groupings shall be constructed in accordance with this section. Where pilot lights, Hand-Off-Automatic switches, or reset buttons are called for, they shall be mounted through the door of the control cabinet.
- O. All heater elements must be coordinated against motor nameplate ratings.

- P. Furnish detailed wiring diagrams to those installing the electrical work and furnish such other information necessary to assure the proper connection, operation and control of motorized equipment, including interlocks, and automatic and safety control auxiliary circuits.
- Q. Magnetic starters shall have ambient compensated, manually resettable, thermal overload in each phase leg and low voltage protection. Overload selection shall be based on actual full load nameplate amps of motor installed.
- R. All components within starters (relays, coils, cores, resistance, insulation contacts, trippers, etc.) shall be of the approved type. All parts subject to wear, arcing, etc., shall be renewable.
- S. All wiring within starters shall be in full accordance with all local and Underwriters Code requirements.

2.6 FIRE PUMP MOTOR CONTROLLERS

- A. The fire pump control panel shall be completely assembled, wired and tested at the Manufacturer's factory, and shall be specifically listed and approved for fire pump service.
- B. The design of the controller shall conform to the requirements outlined in NFPA 20. All equipment shall be Factory Mutual, approved, Underwriters Laboratories listed, and approved for use by the Authorities Having Jurisdiction.
- C. The panel enclosure shall be a NEMA Type 2, drip-tight, free-standing formed sheet steel cabinet arranged to permit installation with the back against the wall with all operating handles, wiring, and components accessible from the front. The entire assembly, including the enclosure, shall be "Service Rated" and have a short circuit current rating of not less than 100,000 amperes at 460 volts.
- D. Controller shall be combined manual and automatic type, with automatic transfer switch as hereinafter described for emergency power supply, suitable for full voltage starting of a squirrel cage motor, and shall consist of the following components:
 - 1. One (1) isolating switch, 3 poles, non-fusible of approved capacity, with latch-in device manually operated.
 - 2. One (1) circuit breaker, manually operated, 3 poles, 600 volts, AC, having a rating of at least 115% of the rated full load current of the motor. The breaker shall permit normal starting without tripping and shall provide stalled rotor protection and instantaneous short-circuit protection. The circuit breaker shall be inverse time delay type with a time delay of not over 20 seconds on 600% (locked rotor current) of the motor full load current. The magnetic trips shall be calibrated at least up to and set at 300% of the motor full load amperes.
 - 3. One (1) motor starter, full voltage type, designed to be energized automatically through action of the pressure transducer, or manually by means of a start button on the front of the enclosure. Under emergency conditions it shall be possible to

start the fire pump manually through an externally operated handle provided with a latch-in device.

- 4. One (1) solid-state pressure transducer with a range of 0-300 psi for controlling the running of the motor automatically and provided with independent adjustment for cut-in and cutout pressure points. Connection to the pressure transducer shall be separated from all electrical components by a waterproof barrier.
- 5. One (1) deluge valve relay for remote starting.
- 6. One (1) power availability relay energized from the load side of the circuit breaker so that it will drop out if the circuit breaker is opened or the power fails. This relay shall be provided with one (1) normally closed and one (1) normally open isolated contact for remote alarm indication.
- 7. One (1) start button on front of enclosure.
- 8. One (1) stop button on front of enclosure.
- 9. Provide "Modification Terminal Blocks" (in addition to the standard terminal block), which shall include a minimum of five (5) N.C. and five (5) N.O. alarm contacts.
- 10. Terminal blocks and red nameplates shall be provided as required by the Underwriters.
- E. The fire pump controller shall feature an operator interface with user keypad. The interface shall monitor and display motor operating conditions, including all alarms, events and pressure conditions including 3 phase amps and volts simultaneously. The controller shall be provided with:
 - 1. Sequential Start Timer (on delay) 0-60 seconds.
 - 2. Run Period Timer 0-60 minutes.
 - 3. Off Delay 0-60 minutes.
 - 4. Manual Stop Only.
- F. The controller shall record all operational alarm events to system memory. All events shall be time and date stamped and shall include an index number. The system memory shall have the capability of storing 3,000 events and allow the user access to the event log via the user interface. The user shall have the ability to scroll through the stored messages in groups of 1 to 10.
- G. The controller shall have a built-in USB host controller. A USB port capable of accepting a USB flash memory disk shall be provided. The controller shall save all operational and alarm events to the flash memory on a daily basis. Each saved event shall be time and date stamped. The total amount of historical data saved shall solely

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depend on the size of the flash disk utilized. The controller shall have the capability to save settings and values to the flash disk on demand via the user interface.

- H. The controller shall be network ready and feature an RS485 serial communications for use with 2 or 4 wire Modbus RTU communications.
- I. The control panel shall be Firetrol Model FTA-1000 Full Voltage fire pump controller.
- J. See Equipment Schedule for start-stop pressure settings.

2.7 JOCKEY PUMP MOTOR CONTROLLERS

- A. The jockey pump control panel shall be completely assembled, wired and tested at the Manufacturer's factory, and shall be specifically listed and approved for jockey pump service.
- B. The design of the controller shall conform to the requirements outlined in NFPA 20. All equipment shall be Factory Mutual, approved, Underwriters Laboratories listed, and approved for use by the Authorities Having Jurisdiction.
- C. The jockey pump controller shall be the same Manufacturer as the main fire pump controller.
- D. The jockey pump controller shall consist of a NEMA Type 2 wall-mounted, drip-proof enclosure formed sheet steel enclosure with the following parts assembled and wired therein:
 - 1. One (1) externally operated fusible disconnecting switch.
 - 2. One (1) across-the-line type magnetic starter with thermal overload protection.
 - 3. One (1) hand-off-automatic selector switch.
 - 4. One (1) running period timer to keep motor running for a predetermined time after each automatic start to prevent short cycling.
 - 5. One (1) pressure switch, with a range of 0-290 psi, diaphragm style, snap-action type contact with an adjustable pressure differential.
- E. Jockey Pump Controllers shall be Firetrol, Inc., Model FTA-560F.
- F. See Equipment Schedule for start-stop pressure settings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all equipment in factory packaging and examine for visible damage. All damaged equipment shall be removed from the job site and replaced by the manufacturer.

- B. Carefully check space requirements with other trades to ensure that all motor controllers can be installed in the spaces allotted thereto and that the required clearance are maintained.
- C. Wherever the installing Contractor's work interconnects with work of other Contractors, the installing Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary so that they may properly install all necessary connections and equipment.

3.2 INSTALLATION

- A. Electric motors and starters shall be installed in accordance with the manufacturer's recommendations.
- B. Fire pump and jockey pump controllers shall be installed in accordance with NFPA and the local Authorities Having Jurisdiction.
- C. The arrangement, positions and layout of equipment indicated on the drawings shall be followed as closely as possible, but the right is reserved by the Architect to change locations and elevations to accommodate conditions which may arise during the progress of the work, prior to installation, without additional compensation for such changes. The responsibility for accurately laying out the work and coordinating the installation with other trades rests with this Contractor. Should it be found that any work is laid out so that interferences will occur, report that to the Architect before commencing work.
- D. Install motors and motor controllers with space for service access; no less than minimum of 3 ft. 0 in. clear or as mandated by code and the Authorities Having Jurisdiction, whichever is greater.
- E. The installation of all starting equipment furnished under this section shall be as specified under Division 26, except starters specified to be factory mounted and wired as part of the equipment. All wiring necessary to supply power to the electric motors provided under this section will be provided under the Electrical Section, including connections from the starters and/or motor control centers to the motors.

3.3 CLEANING

A. Before final connections are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all equipment in condition suitable for finish painting, before final acceptance.

3.4 INSPECTION AND STARTUP SERVICE

- A. Inspect each motor, starter, transfer switch, fire pump and jockey pump control panel for proper installation.
- B. Inspect each electrical connection and verify lugs are tightened to the specified torque ratings as required by the Manufacturer. Verify the control panel, both inside and out is free from debris. Verify connection to normal and emergency electrical service.

- C. Inspect each automatic transfer switch including electrical connections and manually operate prior to startup to verify operation.
- D. Each motor shall be checked for proper rotation and alignment prior to startup of pumps.
- E. Properly lubricate all electric motor bearings and parts requiring lubrication prior to startup. The lubricant shall be as recommended by the equipment Manufacturer.
- F. The motor controller manufacturer shall provide factory-trained field service personnel for the final checkout and startup. This service shall include:
 - 1. Field checkout of power and control wiring to controllers and motors, including interfacing signal wiring to the building control system.
 - 2. Initial power-up of the equipment, including measurement of input voltages.
 - 3. Initial operation of the equipment, including measurement of output voltage and current under operating load.
 - 4. Operational check of control logic, operator devices, safety device inputs, protective functions, motors, and auxiliary control device inputs.
 - 5. Adjustment of motor overload protection devices.

3.5 FIELD TESTS

- A. Performance Test
 - 1. The Contractor shall prove the capacity and performance and/or demonstrate operating controls and safety devices of each piece of equipment by field tests as requested and/or specified in various sections of these specifications. All equipment and instruments required for tests shall be provided at no additional cost to the Owner. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests, if he so desires.
 - 2. The Contractor shall notify the Owner, Architect, Engineer and Inspectors Having Jurisdiction in writing, at least two (2) weeks prior to the day of the test that arrangements may be made for their presence to witness the tests.
 - 3. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
 - 4. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.
 - 5. Test motor amperage and voltage on each phase at operating conditions.

- 6. Perform a complete test of each fire pump and jockey pump controller to verify functionality, alarms and communication between the controller and fire alarm system.
- B. Integrated Test
 - 1. Test the communication between the fire pump controllers and jockey pump controllers and the fire alarm systems. Verify that alarms are fully functional prior to final acceptance testing.
 - 2. Verify that overload heaters installed in motor starters are properly sized and adjusted for the motors they serve.
 - 3. Verify that all motors have been properly lubricated and left ready for operation.
 - 4. All alarms (BMS, fire alarms, etc.) shall be tested to fulfill satisfactory operating conditions. Verify proper operation of electrical safety interlocks and limit switches.
- C. Final Acceptance Test
 - 1. Schedule test to be witnessed by the Authority Having Jurisdiction, Owner's insurance underwriter, Owner's representative, Commissioning Agent and/or Engineer.
 - 2. Test each motor, fire pump controller, jockey pump controller and all associated alarms in accordance with Authority Having Jurisdiction.
 - 3. Test all fire pumps and fire pump controllers in the presence of the Authority Having Jurisdiction.
 - 4. The Contractor shall perform a full functional test of each fire pump controller and jockey pump controller prior to final acceptance by the Owner.
- D. Commissioning
 - 1. Commission each fire pump controller, jockey pump controller and electric motor

3.6 ADJUSTING AND BALANCING

- A. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- B. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- C. The building fire alarm system devices shall be properly adjusted and left in good working condition.

- D. Adjust motor overload protection devices.
- E. Unless otherwise specified, equipment shall be adjusted in accordance with Manufacturer's recommendations to function properly with capacities required and/or specified.
- F. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
- G. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.

END OF SECTION 210513

SECTION 210519

METERS AND GAUGES FOR FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all meters and gauges required for equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Pressure gauges.
 - 2. Fire pump test meters.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Each flow meter and pressure gauge shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
- B. Reference Standards
 - 1. National Fire Protection Association (NFPA)
 - a. NFPA 13: Standard for the Installation of Sprinkler Systems.
 - b. NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.
 - c. NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 21 00 00 and shall include, but not be limited to:
 - 1. Pressure gauges and flow meters for all equipment included under this section.
 - 2. Submit manufacturer's literature including general assembly information, size, connection, make, model, pressure range, scale range, finish, materials of construction and units of pressure and/or flow.
- B. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for all equipment.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.
- F. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All pressure gauges and flow meters shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment.
 - 1. The pressure gauge manufacturer shall provide documentation the gauge has been factory tested and performs to the accuracy specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.

C. Protect all components from physical damage, including effects of weather, water, and construction debris.

1.8 UNIT PRICES

- A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.
 - 1. Fire Pump Test Meter (see drawings for size) \$ /each

1.9 WARRANTY

- A. Comply with the requirements of Section 21 00 00.
- B. Furnish a five (5) year manufacturer's warranty for each fire pump test meter.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Fire Pump Test Meters
 - 1. Global Vision Inc.
 - 2. SPP Pumps.
 - 3. Victaulic.
- D. Pressure Gauges
 - 1. Ashcroft Gauge Co.
 - 2. Reliable Sprinkler Co.
 - 3. Viking Corp.

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- 4. Simplex Grinnell.
- 5. Trerice.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment, which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 FIRE PUMP TEST METER

- A. Provide a fire pump test meter with associated piping accessories required for each automatic fire pump installation as required by the Authority Having Jurisdiction and as specified herein.
- B. The fire pump test meter shall be an FM Approved and/or UL listed, venturi type, fixed mounted fire pump test meter supplied by one manufacturer.
- C. The entire assembly shall be rated for the fire pump discharge pressure, which it is installed on. Test meters shall be venturi type (butt-welded, grooved, or full flanged) with steel body, complete with valve manifold for connection to flow tube meter and quick disconnect valves for calibration purposes.
- D. Venturi's shall be selected to accurately measure flow throughout the range of 50% to 200% of the rated capacity of the fire pump for which the meter will be used.
- E. Provide a 4-1/2 in. diameter dial type flow gauge for each venturi flow tube showing the entire flow range of 0% to 200% of the fire pump rating. The gauge shall be fixed mounted on the venturi.
- F. The accuracy of the meter shall be no less than 0.5% of full scale.
- G. Flow meters shall be equipped with shutoff valves, vent valves and shall be suitable for the operating pressure of the systems.

- H. Attach a brass identification tag with chain to each venturi flow tube indicating manufacturer, model number, size, flow rating in GPM, meter range, maximum working pressure, date of manufacture, FM Approval and/or UL listing.
- I. Operating instructions shall be secured to unit.

2.4 PRESSURE GAUGES

- A. Provide pressure gauges at the water entry to the building, on the inlet and outlet of each sprinkler control assembly, inlet and outlet of each pressure-reducing valve, fire pump, jockey pump, and other locations as specified herein.
- B. All pressure gauges shall have an accuracy span as specified with ranges suitable for the service intended. The normal operating range shall be between 25% and 75% of the full-scale range, and the maximum operating pressure shall not exceed 75% of the full-scale range. Gauges shall read in the pressure ranges of the systems in which they are installed or as listed in the Equipment Capacity Schedule.
- C. General Purpose Pressure Gauges
 - 1. General purpose pressure gauges shall be accurate to $\pm 2-1/2\%$ of span, 4-1/2 inch (114 mm) size, aluminum case with rubber blow-out disc in rear, acrylic lenses, chrome-plated steel ring, with PowerFlexTM movement and True Zero indication.
 - 2. Each gauge shall have 1/4-inch (6 mm) N.P.T. bottom connection, with adjustable black pointer, white face, black figures and segments similar to Ashcroft Gauge Co. Model No. 2071A.
 - 3. Gauges shall be fitted with pulsation snubbers and brass bar stock needle valves or ball valves rated at 600 psi (40 bar) WOG. Ball cocks with plug-type mechanisms shall not be acceptable.
- D. Pressure Gauges at Equipment
 - 1. Pressure gauges at equipment shall be accurate to $\pm 1\%$ of span, 4-1/2 inch (114 mm) size, stainless steel case with rubber blow-out disc in rear, acrylic lenses, chrome-plated steel ring, with PowerFlexTM movement and True Zero indication.
 - 2. Each gauge shall have 1/4-inch (6 mm) N.P.T. bottom connection, with adjustable black pointer, white face, black figures and segmentals similar to Ashcroft Gauge Co. Model No. 1009.
 - 3. Gauges shall be fitted with pulsation snubbers and brass bar stock needle valves or ball valves rated at 600 psi (40 bar) WOG. Ball cocks with plug-type mechanisms shall not be acceptable.

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Gauge Location	Pressure Range
At top of each riser	0 - 250 psi
At outlet of each sprinkler control assembly	0 - 250 psi
Each pump suction	0 - 150 psi
Each pump discharge	0 - 500 psi

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

- A. A fire pump test meter shall be installed for each automatic fire pump where specified herein, in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- B. Pressure gauges shall be installed where specified herein, in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.

3.3 CLEANING

A. Before final connections are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all equipment in condition suitable for finish painting before final acceptance.

3.4 INSPECTION AND STARTUP SERVICE

- A. Inspect each fire pump test meter for proper installation according to the manufacturer's instructions. Verify all connections to venturi and hoses are tight and free of leakage.
- B. Inspect each pressure gauge for proper installation according to the manufacturer's instructions. Verify valve serving each gauge is open and gauge is registering proper pressure.
- C. Prior to startup of system, verify that the normal operating range will be between 25% and 75% of the full-scale range, and the maximum operating pressure does not exceed 75% of the full-scale range of the pressure gauge.
- D. Vendor shall furnish written instructions for testing flow-measuring stations and water flow meters in the field as part of the operating and maintenance instructions.

E. Document the results of all testing and inspections.

3.5 FIELD TESTS

- A. Performance Test
 - 1. The Contractor shall prove the capacity and performance of each fire pump test meter and demonstrate operating controls by field tests as required. All equipment and instruments required for tests shall be provided at no additional cost to the Owner. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests, if he so desires.
 - 2. The Contractor shall notify the Owner, Architect, Engineer and Inspectors Having Jurisdiction in writing, at least two (2) weeks prior to the day of the test that arrangements may be made for their presence to witness the tests.
 - 3. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
 - 4. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.
 - 5. Perform a complete flow test of each fire pump in accordance with Section 21 31 13 to verify functionality and accuracy of each fire pump test meter.

3.6 ADJUSTING AND BALANCING

- A. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- B. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- C. Unless otherwise specified, fire pump test meters shall be calibrated in accordance with manufacturer's recommendations to function properly with capacities required and/or specified.
- D. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.

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END OF SECTION 210519

SECTION 210523

GENERAL-DUTY VALVES FOR WATER-BASED FIRE SUPPRESSION PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all valves required for equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Butterfly valves.
 - 2. Check valves.
 - 3. Gate valves.
 - 4. Tamper switches.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.
- C. The following specification sections apply to all work herein:

1.3 REFERENCES

- A. Each valve and all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. American Society of Mechanical Engineers (ASME)
 - 1) ASME/ANSI B16.5: Pipe Flanges and Fittings.
 - 2) ASME B16.34: Valves Flanged Threaded and Welding End.

GENERAL-DUTY VALVES

	b.	Manufacturers	Standardization	Society ((MSS)
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- 1) MSS SP-6: Standard Finishes for Contact Faces of Pipe Flanges and Connecting-end Flanges of Valves and Fittings.
- 2) MSS SP-25: Standard Marking System for Valves, Fittings, Flanges and Unions.
- MSS SP-53: Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and Other Piping Components.
- 4) MSS SP-61: Pressure Testing Steel of Valves.
- 5) MSS SP-67: Butterfly Valves.
- 6) MSS SP-68: High Pressure Offset Seat Butterfly Valves.
- 7) MSS SP-70: Cast Iron Gate Valves, Flanged and Threaded Ends.
- 8) MSS SP-71: Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- 9) MSS SP-80: Bronze Gate, Globe, Angle and Check Valves.
- 10) MSS SP-82: Valve Pressure Testing Methods.
- 11) MSS SP-85: Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.
- 12) MSS SP-110: Ball Valves Threaded, Socket-welding, Solder Joint, Grooved and Flared Ends.
- c. National Fire Protection Association (NFPA)
 - 1) NFPA 13: Standard for the Installation of Sprinkler Systems.
 - 2) NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.
 - 3) NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.
 - 4) NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the Conditions of the Contract, and Section 21 00 00 and shall include, but not be limited to:

- 1. Schedule of valves, complete with typical mill reports.
- 2. Fire suppression piping control valves, pressure-reducing valves, breach control valves, deluge valves, check valves, alarm valves and chain operators.
- B. Product Data: Submit manufacturer's literature including general assembly, including but not limited to the following:
 - 1. Dimension and specification sheets.
 - 2. Model number.
 - 3. Pressure rating.
 - 4. Working pressure.
 - 5. List of materials.
 - 6. Manufacturer's installation instructions.
- C. Schedule of Valves: Submit a single, well-organized schedule for all valves indicating the following:
 - 1. Valve type/model number.
 - 2. System type.
 - 3. Location/floor.
 - 4. Pressure rating.
 - 5. Pipe size.
 - 6. Connection method.
- D. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- E. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for the system.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.

- C. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.
- F. Maintain one (1) copy of the approved submittals for each product on site.
- 1.6 FACTORY TESTING
 - A. All valves shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. The valve manufacturer shall provide documentation that all valves have been factory tested and perform to the performance and pressure ratings specified.
 - 2. All valves shall be factory tested in accordance with the latest applicable version of NFPA and UL Standards.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Comply with the requirements of Section 21 00 00.
 - B. Accept all material and equipment on-site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
 - C. Protect all components from physical damage, including effects of weather, water and construction debris.
 - D. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, pilot line and weld ends.
 - 3. Set the angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
 - E. 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.
- 3. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

1.8 COORDINATION

A. Coordinate the installation of work in this section with the following sections:

1.	Section 01 31 46	-	Special Requirements
2.	Section 26 05 00	-	Common Work Result for Electrical
3.	Section 26 05 19	-	Low Voltage Electrical Power Conductors and Cables
4.	Section 28 31 13	-	Fire Detection and Alarm

B. The installation of all wiring for monitoring devices furnished under this section shall be installed as specified under Division 28.

1.9 UNIT PRICES

A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.

1.	Butterfly Valve	\$/each
2.	Check Valve	\$/each
3.	Gate Valve	\$/each

1.10 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Furnish a five (5) year manufacturer's warranty for all manual valves.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the

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project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.

- C. Butterfly Valves
 - 1. Jenkins.
 - 2. Milwaukee.
 - 3. Nibco.
 - 4. Victaulic.
- D. Chainwheels
 - 1. Babbit Steam Specialty Co.
 - 2. Roto Hammer Industries.
 - 3. Trumbull Industries.
- E. Check Valves
 - 1. Crane.
 - 2. Kennedy.
 - 3. Mueller.
 - 4. Nibco.
 - 5. Williams Hagar.
- F. Gate Valves
 - 1. Crane.
 - 2. Jenkins.
 - 3. Kennedy.
 - 4. Nibco.
 - 5. Stockham.
 - 6. Wolworth.
- G. Pressure-Relief Valves
 - 1. Cla-Val Co.
 - 2. Danfoss.
 - 3. Singer Valve Inc.
 - 4. Val-matic.
 - 5. Watts.
- H. Tamper Switches
 - 1. Acme.
 - 2. Grinnell.
 - 3. Potter.
 - 4. Viking.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.
- D. Shutoff valves, isolation valves, and check valves shall be provided as indicated on the Construction Documents or as required by the Authorities Having Jurisdiction on the drawings, required or directed.
- E. Valve pressure ratings shall not be less than indicated and as required for system pressures.
- F. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- G. The use of butterfly valves shall be limited to shutoff services only and only where specifically permitted by the Engineer.
- H. Valve-End Connections
 - 1. Flanges on iron valves shall meet ASME B16.1
 - 2. Flanges on steel valves shall meet ASME B16.5
 - 3. Flanges on bronze and/or brass valves shall meet ASME B16.24
 - 4. Grooved end valves shall meet AWWA C606.
 - 5. Threaded ends shall meet ASME B1.20.1.
 - 6. Soldered lines double union ends with solder joints ASME B16.18.
- I. Valve Operators

- 1. Gear operators shall be provided on all quarter turn valves.
- 2. Handwheels shall be provided on all water supply valves including quarter-turn types.
- 3. Provide ladders or chain operating devices in Mechanical Equipment Rooms or stairwells for all valves located more than 7 feet 0 inches above floor.
- J. Valves in insulated piping shall be provide with 2 inch (50 mm) stem extensions having the following features:
 - 1. Extended operating handle of non-thermal-conductive material.
- K. Provide bypasses for gate valves as tabulated below. Install bypasses so that the bypass valve is accessible.

	Pressure Differential Above Which	
Valve Size	a Bypass Should Be Used	Bypass Size
4 inch (100 mm)	200 psi (13.8 bar)	1 inch (25 mm)
5 inch (125 mm),	200 psi (13.8 bar)	1-1/4 inch (32 mm)
6 inch (150 mm)		
8 inch (200 mm)	100 psi (6.9 bar)	1-1/2 inch (38 mm)
10 inch (250 mm)	75 psi (5.2 bar)	1-1/2 inch (38 mm)

- L. Floor Stands for Valves: With or without position indicator, as approved.
- M. Valves used on the fire standpipe system shall be listed by UL/FM and approved by the municipal Authorities Having Jurisdiction. Where the valve manufacturer selected cannot furnish an IBBM valve with such approval, substitute an approved cast steel valve.
- N. All fire standpipe valves for each zone shall be as scheduled below including the associated distribution loop at the base of the building:

Check Valves	Gate Valves	WWP (psi) (bar)
Nibco F-908-W	Nibco F-607-RW	175 (12.1)
Nibco F-968-B	Nibco F-697-0	350 (24.2)
Nibco F-968-B	Nibco F-667-0	500 (34.5)

- O. Valves controlling sprinkler takeoffs shall be FM approved, UL listed, NYC OTCR approved, OS&Y gate, or butterfly valves, approved for the proper pressure rating in the zone, which it is served.
- P. All valves controlling water to sprinklers shall be as scheduled below:

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Valve Type	1/2 to 2 in.	2-1/2 to 12 in.
		Nibco F-607-RW (175 wwp) (12.1 bar)
OS&Y Gate	Nibco T-104-0 (2 in. only, 175 wwp) (12.1 bar)	Nibco F-697-0 (350 wwp) (24.2 bar)
		Nibco F-667-0 (500 wwp) (34.5 bar)
Butterfly	Nibco LD-3510-8 (2 in. Only, 300 wwp) (20.7 bar)	Nibco GD-6765-8N (350 wwp) (24.2 bar)

2.3 BUTTERFLY VALVES

- A. Resilient Seated and High-Performance Butterfly valves shall be full lug type suitable for bidirectional dead-end service at rated pressure without use of downstream flange. Conforming to ANSI Class 150 flange drilling.
- B. Stem seal shall not rely on compression between seating material and disc but shall be accomplished by EPDM O-ring seals and have threaded upper and lower collar bushings to provide blowout proof stems and low torque operation.
- C. Disc shall not be attached to stem by fasteners or locknuts. Molded-in seat material shall be EPDM and designed to prevent dislocation during closure; seating material must simultaneously act as flange gasket.
- D. Valve must be factory tested and certified to seat bubble tight.
- E. Gear operators shall be used on all fire protection butterfly valves.
- F. Fire protection butterfly valve shall be suitable for indoor/outdoor use, equipped with two (2) factory-mounted internal supervisory switches.
- G. Resilient seated butterfly valves shall be constructed as follows:

Body	Ductile Iron
Body Style	Tapped full lug or grooved
Trim	316 stainless steel stem
Disc	Ductile iron, Aluminum bronze, bronze or stainless
	steel
Seat	EPDM
Body P/T Rating	175 psig (12.1 bar) at 100°F (38°C) minimum
Seat P/T Rating	175 psig (12.1 bar) at 100°F (38°C) minimum

H. High performance butterfly valves, ANSI Class 150 valves shall be constructed as follows:

Ductile from

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	01071
Body Style	Tapped full lug or Grooved
Trim	316 stainless steel stem
Disc	Aluminum bronze, bronze or stainless steel
Seat	PTFE
Body P/T Rating	285 psig (19.6 bar) at 100°F (38°C) minimum
Seat P/T Rating	200 psig (13.5 bar) at 100°F (38°C) minimum

2.4 CHECK VALVES

- A. Check valves shall be threaded, flanged or grooved ends suitable for the system, which it is being installed.
- B. Check valves shall be a horizontal swing check with renewable bronze seat and disc.
- C. Valve must be factory tested and certified to seat bubble tight.
- D. Cast iron swing check valves shall be constructed as follows:

Body	Cast Iron
Body Style	Bolted Cover
Disc	Cast Bronze
Ends	Flanged
Body P/T Rating	175 psig (12.1 bar) at 100°F (38°C) minimum
Seat P/T Rating	175 psig (12.1 bar) at 100°F (38°C) minimum

E. Class 600 cast steel swing check valves shall be constructed as follows:

Body	Carbon steel
Body Style	Bolted cover
Disc	Stainless steel
Seat	Steel
Trim	Carbon steel
Ends	Flanged
Body P/T Rating	ASME A216
WOG Rating	600 psig (41.4 bar) minimum

2.5 GATE VALVES

- A. All gate valves on the fire standpipe or sprinkler system 4 inches (100 mm) and over shall be of the OS&Y type.
- B. Where space conditions do not permit the installation of this type of valve, utilize Class 125 non-rising stem (NRS) gate valves.
- C. The use of NRS gate valves shall be called out by the Contractor and approved by the Engineer prior to installation.
- D. Ductile Iron Class 125, 150 and 300 gate valves 2-1/2 inch (65 mm) and larger shall be constructed as follows:

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Body	Cast Iron
Body Style	Outside screw and yoke rising stem
Trim	Bronze
Wedge	Cast Bronze
Packing	Asbestos free
Ends	Flanged
Body P/T Rating	ASME A536
WOG Rating	175 psig (12.1 bar) minimum

E. Cast Steel Class 600 gate valves 4 inch (100 mm) and larger shall be constructed as follows:

Body	Cast Steel
Body Style	Outside screw and yoke rising stem
Trim	Steel
Wedge	Carbon Steel
Packing	Asbestos free
Ends	Flanged
Body P/T Rating	ASME A216
WOG Rating	800 psig (55.2 bar) minimum

2.6 PRESSURE-RELIEF VALVES

- A. Pressure-relief valves shall be provided on all automatic fire pump discharges as specified herein, installed in accordance with NFPA 20 and the Authorities Having Jurisdiction.
- B. The main valve shall be a hydraulically operated, pilot-controlled, diaphragm type, globe or angle pattern valve. The valve shall be FM Approved and UL Listed for fire service to maintain steady line pressure in fire protection pumping systems.
- C. The main valve shall have a resilient disc, having a rectangular cross-section, contained on three and one-half sides by a disc retainer and forming a tight seal against a single renewable seat; quad rings and "O" rings shall not be acceptable. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a threaded removable T303 stainless steel bearing in the valve cover and by an integral bearing in the threaded removable T303 stainless steel valve seat. This diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. All necessary repairs shall be possible without removing the main valve from the line.
- D. Pilot-operated pressure-relief valves shall be cast ductile iron ASTM A536 or stainlesssteel ASTM A743 body and cover, with brass or T303 stainless steel trim. The valve shall have Class 300 flanged ends that conform to ANSI B16.24 and shall have a maximum working pressure of 225 psi (15.25 bar).
- E. The pilot control shall be a normally open, direct acting, adjustable, spring-loaded diaphragm valve, designed to close when downstream pressure rises. The valve body shall be all bronze with stainless steel trim. This valve shall include a round Buna-N

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diaphragm, retained by eight (8) machine screws. The rubber disc that seals against the stainless steel seat shall be compression molded into a brass disc retainer. The disc retainer shall have machined threads to attach to a cast bronze yoke. The yoke shall be attached to the diaphragm, with torque compensation, and shall convert differential force (spring load vs. outlet pressure) into linear motion. This design shall ensure smooth transition while the valve modulates to match the corresponding pressure changes. The pilot system shall also include a fixed restriction device, a self-cleaning strainer, and a field-adjustable opening speed control.

F. Pilot operated pressure-relief valves shall be Model No. 50B-4KG1KXHI (globe pattern) or 2050B-4KG1KXHI (angle pattern), as manufactured by Cla-Val Company.

2.7 TAMPER SWITCHES

- A. Provide tamper switches for all valves controlling water flow in fire suppression systems as identified on the Construction Documents or as required by the Authority Having Jurisdiction.
- B. All interconnecting electrical wiring will be furnished under Divisions 26, 28 for tamper switches on valves and tamper switches directly connected to equipment provided by this Contractor, required for the transmission of alarm impulses.
- C. Tamper switches shall be open or closed type to conform with the alarm system to which they are connected.
- D. Tamper switches shall give an alarm if the valves served are closed, the switches are removed, or if the cover is opened. Valve stems shall be notched to take tamper switches.
- E. Provide tamper switches for the following valves including but not limited to the following:
 - 1. All valves control the flow of water to the fire standpipe system, fire hose valves, fire pumps and jockey pumps.
 - 2. All valves on the incoming fire service control valves, meter valves, fire reserve tank fill lines and all valves on the outlet of each fire reserve tank.
 - 3. All valves controlling the flow of water to sprinkler heads, floor control valves, supply valves to pre-action and deluge valves.
- F. Tamper switches shall be Acme Fire Alarm Co. Type OSYS-U, or as approved.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

- A. All valve installations shall be in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- B. Exposed valves shall be installed as nearly as possible parallel to or at right angles to the column lines of the building.
- C. Valves in finished portions of the building, except in mechanical equipment rooms, stairwells, or where otherwise indicated on the drawings shall be concealed and provided with access doors.
- D. All piping shall be carefully graded so as to eliminate traps and pockets. Where water traps cannot be avoided, provide drain valves.
- E. All valves throughout the building shall be thoroughly and substantially supported with UL listed and/or FM approved hangers and support devices. Furnish and install any special hangers or supports that may be required due to any peculiarities of construction. The design, selection spacing, and application of horizontal hangers, supports, restraints, anchors, and guides shall be in accordance with the applicable NFPA 13 and 14.
- F. All valves shall be installed according to the Local Authority rules and an inspection certificate furnished.
- G. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Balanced Check Valves (center-guided): In horizontal or vertical position, with stem upright and plumb.

3.3 CLEANING

A. Before final connections are made and before operation of all valves, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all valves in condition suitable for finish painting, before final acceptance.

3.4 INSPECTION AND STARTUP SERVICE

- 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 material composition is suitable for service, and that it is free from defects and damage.
- E. A factory representative from the pressure-reducing valve and control valve manufacturer shall be present for startup service, inspection and any necessary adjustments.
- F. After completion of the automatic sprinkler system and at the beginning of the warranty period the Automatic Sprinkler Subcontractor shall perform, without charge to the Owner, one (1) inspection of the sprinkler system during the warranty period. Inspection shall be as per the applicable NFPA No. 25, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems", plus the following maintenance to be performed during the course of the inspection:
- G. Defective valves shall be replaced with new valves.

3.5 FIELD TESTS

- A. Integrated Test
 - 1. Test the communication between tamper switches and the fire alarm systems. Verify that alarms are fully functional prior to final acceptance testing.
 - 2. Verify that all valves have been properly lubricated and left ready for operation.
 - 3. All alarms (BMS, fire alarms, etc.) shall be tested to fulfill satisfactory operating conditions. Verify proper operation of electrical safety interlocks and limit switches.
- B. Final Acceptance Test: The Standard Form of the National Fire Sprinkler Association, Inc., "Report of Inspection" (Sheets 1 and 2), shall be filled out in triplicate after each inspection and the copies sent to the Architect and Owner.
- C. Commissioning
 - 1. Reserved.

3.6 ADJUSTING AND BALANCING

- A. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- B. Repair, or if required by the Engineer replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- C. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.

- D. Notify the Engineer and Inspectors Having Jurisdiction at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.
- E. The building fire alarm system devices shall be properly adjusted and left in good working condition.
- F. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.
- G. Adjust valve stops to assure positive shutoff.
- H. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.

END OF SECTION 210523

SECTION 210529

HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all hangers, supports and anchors required for piping and equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. The Division 21 Subcontractor shall assume complete responsibility for the anchoring of the equipment, piping systems, specified hereinafter to the concrete foundation pads, to the concrete inertia bases, and to the supporting structural steel and concrete beams.
- C. Section includes:
 - 1. Pipe hangers and supports.
 - 2. Attachments to structure.
 - 3. Formed steel channel supports and accessories.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. All hangers and supports, including all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. American Society of Mechanical Engineers
 - 1) ASME B31.1: Power Piping.

- 2) ASME B31.9: Building Services Piping.
- b. ASTM International
 - 1) ASTM A 36: Standard Specification for Carbon Structural Steel.
 - 2) ASTM A 47: Standard Specification for Ferritic Malleable Iron Castings.
 - 3) ASTM A 48: Standard Specification for Gray Iron Castings.
 - 4) ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5) ASTM A 240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 6) ASTM A 283: Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 7) ASTM A 536: Standard Specification for Ductile Iron Castings.
 - 8) ASTM A 575: Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
 - 9) ASTM A 668: Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
 - 10) ASTM A 1011: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 11) ASTM B 633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 - 12) ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.
 - 13) ASTM E 119: Method for Fire Tests of Building Construction and Materials.
 - 14) ASTM E 814: Test Method of Fire Tests of Through Penetration Firestops.
 - 15) ASTM F 708: Standard Practice for Design and Installation of Rigid Pipe Hangers.
- c. American Welding Society

- 1) AWS D1.1: Structural Welding Code Steel.
- d. Manufacturers Standardization Society of the Valve and Fittings Industry
 - 1) MSS SP 58: Pipe Hangers and Supports Materials, Design and Manufacturer.
 - 2) MSS SP 77: Guidelines for Pipe Support Contractual Relationships.
 - 3) MSS SP 89: Pipe Hangers and Supports Fabrication and Installation Practices.
 - 4) MSS SP 90: Guidelines on Terminology for Pipe Hangers and Supports.
 - 5) MSS SP 127: Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.
- e. National Fire Protection Association (NFPA)
 - 1) NFPA 13: Standard for the Installation of Sprinkler Systems.
 - 2) NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.
 - 3) NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 21 00 00 and shall include, but not be limited to:
 - 1. Provide shop drawings indicating system layout with location showing critical dimensions, sizes, pipe hanger and support locations and detail of trapeze hangers.
 - 2. Method of attachment to and load imposed on building structures by hangers, anchors, supports, guides and supplemental steel shall be submitted for review and approved by the project Architect and Structural Engineer.
 - 3. Shop drawings indicating support methods, point loadings to the building structure and hanger locations shall be submitted for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes to hanging and support methods.
- B. Product Data: Submit manufacturer's literature including general assembly,

- 1. Hangers and Supports: Submit manufacturer's catalog data including load capacity and sizing schedules specific to this project.
- 2. Inserts: Submit manufacturer's catalog data including load capacity.
- C. Design Data: Indicate load-carrying capacity of trapeze, multiple pipe, and riser support hangers. Indicate calculations used to determine load-carrying capacity of trapeze, multiple pipe, and riser support hangers. Submit sizing methods and calculations sealed by a Professional Engineer licensed in New York State.
- D. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- E. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for the system.
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
 - 2. Firestopping: Submit preparation and installation instructions.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.
- F. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All hangers, rods, supports and accessories shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Comply with the requirements of Section 21 00 00.

- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.

1.8 COORDINATION

A. Coordinate with other trades to use common means of support. Submit for approval all pertinent design data relating to the support as well as verification of the responsibility for the support.

1.9 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Furnish a five (5) year manufacturer's warranty for all pipe hangers and supports.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Anchors and Inserts (Undercut Wedge Type)
 - 1. DeWalt.
 - 2. Hilti.
 - 3. ITW Red Head.
 - 4. MKT Fastening, LLC.
 - 5. Simpson Strong-Tie.

D. Anchors and Inserts (Adhesive Type)

- 1. DeWalt.
- 2. Hilti.
- 3. ITW Red Head.
- 4. Simpson Strong-Tie.
- E. Formed Steel Channel Supports

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- 1. Anvil International.
- 2. Carpenter & Patterson, Inc.
- 3. Empire Industries, Inc.
- 4. Eaton

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- 5. Hilti.
- 6. National Pipe Hanger Corporation.
- 7. PHS Industries, Inc.
- 8. Piping Technology and Products.
- 9. Thomas & Betts Kindorf.
- 10.
- F. Pipe Hangers, Supports and Guides
 - 1. Anvil International.
 - 2. Carpenter & Patterson.
 - 3. Empire Industries, Inc.
 - 4. Eaton
 - 5. Hilti.
 - 6. National Pipe Hanger Corporation.
 - 7. PHS Industries, Inc.
 - 8. Piping Technology and Products.
 - 9. Thomas & Betts Kindorf.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 PIPE HANGERS AND SUPPORTS

A. Provide suitable and substantial hangers and supports for all piping and equipment. Hangers and supports shall be of the type, size and spacing specified or as required by the Authority Having Jurisdiction.

- B. Hangers shall be UL Listed and/or FM Approved and approved for use on fire service as listed in NFPA 13. All hangers and supports shall be designed to support five (5) times the weight of the water-filled pipe plus 250 lb. (114 Kg) at each point of piping support.
- C. Comply with maximum load ratings with consideration for allowable stresses prescribed by ASME B31.1 or MSS SP-58 and shall comply with NFPA 13 requirements.
- D. Pipe hangers, anchors, supports and guides shall be manufactured, selected, fabricated and installed in accordance with MSS SP-58, MSS SP-69 and MSS SP-89.
- E. Provide supports, guides and anchors that do not transmit unacceptable vibration to building structure.
- F. The support systems shall provide for, and control, the free or intended movement of the piping, including its movement in relation to that of connected equipment.
- G. Provide for vertical adjustments after installation of supported material and during commissioning, where feasible, to ensure pipe is at design elevation and slope.
- H. Select hangers and supports to perform under all conditions of operation, allowing free expansion and contraction, and to prevent excessive stresses being introduced into piping system and connected equipment.
- I. Where piping is required to be seismically restrained, the yoke on clevis hangers and/or roller hangers shall be reinforced to prevent the yoke from deforming. In the case of clevis hangers providing nuts on the inside and outside of the threaded rod connecting the yoke and clevis is acceptable.
- J. Provide drawings indicating pipe loads, including method of suspension and hanger location, and submit them for approval prior to proceeding with installation. Provide all the supplementary steel required to support, guide and anchor piping within shafts, Mechanical Equipment Rooms and all the other floors.
- K. Particular care shall be taken to support all pipes in a manner approved by the Architect, including the providing of supplementary steel, if required.
- L. Where insulation is provided, protect the insulation, the length of the sleeve with a galvanized 20 gauge shield (360 deg.).
- M. Support vertical risers from the building construction by means of pipe clamps at every floor. Provide channels of approved sizes where pipe clamps are too short to connect to the building construction.
- N. Finishes
 - 1. Hangers, anchors, inserts, supports and guides (swivel ring, split ring, roller, wrought pipe clamp, or adjustable wrought clevis-type hangers, roller supports, floor stands, wall brackets, etc.) installed within the building shall be hot dipped galvanized in accordance with ASTM A123 or stainless steel.

- 2. Strut channels installed indoors shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90.
- 3. Hangers, anchors, supports, guides and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123 or stainless steel. All hanger hardware shall be hot-dip galvanized or stainless steel. Zinc-plated hardware shall not be acceptable for outdoor or corrosive use.
- O. Hangers
 - 1. Pipes 2 inches (50 mm) and smaller shall be supported with one of the following:
 - a. Adjustable steel swivel ring (band type) hanger.
 - b. Malleable iron split ring hanger.
 - c. Adjustable steel clevis hanger.
 - 2. Pipes 2-1/2 inches (63.5 mm) and larger shall be supported with one of the following:
 - a. Adjustable steel swivel ring (band type) hanger.
 - b. Adjustable steel clevis hanger.
 - 3. Insulated pipes shall be supported adjustable steel clevis hangers and preinsulated sheet metal insulation shields.
- P. Trapeze Hangers
 - 1. Shall be constructed of one of the following:
 - a. 12 gauge roll-formed 1-5/8 inch (40 mm) by 1-5/8 inch (40 mm) minimum structural steel channel.
 - b. Two (2) structural steel channels secured together with 1/2 inch (12.5 mm) or 3/4 inch (20 mm) steel pipe sections.
 - 2. Pipes shall be secured to trapeze by one of the following methods:
 - a. Uninsulated Pipe: 2-piece pipe straps with thermoplastic elastomeric liner sized for outside diameter of pipe.
 - b. Insulated Pipe: 2-piece pipe straps sized for outside diameter of pipe and insulation using insulation shields.
- Q. Floor and/or Roof Supports
 - 1. Shall be one of the following:

- a. Adjustable pipe saddles and nipples welded or screwed to steel base stands secured to floor or roof.
- b. Adjustable roller stands with base plates secured to floor or roof.
- 2. Pipes shall be secured to supports by one of the following methods:
 - a. Uninsulated Pipe: 2-piece pipe straps with thermoplastic elastomeric liner sized for outside diameter of pipe.
 - b. Insulated Pipe: 2-piece pipe straps sized for outside diameter of pipe and insulation using insulation shields.
- R. Accessories
 - 1. Pipe protection saddles shall be formed from carbon steel, 1/8 inch (3 mm) minimum thickness, sized for insulation thickness.
 - 2. Preinsulated shields shall be 180 degrees, 18 gauge minimum galvanized sheet metal, minimum 12 inch (305 mm) long, with high-density water-repellant Kaylo insulation, foam glass or high-density polyisocyanurate inserts minimum thickness to match the outside diameter of the insulated pipe.

2.4 ATTACHMENTS TO STRUCTURE

- A. All piping shall be carried by pipe hangers and supports attached to the building structure. All supports and restraints requiring connections to steel-plated building construction shall be welded to steel plating.
- B. Method of attachment to and load imposed on building structures by hangers, anchors, supports, guides and supplemental steel shall be submitted for review.
- C. In no case shall hangers be supported by means of vertical expansion bolts.
- D. Powder and power-actuated devices, grip nails, and/or expansion nails shall NOT be permitted.
- E. Structural Steel Attachments
 - 1. Center-loaded beam clamps or welded beam attachments shall be used where piping is to be suspended from building steel. Clamp shall be forged steel or malleable iron with cross bolts sized as required to fit beams and selected on the basis of load configuration and load to be supported.
 - 2. Where allowed by Structural Engineer, C-clamps with locknuts, cup point set screws and retaining straps shall be used. Top flange C-clamps shall be used when attaching a hanger rod to the top flange of structural shapes. Set screw torque shall be in accordance with manufacturer's recommendation.
- F. Concrete Inserts

- 1. Cast-in-place continuous or spot concrete inserts shall be used where applicable.
- 2. Continuous inserts shall be made of 12 gauge, ASTM A1011 SS Grade 33 structural quality carbon steel, complete with Styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs./ft. in concrete.
- 3. Spot inserts shall be constructed of one of the following:
 - a. Malleable iron or pressed steel having a space for rods of all sizes. All inserts for pipes 3 inches (75 mm) and larger in size shall be installed with a reinforcing rod 5/8 inch (16 mm) in diameter, run through a slot in the insert specifically provided for this purpose.
 - b. Internally threaded machined steel insert with large, flanged heads suitable for installation on wood forms and/or formed metal decking.
- G. Post Installed Anchors
 - 1. Contractors shall submit each anchor's ICC-ES report to the Structural Engineer of the project for review.
 - a. Anchors shall be installed in accordance with the manufacturer's ICC-ES report and published installation instructions.
 - b. All post-installation anchors shall be listed in the manufacturer's ICC-ES report for use in cracked concrete.
 - 2. Contractor shall review the structural composition of all concrete slabs where post-installation anchors will be used and only anchor models/types approved for use in the specific structural slab type shall be permitted, in accordance with the manufacturer's ICC-ES report and per approval of the project's Structural Engineer.
 - 3. Each post-installation anchor shall be sized for the worst-case operating loads imposed to the structure.
 - 4. Post-installed anchors may be installed in the vertical position under any of the following conditions:
 - a. When used in concrete, gravel or crushed stone aggregate to support pipes 4 inches or less in diameter.
 - b. When post-installed anchors are alternated with hangers connected directly to the structural members, such as trusses and girders, or to the sides of concrete beams to support pipe 5 inches and larger.
 - c. When post-installed anchors are spaced not over 10 ft. apart to support pipes 4 inches or larger.

- 5. Post-installed anchors shall not be used in ceilings of gypsum or other similar soft material.
- 6. Post-installed anchors shall not be used in cinder concrete, except for branch lines where the post-installed anchors are alternated with through-bolts or hangers attached to beams.
- 7. Where through-bolts or hangers attached to beams is not feasible, the Contractor is responsible for providing hangers certified by a registered Professional Engineer capable of complying with the following:
 - a. Hangers shall be designed to support five times the weight of the waterfilled pipe plus 250 lbs. (114 kg) at each point of piping support.
 - b. These points of support shall be adequate to support the system.
 - c. The spacing between hangers shall not exceed the value given for the type of pipe as indicated in Table 9.2.2.1(a) or Table 9.2.2.1(b).
 - d. Hanger components shall be ferrous.
 - e. Detailed calculations shall be submitted, when required by the reviewing authority, showing stresses developed in hangers, piping, and fittings and safety factors allowed.

2.5 FORMED STEEL CHANNEL SUPPORTS AND ACCESSORIES

- A. Formed steel channel supports shall be capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3 and shall comply with NFPA 13 requirements.
- B. Channel shall be made of minimum 12-gauge ASTM A570 Grade 33 steel electrogalvanized after fabrication. Channel sections may be formed by single, or factory welded multiple sections of any of the following:
 - 1. 1-5/8-inch (41.25 mm) x 1-5/8-inch (41.25 mm) channel.
 - 2. 2-7/16-inch (62 mm) x 1-5/8-inch (41.25 mm) channel.
 - 3. 3-1/4-inch (82.5 mm) x 1-5/8-inch (41.25 mm) channel.
- C. Grip/Lock nuts shall be made of 3/8 inch (10 mm) thick case hardened mild steel bars electro galvanized after fabrication.
- D. All angle brackets connectors and washers shall be made of 1/4 inch (6.35 mm) steel plate electro galvanized after fabrication.

2.6 CONCRETE PADS FOR EQUIPMENT

- A. Pumps for the service listed below shall be installed on reinforced concrete pads with minimum thickness as specified below and designed for support of the pump and pump elbows as listed hereinafter. The following pumps and equipment require this type of installation:
 - 1. Fire pumps.
 - 2. Jockey pumps.
 - 3. Automatic Fire Pump Controller.
 - 4. Air compressors.
- B. Concrete pads for various pieces of equipment will be furnished under another section. Pads shall be provided in all Equipment Rooms. This shall include floor mounted equipment, equipment mounted on legs and pipe support stands. Equipment pads shall generally conform to the shape of the piece of equipment it serves with a minimum 3 inch (75 mm) margin around the equipment and supports.
- C. General equipment pads shall be a minimum of 4 inches (100 mm) high, with all external corners bull-nosed to a tooled radius. All floor-mounted equipment located on the lowest level of the project shall be mounted on a 12 inch (308 mm) concrete pad unless otherwise noted on the plans.
- D. Automatic fire pump, jockey pump and fire pump controller pads shall be a minimum of 12 inches (300 mm) high, with all external corners bullnosed to a tooled radius.
- E. Shop drawings stamped "REVIEWED" shall be used for dimensional guidance in sizing pads and anchor bolt locations.
- F. Furnish and install hot-dipped galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs.
- G. Bolts shall be of the size and number recommended by the manufacturer of the equipment and as required for seismic restraint. Anchor bolts shall be located by means of suitable templates.
- H. When equipment is placed on vibration isolators, the equipment shall be secured to the isolator and the isolator secured to the floor, pad, or supported as recommended by the vibration isolation manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

- A. Hanger, rods, supports and accessories shall be installed in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- B. Furnish and install all necessary support for equipment furnished under this section. To meet the varying conditions in each case, these supports shall consist of pipe stands, steel angle or strap hangers, saddles, and brackets, as required for a complete installation.
- C. All such supports shall have substantial flanges bolted to floor construction; hangers shall be supported from the framing as described hereinabove. Supports shall be properly located with reference to any supporting pads or legs of the equipment carried and must be distributed so as not to bring any undue strains to the equipment.
- D. All hanger and support details shall be submitted for review and approval.
- E. Guarantee that the work, as installed under this section of the specifications, will not result in the transmission of objectionable noise or vibration to any occupied parts of the building, and take full responsibility for any necessary modifications of this equipment, or of the foundations and supports for the same, necessary to secure this result.
- F. Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom beam flanges.
- G. Proper care and ventilation should be given when welding galvanized components.
- H. Clamps on Riser Piping
 - 1. Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - 2. Bolt tightening torques shall be to industry standards.
 - 3. Steel Pipes: Clamp is fitted preferably below coupling or welded pipe lug.
- I. Support from Structural Members: Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- J. Field welding of supports should be done by qualified welders using qualified welding procedures.
- K. Space supports so that there is at least one hanger for each length of pipe, with one hanger within 30 inches (762 mm) of the end sprinkler head.
- L. Horizontal piping shall be supported in accordance with the following schedules:

SINGLE ROD SUPPORT - STEEL PIPE		
Pipe Size	Maximum Hanger Spacing	Rod Size

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. 4				
1 to 2 inches	10 feet 0 inches (3,048 mm)	3/8 inch (10 mm)		
(25 mm to 50 mm)				
2-1/2 and 3 inches	12 feet 0 inches (3,658 mm)	1/2 inch (12.5 mm)		
(63 mm to 75 mm)				
4 to 5 inches	12 feet 0 inches (3,658 mm)	5/8 inch (16 mm)		
(100 mm to 125 mm)				
6 to 10 inches	12 feet 0 inches (3,658 mm)	3/4 inch (20 mm)		
(150 mm to 250 mm)				
DOUBLE ROD SUPPORT				
Pipe Size	Maximum Hanger Spacing	Rod Size		
6 to 8 inches	12 feet 0 inches (3,658 mm)	1/2 inch (12.5 mm)		
(150 mm to 200 mm)				
10 to 12 inches	12 feet 0 inches (3,658 mm)	5/8 inch (16 mm)		
(250 mm to 300 mm)				
		1		

- M. Maximum hanger spacing may not be exceeded; however, actual installed spacing will depend on location of structural framing and floor slab construction. Where building construction does not permit the above spacing, provide additional steel supports.
- N. Unsupported lengths of branch sprinkler piping shall be in conformance with NFPA standards based on static or flowing pressure, whichever is greater. Systems with pressures exceeding 100 psi have more restrictive unsupported lengths and require restraints to prevent upward movement of the pipe.
- O. Install lock nuts at the bottom of all hanger rods.
- P. Vertical pipe risers shall be supported independently of connected horizontal piping.
- Q. Support vertical risers from the building construction by means of pipe clamps, Grinnell Model No. 261, at every story height.
- R. Where hangers cannot be supported from building framing, they may be supported from concrete inserts, subject to the approval of the Structural Engineer. Furnish, locate and set such inserts and make sure that such inserts are in place when the concrete is poured.
- S. Set all inserts for all pipes in ample time to allow the work of the other trades to be performed at the scheduled time.
- T. Smaller pipes may be suspended from cross-pieces of pipe or steel angles, which, in turn, shall be hung from building concrete construction by means of rods and inserts. The intention is to provide supports which, in each case, shall be amply strong and rigid for the load, but which shall not weaken or unduly stress the building construction.
- U. Provide approved roller supports, floor stands, wall brackets, etc., for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls. Pipelines near walls may also be hung by hangers carried from approved wall brackets at a higher level than the pipe.

- V. No piping shall be hung from other piping or ductwork. In no case shall hangers be supported by means of vertical expansion bolts.
- W. Hangers for piping shall support the pipe without piercing the insulation. Pre-insulated pipe shields shall be used to protect the insulation on pipes. It is the intent that the insulation shields shall bear only on the insulation, which is of such density that the insulation will not be compressed, crushed, or deformed.
- X. Power- or powder-actuated devices shall not be permitted.

3.3 CLEANING

- A. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips, or other deleterious material. Leave all hangers and supports in condition suitable for finishing painting before final acceptance.
- B. Touch up, repair, or replace damaged products before Substantial Completion.
- 3.4 INSPECTION AND STARTUP SERVICE
 - A. Inspect each hanger, rod and support for piping and equipment for proper installation according to the manufacturer's instructions.

3.5 FIELD TESTS

A. Performance Test: All hanger and support devices and components shall be tested in accordance with the latest applicable industry standards.

3.6 ADJUSTING AND BALANCING

- A. Adjust all pipe hangers, miscellaneous supports and equipment supports to equalize load for the piping and equipment they carry and to ensure that rods are vertical under operating conditions.
- B. Hangers at equipment shall be adjusted to ensure that there are no loads imposed on the equipment by the piping connected to the equipment.
- C. Hangers and Supports
 - 1. Ensure that rod is vertical under operating conditions.
 - 2. Equalize loads for all piping and equipment supports.
- D. Adjustable Clevis
 - 1. Tighten hanger load nut securely to ensure proper hanger performance.
 - 2. Tighten upper nut after adjustment.
- E. Beam Clamps: Tighten all set screws and lock nuts.

F. Riser Clamps

- 1. Ensure all riser clamps are securely resting on the concrete slab or Kindorf after the system is tested and pressurized.
- 2. A tightened riser clamp nuts after vertical adjustments are made.

END OF SECTION 210529

SECTION 210553

IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all identification nameplates and tags required for equipment and piping as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Equipment nameplates.
 - 2. Pipe identification.
 - 3. Signage.
 - 4. Valve tags.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. All nameplates, signs and valve tags shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. American Society of Mechanical Engineers
 - 1) ASME A13.1: Scheme for the Identification of Piping Systems.
 - b. American National Standards Institute

- ANSI Z535: Safety Color Code Environmental Facility Safety Signs - Criteria for Safety Symbols - Product Safety Sign & Labels - Accident Prevention Tags.
- c. ASTM International
 - 1) ASTM D 882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- d. National Fire Protection Association (NFPA)
 - 1) NFPA 13: Standard for the Installation of Sprinkler Systems.
 - 2) NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.
 - 3) NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.
 - 4) NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
 - 5) NFPA 72: National Fire Alarm Code.
 - 6) NFPA 101: National Life Safety Code.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 21 00 00 and shall include, but not be limited to:
 - 1. Schedule of valve tags, including catalog cut, color, model number and diagrammatic charts.
 - 2. Schedule of nameplates for all equipment, including model number, reference name and diagrammatic charts.
 - 3. Catalog cuts of pipe markers.
 - 4. Catalog cuts of nameplates for all equipment.
- B. Submit two (2) samples of each type of the following:
 - 1. Equipment labels.
 - 2. Tags, including colors and lettering styles.
 - 3. Piping markers.
 - 4. Tags for valves and controls.

- C. Product Data: Submit the manufacturer's literature for each product submitted.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions, and connection requirements, for the system.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years of documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Furnish all equipment, materials, and accessories new and free from defects.
- E. Maintain one (1) copy of the approved submittals for each product on site.
- F. Conform to ASME A13.1 for the color scheme for identification of piping systems and accessories and ANSI Z535 Safety Color Code Environmental Facility Safety Signs Criteria for Safety Symbols Product Safety Sign & Labels Accident Prevention Tags.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Accept all material and equipment on-site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including the effects of weather, water, and construction debris.
- D. Store tapes, adhesives, mastics, and labeling materials in ambient conditions acceptable to and in accordance with the recommendations of the manufacturer.
- E. Labeling and markers that become damaged in the opinion of the Engineer may be rejected and shall be repaired or replaced by the Contractor at no additional expense to the Contract.

1.7 WARRANTY

- A. Comply with the requirements of Section 21 00 00.
- B. Furnish a one (1) year manufacturer's warranty for all system tags and nameplates.

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C. The warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Equipment Nameplates and Signage
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.
- D. Pipe Identification
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.
- E. Valve Tags
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the

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Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

C. Materials and equipment that are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement, or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 EQUIPMENT NAMEPLATES

- A. Mechanical equipment shall be identified by means of nameplates permanently attached to the equipment.
- B. Equipment nameplate designations shall correspond to the system identification on the Contract Drawings and "Record Drawings".
- C. Equipment nameplates shall conform to the following:
 - 1. Equipment nameplates located within the building shall be made of laminated three-layer matte finish flexible acrylic sheet, with cap and core permanently fused together to form a break-resistant, stain-resistant, chip-proof and shatterproof product with black surface and white core engraved letters and numbers. Equipment nameplates shall have contact-type permanent adhesive backing and be pre-drilled or punched for attachment.
 - 2. Equipment nameplates located outside of the building shall be 20 mil (0.5 mm) black enameled aluminum and pre-drilled or punched for attachment.
 - 3. Equipment nameplates shall be a minimum of 3 inch (75 mm) long by 1 inch (75 mm) wide with white letters a minimum 1/4 inch (6.25 mm) high.

2.4 PIPING IDENTIFICATION

- A. All piping shall be identified as to type of use, service, and direction of flow in accordance with ANSI A13.1.
- B. Pipe markers shall meet ANSI and OSHA requirements for identifying the service, direction of flow, system, and zone, for the various piping systems.
- C. They shall be factory-fabricated, flexible, semi-rigid UV-resistant heavy-duty vinyl, preformed to fit around pipe or pipe covering. Larger sizes may have a maximum sheet size with a spring fastener.
- Each marker shall consist of one (1) label with direction-of-flow arrows and the name of the service printed in black letters not less than 1 inch (25 mm) high for pipe 2-1/2 inches (60 mm) and smaller, 2-inch (50 mm) high for 3 inches (75 mm) pipe and larger. Markers shall have backgrounds of different colors for the various service groups.

- E. Locate markers at each valve, at each entry thru walls, within access doors, and on 20foot (6,096 mm) centers for straight runs of pipe.
- F. Painting
 - 1. Paint products for identification of plumbing systems shall be exterior grade, alkyd-based products.
 - 2. All fire standpipe piping, sprinkler main, and branch piping shall be painted in accordance with the Authorities Having Jurisdiction.
 - 3. All fire standpipe and sprinkler piping shall be painted in accordance with the New York City Building Code, prior to the hydrostatic pressure test and whether the pipe will be encased, partially encased in building construction, or exposed. as described herein:
 - a. Fire Standpipe System
 - 1) Main distribution piping, cross connection and risers shall be painted red.
 - 2) Handles of valves serving dedicated fire standpipe systems shall be painted red.
 - b. Combination Fire Standpipe Systems
 - 1) Main distribution piping, cross connection and risers shall be painted red.
 - 2) Handles of valves serving combination fire standpipe systems shall be painted yellow.
 - c. Sprinkler Systems
 - 1) Sprinkler floor control assemblies and main distribution piping within egress stairs shall be painted red.
 - 2) Handles of valves serving dedicated sprinkler systems shall be painted green.
 - d. Fire Department Connections
 - 1) Fire department connections serving a standpipe system shall be provided with caps painted red.
 - 2) Fire department connections serving a combination standpipe and sprinkler system shall be provided with caps painted yellow.
 - 3) Fire department connections serving an automatic sprinkler system shall be provided with caps painted green.

4) Fire department connections serving a non-automatic sprinkler system shall be provided with caps painted silver.

2.5 SIGNAGE

- A. Provide all designating signs for fire department connections, control valves, alarms, hydraulically designed systems, and equipment as required by the Contract Documents and Authorities Having Jurisdiction.
- B. Fire department connections and fire pump test headers located on the exterior of the building shall be conspicuously marked to indicate their function.
- C. Fire department connections shall be marked as follows:
 - 1. Fire department connections serving a standpipe system shall have the word "STANDPIPE" in letters 1 inch (25.4 mm) high and 1/8 inch (3.2 mm) deep cast in the body or provided with a non-ferrous metal plate secured to the connection or mounted on the wall in a visible location.
 - 2. Fire department connections serving a combination standpipe and sprinkler system protecting the entire building shall have the words "COMBINATION STANDPIPE AND SPRINKLER SYSTEM" in letters 1 inch (25.4 mm) high and 1/8 inch (3.2 mm) deep cast in the body or provided with a non-ferrous metal plate secured to the connection or mounted on the wall in a visible location.
 - 3. Fire department connections serving a sprinkler system protecting the entire building shall have the word "SPRINKLER" in letters 1 inch (25.4 mm) high and 1/8 inch (3.2 mm) deep cast in the body or provided with a non-ferrous metal plate secured to the connection or mounted on the wall in a visible location.
 - 4. Fire department connections serving a sprinkler system protecting only a portion of the building shall have the word "SPRINKLER" in letters 1 inch (25.4 mm) high and 1/8 inch (3.2 mm) deep cast in the body or provided with a non-ferrous metal plate secured to the connection or mounted on the wall in a visible location indicating the portion of the building protected.

2.6 VALVE TAGS

- A. Provide a valve tag for each valve.
- B. Each valve tag shall be 2-inch (50 mm) diameter, brass or aluminum, stamped with designating numbers, minimum 2 inches (50 mm) high, prefixed by the letters "FP", painted with white enamel, and background painted with red enamel.
- C. Attach each valve tag to valve handle or spindle with a brass chain.
- D. All valves and controls shall be designated with corresponding numbers on the valve charts or diagrams.

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E. The nomenclature to be used on these tags shall be submitted to the Consulting Engineer for approval.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

- A. Valve tags and nameplates shall be installed in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- B. Install nameplates with adhesive.
- C. Install valve tags with corrosion-resistant brass chain.

3.3 CLEANING

- A. Clean and remove all accumulation of dirt, chips or other deleterious material on equipment nameplates, valve tags and signage. Leave all valve tags and equipment nameplates in clean and legible condition before final acceptance.
- B. Touch-up, repair or replace damaged tags and nameplates before final acceptance.

END OF SECTION 210553

SECTION 210800

TESTING AND ADJUSTMENTS FOR FIRE PROTECTION WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section is coordinated with and complementary to the General Conditions and Special Conditions of the Work, wherever applicable to Mechanical and Electrical Work.
- B. Section 01 31 46 Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 21 05 00 General Provisions for Fire Protection Work shall apply.

1.02 SCOPE OF WORK

A. The Work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install, complete and make ready for operation by the Owner, all work as shown on the Drawings and as specified hereinafter.

1.03 REQUIREMENTS

- A. All tests shall be made in the presence of the Architect or their representatives, and the local authorities having jurisdiction of the work to be tested, as may be directed; and at least 72 hours notice shall be given in advance of all tests.
- B. The Work of this Contractor shall include the furnishing of all testing instruments, gauges, pumps, smoke machines, and other equipment required or necessary for tests, required by laws, rules and regulations and as specified.
- C. Provide all other tests required by local inspectors and all other authorities having jurisdiction.
- D. All appurtenances shall be operated after installation to determine whether or not they meet the requirements of the Specifications.
- E. All defects disclosed in the work by tests and otherwise shall be made good or the Work replaced without additional cost to the Owner. No caulking on screwed joints, cracks or holes will be acceptable.
- F. Tests shall be repeated after any defects disclosed thereby have been made good or the work replaced if it is deemed necessary.
- G. All tests shall be made at the expense of the Contractor.
- H. Tests are not permitted to be made with air except as noted.
- I. Contractor to provide required test plug tee fittings during erection of pipe system.
- J. If the pipe installation fails to meet testing requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials

or workmanship. The completed pipe installation shall meet the requirements of the tests after the leaks have been corrected.

- K. All piping which is to be enclosed in partitions or hung ceilings shall be tested and made tight when directed by the Construction Supervisor and in adequate time to permit the installation of partitions and ceilings. When necessary, the Contractor shall drain the piping and/or take over such precautions as required to prevent damage by freezing.
- L. The Contractor shall also be responsible for the Work of other trades that may be damaged or disturbed by the tests, or the repair or replacement of his Work, and he shall, without extra charges, restore to its original condition any Work so damaged or disturbed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 FIRE STANDPIPE SYSTEM

- A. Before any paint is applied, the fire standpipe system shall be tested hydrostatically at not less than 200 psi pressure for two (2) hours minimum, and in accordance with all requirements of the authorities having jurisdiction and NFPA latest edition.
- B. The test shall be made in the presence of the Building and Fire Department Inspectors, and all other authorities having jurisdiction, and to their satisfaction.

3.02 SPRINKLER SYSTEMS

- A. Before any paint is applied, all sprinkler systems shall be tested hydrostatically at not less than 200 psi pressure for two (2) hours minimum, and in accordance with all requirements of the authorities having jurisdiction and NFPA latest edition.
- B. The test shall be made in the presence of the Building and Fire Department Inspectors, and all other authorities having jurisdiction and to their satisfaction.

END OF SECTION 210800

SECTION 211313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all piping, material, fittings and appurtenances required for a complete sprinkler system as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Alarm devices.
 - 2. Material of piping systems.
 - 3. Signage.
 - 4. Sprinkler drains.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. All piping, materials, fittings and appurtenances and all associated components of the sprinkler system shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - A. New York City Building Code.
 - B. New York City Fire Code.
 - 2. Reference Standards
 - A. American Society of Mechanical Engineers
 - 1. ASME B16.1: Cast Iron Pipe Flanges and Flanged Fittings.
 - 2. ASME B16.3: Malleable Iron Threaded Fittings.

- 3. ASME B16.4: Gray Iron Threaded Fittings.
- 4. ASME B16.5: Pipe Flanges and Flanged Fittings.
- 5. ASME B16.9: Factory-Made Wrought Steel Buttwelding Fittings.
- 6. ASME B16.11: Forged Fittings, Socket-Welding and Threaded.
- 7. ASME B16.25: Buttwelding Ends.
- 8. ASME B36.10M: Welded and Seamless Wrought Steel Pipe.

B. ASTM International

- 1. ASTM A 53/A 53M: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- 2. ASTM A 135: Standard Specification for Electric-Resistance-Welded Steel Pipe.
- 3. ASTM A 234: Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- 4. ASTM A 733-16: Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
- 5. ASTM A795: Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- C. American Welding Society
 - 1. AWS A5.8: Specification for Filler Metals for Brazing and Braze Welding.
 - 2. AWS D1.1: Structural Welding Code Steel.
 - 3. AWS D10.12M/D10.12: Guide for Welding Mild Steel Pipe
- D. Manufacturers Standardization Society
 - 1. MSS SP6: Contact Faces of Pipe Flanges and Connecting-end Flanges of Valves and Fittings.
 - 2. MSS SP9: Spot Facing for Bronze, Iron and Steel Flanges.
 - 3. MSS SP43: Wrought Stainless Steel Butt-welding Fittings.

- 4. MSS SP44: Steel Pipeline Flanges.
- 5. MSS SP-51: Class 150LW Corrosion Resistant Cast Flanges and Flanged Fittings.
- 6. MSS SP-75: Specifications for High-Test Wrought Butt Welding Fittings.
- 7. MSS SP-77: Guidelines for Pipe Support Contractual Relationships.
- 8. MSS SP-83: Steel Pipe Unions Socket-Welding and Threaded.
- 9. MSS SP-97: Forged Carbon Steel Branch Outlet Fittings-Socket Welding, Threaded and Butt-welding Ends.
- E. National Fire Protection Association (NFPA)
 - 10. NFPA 13: Standard for the Installation of Sprinkler Systems.
 - 11. NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
 - 12. NFPA 72: National Fire Alarm Code.
 - 13. NFPA 101: Life Safety Code.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 21 00 00 and shall include, but not be limited to:
 - 1. Provide a pipe, material and fitting schedule for all sprinkler systems including:
 - A. System working pressure.
 - B. Type of pipe including material of construction.
 - C. Fitting type of each type of pipe and each size.
 - 2. Sprinkler system appurtenances, water flow devices, tamper switches and signage as required by the Authority Having Jurisdiction.
 - 3. The Contractor shall submit piping shop drawings for review prior to fabrication of any of the systems. Shop drawings shall indicate plan locations and elevations of piping and hangers, including bottom elevation of major piping and be coordinated with ductwork and other mechanical and electrical services.
- B. Welders' Certificate: Submit welders' certification of compliance with ASME Section IX and AWS D1.1 prior to proceeding with any welding.

C. Product Data: Submit manufacturer's literature including general assembly, materials of construction, manufacturing process, pressure ratings and approvals.

Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.

- B. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for the system.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials, and accessories new and free from defects.
- F. An independent testing agency shall observe the fitting-up and making of welds and subject a percentage of both shop welds and field welds to either ultrasonic or magnetic particle flaw testing. These observations and tests shall be performed on a random basis.
- G. The Contractor must maintain on-site current copies of each welder or welding operator's Procedure Qualification Record.
- H. All welds shall bear the identifying number, letter, or symbol of the welder or welding operator.
- I. To ensure uniformity and compatibility of piping components in a grooved in the piping system all grooved products and grooving tools must be the products of a single manufacturer.
- J. The manufacturer of grooved piping fittings shall provide on-site training for Contractor's field personnel by a factory-trained representative in the proper use of grooving tools, application of groove, and product installation. In addition, the manufacturer's representative shall periodically visit the job site and inspect the installation. The contractor shall remove and replace any improperly installed products.
- K. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All piping, fittings, and couplings shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment and as specified herein:
 - 1. The piping manufacturer shall provide hydrostatic test reports indicating pressure rating and compliance with the specifications.
 - 2. The fitting and coupling manufacturer shall provide hydrostatic test reports indicating pressure rating and compliance with the specifications.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements of Section 21 00 00.
- B. Accept all material and equipment on-site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including the effects of weather, water, and construction debris.

1.8 COORDINATION

- A. Certain materials will be furnished, installed, or furnished and installed, under other sections of the specifications. Examine the Construction Documents to ascertain these requirements.
- B. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto. Finished suspended ceiling elevations are indicated on the general construction drawings.
- C. Transmit to trades doing work of other sections all information required for work to be provided under their respective sections (such as foundations, electric wiring, access doors, and the like) in ample time for installation.
- D. Set all inserts for all pipes in ample time to allow the work of the other trades to be performed on the scheduled time.
- E. Furnish and set all sleeves for passage of pipes through structural masonry and concrete walls and floors and elsewhere as required for proper protection of each pipe passing through building surfaces. Coordinate this work with the General Contractor in order to expedite and properly perform this work.
- F. Field drilling, cutting, and/or reinforcing of holes in the structural metal deck required for work under this section shall be coordinated through the General Contractor and must be approved by the Structural Engineer.
- G. Should the Contractor neglect to perform preliminary work and should cutting be required to install equipment, the expense of this cutting and restoring of surfaces to their original condition shall be borne by this Contractor.

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- H. Due to the type of installation, a fixed sequence of operations is required to properly install the complete systems. It shall be the responsibility of this Contractor to coordinate, protect and schedule his work with other trades in accordance with the construction sequence.
- I. Architectural drawings shall be checked for ceiling height requirements.

1.9 UNIT PRICES

A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.

B. Piping

1.	2-1/2 inch (63 mm)	\$/l.f. (m)		
2.	3 inch (75 mm)	\$/l.f. (m)		
3.	4 inch (100 mm)	\$/l.f. (m)		
4.	6 inch (150 mm)	\$/l.f. (m)		
5.	8 inch (200 mm)	\$/l.f. (m)		
Tampe	r Switches	\$/each		
Water Flow Switches				
1.	2-1/2 inch (63 mm)	\$/each		
2.	3 inch (75 mm)	\$/each		
3.	4 inch (100 mm)	\$/each		
4.	6 inch (150 mm)	\$/each		

1.10 WARRANTY

C.

D.

- A. Comply with the requirements of Section 21 00 00.
- B. Furnish a five (5) year manufacturer's warranty for all piping.
- C. Furnish a five (5) year manufacturer's warranty for all fittings and couplings.
- D. The warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Alarm Devices
 - 1. Tamper Switches
 - A. Potter Electric Signal Co.
 - B. System Sensor.
 - 2. Water Flow Switches
 - A. Potter Electric Signal Co.
 - B. System Sensor.
- D. Material of Piping Systems
 - 1. Mechanical Couplings and Fittings for Grooved Steel Pipe
 - A. Grinnell
 - B. Gruvlok.
 - C. Victaulic
 - 2. Steel Pipe
 - A. Allied Pipe & Tube.
 - B. Ward Mfg.
 - C. Wheatland Pipe & Tube.
 - 3. Steel Pipe Flanges
 - A. Anvil International.
 - B. Taylor Forge.
 - C. Weldbend.
 - 4. Threaded Steel Pipe Fittings
 - A. Anvil International

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B. Ward Mfg.

- 5. Welded Steel Pipe Fittings
 - A. Merit
 - B. National Flange and Fitting Co.
 - C. Weldbend.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement, or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.
- D. Use materials as scheduled and indicated on the fire protection drawings.
- E. All piping, fittings and appurtenances shall be UL Listed and/or FM approved.
- F. An inspection certificate shall be provided by the Contractor stating the installation complies with the local Authority Having Jurisdiction.
- G. All piping, fittings, and appurtenances shall be installed according to NFPA 13.
- H. Pitch all branch piping at a minimum 1/2 in. (13 mm) in 10 feet (3 m) and all main distribution piping at a minimum 1/4 in. (7.5 mm) in 10 feet (3 m). All trapped piping shall be provided with low point drains where required.

2.3 ALARM DEVICES

- A. Provide all alarm devices directly connected to equipment and piping required for a complete system and for the transmission of alarms to the building fire alarm system.
- B. Switches shall be normally open or closed type in order to conform with the alarm system to which they are connected.

- C. All interconnecting electrical wiring will be furnished under Division 26 and 28.
- D. Provide tamper switches for all valves controlling the flow of water to sprinkler systems including floor control valves and suction and discharge valves for sprinkler booster pumps.
- E. Tamper switches shall give an alarm if the valves served are closed, the switches are removed, or the cover is opened.
- F. Valve stems shall be notched to take the switches unless valves are provided with tamper switches from the factory.
- G. Tamper switches shall be the following:
 - 1. For each OS&Y valve, 2 in. (50 mm) through 6 in. (150 mm) provide one (1), Potter Model No. OSYSU-1 supervisory switch.
 - 2. For each butterfly valve, provide one (1), Potter Model No. PCVS-2 supervisory switch with two (2) sets of alarm contacts.
 - 3. Where tamper switches are located outdoors or in corrosive environments provide corrosion-resistant hardware of 316 stainless steel and nickel plated to ASTM B377 Type V Brackets.
- H. Provide water flow switches for each sprinkler control valve assembly.
- I. Water flow switches shall give an alarm due to water flow in the sprinkler system.
- J. Water flow switches shall be vane type, closed circuit with an adjustable retard or time delay to prevent false alarms due to water pressure surges and two (2) sets of alarm contacts.
- K. Water flow devices shall be the following:
 - 1. For each sprinkler system control assembly provide one (1) Potter Model No. VSR, vane type water flow alarm switch with retard.

2.4 MATERIAL OF PIPING SYSTEMS

- A. Piping:
 - 1. Sprinkler piping shall be as indicated in the "Material Schedule" on the Construction Documents. Pipe ends may be factory or field-formed to match joining method.
 - 2. Sprinkler drain piping shall be Schedule 40 galvanized steel pipe.
 - 3. All Schedule 40 sprinkler pipe, black steel or galvanized, shall be of United States or Canadian origin and manufactured in accordance with ASTM A-53A-53M, Type E, Grade A.

- 4. Each length of pipe shall be legibly marked by the Manufacturer to show company name, type of pipe, specification number and pipe length.
- 5. Black steel and galvanized pipe nipples shall be manufactured in accordance with ASTM A733-16, and made of ASTM A53/A53M, standard-weight, seamless steel pipe with threaded ends.
- 6. When grooved steel pipe is used in lieu of threaded pipe Schedule 40 pipe shall be either rolled or cut grooved.
- B. Fittings
 - 1. Fittings shall be threaded or welded, standard weight or extra-heavy pattern, UL, and FM approved fittings, manufactured of steel, ductile iron or malleable iron as required for the pressures experienced in the system. Grooved ductile iron fittings with mechanical couplings may be used in lieu of threaded fittings.
 - 2. When grooved pipe and rigid fittings are utilized, mechanical couplings shall be Victaulic Model No. 07 "Zero-Flex". Where required to comply with project seismic requirements, flexible fittings with mechanical couplings shall be Victaulic Model No. 77.
 - 3. Welded joints and fittings may be used where permitted by the Authorities Having Jurisdiction. Safety procedures described in NFPA 13 must be followed and pressure ratings shall meet or exceed maximum system working pressures.
 - 4. Welding filler metals shall comply with AWS D10.12M/D10.12.
 - 5. Mechanical-T fittings may be used for less than full size branch pipe connections 2 in. (50 mm) and larger. Mechanical-T fittings shall be Victaulic Model No. 920 with a locating collar engaged into the pipe.
 - 6. The manufacturer's hole cutting tool with coupon retaining pilot dual bit shall be used for all holes made outside of the fabrication shop.
 - 7. The following pipe preparation and installation procedures shall be followed:
 - A. Holes must be drilled on the centerline of pipe.
 - B. Make certain the hole to receive the Mechanical-T is the proper size.
 - C. Check pipe surface within 5/8 in. (16 mm) of hole to be certain it is clean, smooth, and free from indentations or projections which would affect gasket sealing. The pipe around the entire circumference within the Mechanical-T fitting shall be free of any dirt, scale or projection, which might prevent the Mechanical-T from seating fully on the pipe surface.
 - D. Remove any burrs, sharp or rough edges from the hole, which might affect assembly, proper seating of the locating collar, or flow from the outlet or gasket seating.

- E. Install in accordance with the manufacturer's installation instructions.
- F. Tighten bolt nuts uniformly until the upper housing is in complete surface contact in the gasket pocket area and the assembly is rigid. Nuts must be tightened to 50 lb. ft. with even gaps between the bolt pads.
- C. Joining Methods
 - 1. Make threaded joints with the use of utility compound or Teflon tape applied to male threads only. The use of lamp wick or filler shall not be acceptable.
 - 2. Cut or rolled grooves in the pipe for use with mechanical grooved couplings shall be made with an approved machine manufactured by the supplier of the couplings.
 - 3. Make welded joints (except for pipe welded end-to-end) with forged one-piece welding flanges, caps, nozzles, elbows, branch outlets, and tees. Submit cut samples for approval if directed. Use fittings of a type which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends. "Weld-o-lets" may be used where standard fittings of required sizes are not available and elsewhere as approved. Weld fittings shall be UL and FM listed.
 - 4. All job welding shall be done by the electric arc welding process in accordance with the following:
 - A. All joints shall be 45-degree bevel type. Pipe mill-beveled or machine-beveled by this Contractor.
 - B. All scale and oxide were removed with a hammer, chisel, or file and the bevel was left smooth and clean.
 - C. Pipe lengths lined up straight with abutting pipe ends concentric.
 - D. Both conductors from the welding machine shall be extended to locations at which welding work is being done. The leads from the welding machine to the location of welding work shall be held together with tape or other approved means so as to prevent induced current in structural steel, piping or other metals within the building. The ground lead shall be connected to a length of pipe with a suitable clamp in such a manner that welding current will not flow through joints in pipe, structural steel of building or steel pipe supports.
 - E. Weld metal thoroughly fused with base metal at all sections. Welds shall be of sound metal, free from laps, slag inclusion or other defects.
 - 5. All welders shall be certified for the service for which they are employed and on which they work by the National Certified Pipe Welding Bureau of the Mechanical Contractors Association of America.
 - 6. Connections to equipment shall be made with welded neck flanges of forged steel or stainless steel as required.

2.5 SIGNAGE

A. Provide all designating signs for sprinkler control valves, alarms, and hydraulically designed systems as required by the Authorities Having Jurisdiction.

2.6 SPRINKLER DRAINS

- A. Provide all necessary drain valves, capped nipples, and auxiliary piping as required to drain trapped portions of the sprinkler system.
- B. Inspector test connections shall be provided with a sight connection and piped to waste.
- C. Main drain and test connection shall be piped to waste.
- D. All sprinklers drain piping, test connections and auxiliary piping shall be Schedule 40 galvanized steel pipe.
- E. Provide all piping required to spill the drains and test connections to the floor, funnel or other drainage connections provided under the Plumbing Contract or arrange with the Plumbing Subcontractor to provide additional drainage facilities, in which case pay all charges related to the additional plumbing work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.
- B. Verify existing conditions prior to starting work.
- C. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto.
- D. Wherever this Contractor's work interconnects with work of other Contractors, this Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary so that they may properly install all the necessary connections and equipment. Identify all work items in an approved manner in order that Ceiling Trade may know where to install access doors and panels.
- E. The General Contractor will provide benchmarks, monuments, and other reference points on the job, which will be available for this Contractor's use.

F. Maintain all existing benchmarks, monuments, and other reference points and perform all field engineering required to ensure that work under this section shall conform with grades, elevations, and lines required.

3.2 INSTALLATION

- A. Install work in accordance with NFPA 13 and the New York City Building Code.
- B. Run and arrange piping approximately as indicated on the construction documents and coordinate with other trades.
- C. The arrangement, positions, and connections of pipes, drains, valves, and the like, indicated on the Construction Documents shall be followed as closely as possible; however, the right is reserved by the Architect to change locations and elevations to accommodate conditions that may arise during the progress of the work, without additional compensation for such changes, provided that no additional appurtenances are required prior to the installation of the work.
- D. Install piping in concealed spaces above finished ceilings and as neatly spaced, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes.
- E. Erect all risers plumb and true, parallel with walls and other pipes.
- F. Ream all pipes smoothly before installation. Do not bend, split, flatten nor otherwise injure the pipe.
- G. The Contractor shall provide all equipment and appurtenances necessary to complete the installation according to code requirements, whether indicated on the drawings or not.
- H. Do not install pipes or other apparatus in a manner that interferes with the full swing of the doors.
- I. Provide all equipment and appurtenances necessary to complete the installation according to code requirements, whether indicated on the drawings or not. Include the complete installation of the number of heads indicated on the drawing with all required piping, valves, etc.
- J. The arrangement, positions, and connections of pipes, drains, valves, and the like, indicated on the construction documents shall be followed as closely as possible, however, the right is reserved by the Architect to change locations, and elevations, to accommodate conditions which may arise during the progress of the work, without additional compensation for such changes, provided that no additional fire standpipe appurtenances are required prior to the installation of the work.
- K. It is the responsibility of this Contractor for accurately laying out the work. Should it be found that any work is laid out so that interferences will occur, report that to the Architect before commencing work.
- L. No piping shall pass over high voltage (440V) electrical bus duct, motor control centers, motor starter racks, telephone equipment, transformer equipment, switchgear equipment or

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any other electrical equipment. Where required, provide protective pans under or over individual pipes and construct the pans of 16-gauge stainless steel with a 6 in. (150 mm) lip, the corners being welded to make the pans watertight. The pan shall drain clear of the bus duct or electrical or telephone equipment. Where pans are above piping, they shall be designed to serve as a deflector plate. Pans over bus duct and electrical or telephone equipment shall be sized to fully protect the equipment. Support pans with pipe hangers/Kindorf and pipe drain clear of the equipment below to safe waste. Give each pan three (3) coats of Rust-Oleum paint and support with pipe hangers and drain clear of the equipment below.

- M. Route piping in an orderly manner parallel and perpendicular to walls maintaining gradient and headroom without interfering with use of space or taking more space than necessary. Whenever practical group piping at common elevations.
- N. Do not install pipes or other apparatus in a manner that interferes with the full swing of the doors and the path of egress as determined by the Architectural Documents.
- O. Furnish and install sleeves for pipe passing through partitions, walls and floors.
- P. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- Q. Install valves in accordance with the specifications and provide access where valves and fittings are not accessible. Coordinate the size and location of access doors with valves.
- R. Protect piping systems from the entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of the completed system.
- S. Welded Piping:
 - 1. All welded joints (except pipe welded end-to-end) shall be made by the use of flanges, caps, nozzles, elbows, branch outlets and tees. Cut samples shall be submitted for approval if directed. All such fittings, etc., shall be of a type which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends. "Weld-o-lets" may be used where standard fittings of required sizes are not available and elsewhere as approved. All job welding shall be done by the electric arc welding process in accordance with the following:
 - A. Joints shall be 45-degree mill beveled or machine beveled.
 - B. All scale and oxide shall be removed with hammer, chisel, file and/or grinding wheel. Bevel shall be left smooth and clean.
 - C. Pipe lengths must be lined up straight with abutting pipe ends concentric.
 - D. Both conductors from the welding machine shall be extended to locations at which welding work is being done. The leads from welding machine to location of welding work shall be held together in an approved manner and then taped so as to prevent induced current in structural steel, in piping or in other metals within the building. The ground lead shall be connected to length

of pipe with suitable clamp in such manner that welding current will not flow through joints in pipe, structural steel of building or steel pipe supports.

- E. Weld metal must be thoroughly fused with base metal at all sections and must exhibit complete penetration to weld root. Welds shall be of sound metal, free from laps, slag inclusion or other defects.
- F. Welders shall be certified by the National Certified Pipe Welding Bureau of the Mechanical Contractors Association of America or by ASME Section 9. Welders shall possess and maintain current Procedure Qualification Records for the service for which they are employed and on which they work.
- G. All welds shall bear the identifying number, letter or symbol of the welder or welding operator.
- T. Grooved Piping:
 - 1. All grooved end components shall be the product of one manufacturer.
 - 2. The manufacturer shall provide on-site training for Contractor's field personnel by a factory trained representative in the proper use of grooving tools, application of groove, and product installation. In addition, the manufacturer's representative shall periodically visit the job site and inspect installation. The contractor shall remove and replace any improperly installed products.
 - 3. Piping shall have rolled or cut grooved-ends as appropriate to pipe material, wall thickness, pressures, size, and method of joining. Pipe ends shall be grooved in accordance with coupling manufacturer's current listed standards conforming to ANSI/AWWA C-606.
 - 4. Mechanical couplings for grooved pipe couplings shall be of the rigid or flexible type as required for the installation, with plated nuts and bolts to secure housing sections together and a synthetic rubber flush seal gasket of the cavity pressure-responsive design.
 - 5. Grooved piping systems shall be installed in accordance with the requirements of the manufacturer's latest published literature.
 - 6. Flexible type couplings shall be installed at final connections to equipment and/or in locations where vibration attenuation and stress relief are required as determined by the Engineer.
 - 7. Coupling housings shall be cast ductile iron conforming to ASTM A 536 (Grade 65-45-12), or malleable iron conforming to ASTM A 47, finished painted with alkyd enamel.
 - 8. Flange adapters shall be cast ductile iron conforming to ASTM A 536 (Grade 65-45-12), or malleable iron conforming to ASTM A 47, finished painted with alkyd enamel.

- 9. Gaskets for mechanical couplings and flange adapters shall be molded flush seal type conforming to the outside diameter of the steel pipe. Synthetic rubber of elastomers having properties as indicated in ASTM D 2000 shall be used. Gasket selection shall comply with the coupling manufacturer's standards, installation and design requirements and shall be suitable for the intended service and temperature range.
- 10. Gaskets for water service from -30°F (-34°C) to 230°F (110°C) shall be Grade "E" EPDM.
- 11. Bolts for mechanical couplings shall be zinc plated (ASTM B 633) heat treated carbon steel track head conforming to physical properties of ASTM A 183, minimum tensile strength 110,000 psi (7,585 bar).

3.3 CLEANING

- A. During construction, properly cap all lines, so as to prevent the entrance of sand, dirt, etc. Each system of piping shall be blown through after completion (for the purpose of removing grit, dirt, sand, etc., from coils and piping), for as long a time as required to thoroughly clean the apparatus.
- B. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all sprinkler piping and appurtenances in suitable condition, before final acceptance.
- C. Touch up, repair or replace damaged piping before final acceptance.
- D. Cover and protect all openings left in floor for passage of pipes. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting to prevent obstruction and damage.
- E. Protect the system against freezing in cold weather.

3.4 INSPECTION AND STARTUP SERVICE

- A. All inspections, examinations and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for by this Fire Protection Subcontractor, as necessary to obtain complete and final acceptance of the system as installed.
- B. The certificates of inspection shall be provided in quadruplicate and shall be delivered to the Architect for distribution.
- C. Inspect all piping, hangers, rod and support for piping and equipment for proper installation according to the manufacturer's instructions.
- D. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- E. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.

- F. Notify the Architect and Inspectors Having Jurisdiction at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.
- G. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.

3.5 FIELD QUALITY CONTROL

- A. Welding Quality Control
 - 1. An independent testing agency shall observe the fitting-up and making of welds as prescribed in ASME/ANSI B31.1 and ASME/ANSI B31.9. The inspection and testing protocol requirements shall be as follows:
 - A. Both shop-made welds and field-made welds shall be subjected to random visual inspections during setup and at various stages of completing the weld.
 - B. The first twenty (20) shop-made butt welds and field-made butt welds shall be subjected to ultrasonic flaw testing. In addition, the first twenty (20) shop-made and field-made fillet welds shall be subject to magnetic particle testing.
 - C. Ten percent (10%) of the remaining welds, on a random basis determined by the independent testing agency, shall also be subjected to either ultrasonic flaw testing or magnetic particle testing.
 - D. Based on the results of the tests performed on each of the twenty (20) welds of each type, a determination of the extent of the subsequent testing beyond the minimum ten percent (10%) noted above shall be established by the Engineer.
- B. Grooved Piping Installation Certification: A factory inspector shall inspect the installation of all grooved piping products to ensure that the installation has been made in accordance with the manufacturer's installation instructions as follows:
 - 1. Inspector shall perform periodic observations of coupling installations in accordance with the latest revisions of the coupling manufacturer's installation instructions. The frequency of the observations shall be adjusted with the pace of the project to ensure that no less than ten percent (10%) of the installation is observed at each stage of completion.
 - 2. The inspector shall have the authority to randomly select which fittings will be inspected. The installing Contractor must provide access to all fittings.
 - 3. The inspector's observations shall be recorded, and all deficiencies noted in the installation shall be tagged for remediation.
 - 4. At the conclusion of each day's observations the inspector shall issue a report of their findings referencing the specific systems examined and describing any deficiencies requiring corrective action to the Engineer of record and the installing Contractor.

- 5. Based on the results of the observation reports a determination of the extent of the subsequent testing beyond the minimum shall be established by the Engineer.
- 6. Upon conclusion of the required inspections and confirmation that any and all deficiencies have been corrected the manufacturer shall provide a report to the Engineer and installing Contractor certifying that the entire installation is in compliance with the manufacturer's requirements.
- 7. All costs for additional testing above and beyond the protocol requirements listed above and all costs associated with repair, replacement, schedule impacts, etc., shall be borne by the Contractor.

3.6 FIELD TESTS

- A. Performance Test
 - 1. Test all systems before any paint is applied, piping is insulated, furred in or otherwise covered.
 - 2. Required tests shall be witnessed by Fire Marshal, Authority Having Jurisdiction, Owner's representative, or Engineer.
 - 3. Test all systems in full accordance with applicable Underwriters' and Municipal requirements, but in no case shall the system be tested at less than 200 psi (13.8 bar) hydrostatic pressure. Apply for the test for a minimum of one (1) hour with no loss in pressure. Prior to applying the hydrostatic test, the system shall be tested with 50 psi (3.5 bar) compressed air for a period of ten minutes with no loss in pressure.
 - 4. Furnish and pay for all devices, materials, supplies, labor, and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- B. Final Acceptance Test
 - 1. After completion of the sprinkler system and at the beginning of the warranty period the Contractor shall perform, without charge to the Owner, one (1) inspection of the sprinkler system during the warranty period. Inspection shall be as per the applicable NFPA No. 25, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems", plus the following maintenance to be performed during the inspection:
 - A. Operation of all control valves.
 - B. Lubrication of operating stems of all interior valves.
 - C. Operation of all water flow and tamper switches.

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D. The Standard Form of the National Fire Sprinkler Association, Inc., "Report of Inspection" (Sheets 1 and 2), shall be filled out in triplicate after each inspection and the copies sent to the Architect and Owner.

3.7 ADJUSTING AND BALANCING

- A. Upon completion of installation, hangers for piping, and supports for equipment shall be adjusted to ensure that the loads are distributed evenly and that there are no loads imposed by the piping or the equipment that it is connected to.
- B. Securely tighten clevis hanger load nuts first to ensure proper hanger performance. Tighten top nut after adjustment.

END OF SECTION 211313

SECTION 213113 ELECTRIC-DRIVE CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all electric-drive centrifugal fire pumps as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Fire pumps.
 - 2. Lubrication.
 - 3. Miscellaneous piping accessories.
 - 4. Tools.

1.2 RELATED SECTIONS

- A. Refer to Divisions 26 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Each electric-drive centrifugal fire pump and all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. National Electrical Manufacturers Association (NEMA)
 - 1) NEMA MG 1: Motors and Generators.
 - 2) NEMA 250: Enclosures for Electrical Equipment.
 - b. National Fire Protection Association (NFPA)

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- 1) NFPA 13: Standard for the Installation of Sprinkler Systems.
- 2) NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.
- 3) NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.
- 4) NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
- 5) NFPA 70: National Electrical Code.
- 6) NFPA 72: National Fire Alarm Code.
- 7) NFPA 101: National Life Safety Code.
- c. Underwriters Laboratories (UL)
 - 1) UL448: Centrifugal Stationary Pumps for Fire Protection Service.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 21 00 00 and shall include, but not be limited to:
 - 1. Fire pump, complete with Underwriters Laboratories and FM Standards certification, capacity curves, test data, seals, construction details, motor horsepower, coupling and guard, rotation, accessories, etc.
 - 2. Fire pump accessories including but not limited to the fire pump flow meter, main relief valve, site glass, hose valve header, and gauges.
- B. Product Data: Submit manufacturer's literature including general assembly, pump curves showing performance characteristics with pump and system, operating point indicated, NPSH curve, controls, wiring diagrams, and service connections.

Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.

- B. Manufacturer's Installation Instructions: Submit support details, installation instructions, and connection requirements, for the system.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. The quality assurance requirements of Section 21 00 00 shall apply to all work specified herein.

- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Certify that motor and fire pump selection and performance have been coordinated with the equipment that is being supplied for the project.
- F. Furnish all equipment, materials, and accessories new and free from defects.
- G. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All fire pumps shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. The fire pump shall be hydrostatically tested and run-tested prior to shipment by the pump manufacturer.
 - 2. The fire pump shall be hydrostatically tested in accordance with NFPA 20 but at a pressure of not less than 1.5 times the no flow (shutoff) head of the pump's maximum diameter impeller plus the maximum allowable suction head, but in no case less than 250 psi (17.25 bar).
 - 3. Characteristic curves of pump performance, efficiency, and brake horsepower shall be drawn from the fire pump test results and furnished to the Engineer and the Contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements of Section 21 00 00.
- B. Accept all material and equipment on-site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including the effects of weather, water, and construction debris.
- D. Handle pumps with lifting lugs are provided for this purpose.
- E. Maintain the minimum temperatures required to prevent the formation of condensation on motor windings, motor controllers and starters.

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F. For extended outdoor storage, remove motors from equipment and store separately in a weatherproof location.

1.8 COORDINATION

A. Coordinate the installation of work in this section with the following sections:

1.	Section 01 31 46	-	Special Requirements
2.	Section 26 05 19	-	Low Voltage Electrical Power Conductors and
			Cables
3.	Section 28 31 13	-	Fire Alarm and Smoke Detection System

1.9 UNIT PRICES

- A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.
 - 1. Service Contract: The manufacturer's authorized service representative shall provide a one (1) year service contract. The service contract period shall commence after acceptance of the equipment. The service contract shall include a complete system inspection twice a year including check of proper pump sequencing and alarm activation with adjustments, as required; and review of instructions for operating personnel, if requested. Any required service work to be noted in a formal inspection report along with a detailed proposal for the repairs. The service representative shall provide for 24-hour emergency service.

1.10 WARRANTY

- A. Comply with the requirements of Section 21 00 00.
- B. Furnish a three (3) year manufacturer's warranty for each automatic fire pump and associated accessories.
- C. The warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed

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substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.

C. Fire Pump

1. As indicated on drawings

2.2 GENERAL REQUIREMENTS

All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the Work.

Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement, or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 FIRE PUMPS

- A. Provide a complete automatic fire pump installation as described herein as indicated on construction documents.
- B. All fire pumps shall be UL listed and/or FM-approved. Installation shall be in accordance with NFPA 20, complete with all accessories and controls and shall meet the hereinafter specified construction requirements.
- C. Working pressures, capacities and stages shall be as specified and scheduled on the construction documents.
- D. Fire pumps shall be connected to horizontal AC squirrel cage motors by means of flexible couplings of approved design. The pump and motor combination shall be mounted on a fabricated steel base with sufficient grout holes to permit grouting to a concrete base at least 12 inches (300 mm) high.
- E. Provide an approved shop drawing for base construction and provide and set the required anchor bolts.
- F. Fire pumps shall be horizontal split case design and equal in construction to the pumps scheduled and shall have similar curves and efficiencies.

- G. Fire pumps shall be constructed in accordance with UL Standard 448 and/or equivalent FM Standards as required by the Authorities Having Jurisdiction.
- H. Where standard construction of the pumps submitted cannot meet the suction and working pressure limits set by the above standards, "heavy" construction pumps shall be used.
- I. Fire pumps shall furnish not less than 150 percent of rated capacity at not less than 65 percent of total rated head. The shutoff head shall not exceed 140 percent of rated head for any type fire pump.
- J. Supply and install for each fire pump the following accessories with the proper design and working pressure requirements:
 - 1. One (1) discharge tee.
 - 2. One (1) hose valve header with one 2-1/2 inch (65 mm) angle valve for each 250 gpm (945 lpm) pump capacity.
 - 3. One (1) set of hose valves with New York City threads.
 - 4. One (1) main relief valve flanged 6 inches (150 mm), steel with a discharge cone.
 - 5. One (1) high-pressure manual air release valve.
 - 6. One (1) eccentric tapered reducer at the suction inlet.
 - 7. One (1) set suction and discharge gauges with gauge savers.
 - 8. One (1) splash partition
 - 9. Two (2) sheet metal guards over shafts, one between splash plate and the motor, and one between splash plate and the pump.
 - 10. One (1) venturi test meter assembly.
 - 11. One (1) full size bypass with two (2) OS&Y valves and a check valve.
 - 12. One (1) pressure-relief valve shall be constructed for discharge against pressure, to the suction connection of the fire pump.
 - 13. One (1) spring-loaded bronze fitted check valves in each pump discharge line with appropriate pressure class for the system.
- K. Motors for automatic fire pump service shall comply with NEMA MG-1 and be NEMA Design B and shall be specifically listed for fire pump service. Their locked rotor current shall comply with NFPA 20 requirements. These motors shall be of American manufacture and as approved and specified in Section 21 05 13.

2.4 LUBRICATION

- A. Provide means for lubricating all bearings and other machine parts. If a part requiring lubrication is concealed or inaccessible, extend the lubrication tube and drain tube with suitable fitting to an accessible location and suitably identify it.
- B. After installation, properly lubricate all equipment and parts requiring lubrication and keep them adequately lubricated with a lubricant recommended by the equipment manufacturer until the Owner issues a Certificate of Substantial Completion for the specific equipment item or system.

2.5 MISCELLANEOUS PIPING ACCESSORIES

- A. Furnish and install all necessary miscellaneous piping accessories that are indicated on the Drawings and/or specified herein.
- B. Provide a fire pump test meter with associated piping accessories required for each automatic fire pump installation as required by the Authority Having Jurisdiction and as specified in Section 21 05 19.
 - 1. The fire pump test meter shall be an FM Approved and/or UL Listed, venturi type, fixed mounted fire pump test meter supplied by one manufacturer.
 - 2. The entire assembly shall be rated for the fire pump discharge pressure, which it is installed on.
- C. Operating instructions shall be secured to the unit.

2.6 TOOLS

- A. All special tools needed for proper operation, adjustment and maintenance of equipment shall be delivered to Owner's representative and a receipt requested for same.
- B. Tools shall include one complete set of high-grade wrenches for pumps, and other equipment furnished in a suitable hardwood or other approved container with lock and two (2) keys. Pasted on inside cover shall be list of all tools provided in box.
- C. Furnish one pressure grease gun of approved design and size, complete with necessary adaptor to fit all lubricating fittings on installed equipment.

PART 3 - EXECUTION

- 3.1 EXAMINATION
 - A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

- B. Carefully check space requirements with other trades to insure that all fire pumps and accessories such as motor controllers can be installed in the spaces allotted thereto and that the required clearance are maintained.
- C. Wherever the installing Contractor's work interconnects with work of other Contractors, the installing Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary so that they may properly install all necessary connections and equipment.

3.2 INSTALLATION

- A. The fire pump installation shall be in accordance with the manufacturer's recommendations, NFPA 20, and the Authorities Having Jurisdiction.
- B. Install fire pumps with space for service access; no less than minimum of 3 ft. (1 m) clear or as mandated by code or the Authorities Having Jurisdiction, whichever is greater.
- C. Decrease from line size with long radius reducing elbows or reducers.
- D. Support piping adjacent to pump independently from pump casing. For base-mounted pumps, install supports under elbows on pump suction and discharge.
- E. Install drains for bases and seals too and discharging into floor drains.
- F. Connect to electrical service in accordance with Division 26.
- G. Lubricate all pumps before startup.
- H. Check, align, and certify base mounted pumps by qualified millwright prior to startup.

3.3 CLEANING

- A. Remove from entire installation of work all protecting materials, dirt, dust, smears, stains, paint spots, and the like, and leave in a clean condition.
- B. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting to prevent obstruction and damage.
- C. Before final connections are made and before operation of equipment and piping, thoroughly blow out, rod out, or wash out all piping, at least twice in a manner as directed and/or approved by the Architect, to remove all accumulation of dirt, chips, or other deleterious material. Make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expense to the Owner.

3.4 INSPECTION AND STARTUP SERVICE

A. The pump manufacturer's representative shall have single-source responsibility for the pumps and complete control system.

- B. Startup services, including pump alignment adjustment and field calibration of controls, operator instruction and system warranty, shall be included in the price for the system.
- C. The presence of an on-site factory service representative is required to participate in startup and final commissioning test(s) as required.
- D. Instruction of Operating Personnel
 - 1. Provide a minimum of sixteen (16) hours of operating and maintenance instruction for building operators, with personal on-the-job instruction by factory trained engineers representing the fire pump and controller manufacturer.
 - 2. This instruction shall be scheduled at the time(s) convenient to the Owner's personnel. Instruction shall cover all equipment and systems provided under this section. Instruction shall be comprised of both classroom type and actual hands-on operating experience.
 - 3. Submit an outline of the instruction program and instruction manual to the Owner or Owner's representative for his approval at least two weeks prior to the proposed start date of the instruction sessions.
 - 4. The Owner may videotape all instruction sessions for purposes of future training. Provide a review and written critique of Owner's videotape within one (1) month after completion of the instruction sessions and receipt of the Owner's videotapes. The critique shall correct all mistakes and clarify all outstanding questions, which arise during the sessions.
 - 5. Furnish five (5) bound copies of operating and maintenance instructions, covering the complete operation and recommended maintenance procedures and intervals for the variable speed drive units and controls.
 - 6. Include spare parts data listing; source and current price of replacement parts and supplies for each item of equipment.
- E. For the duration of the guarantee period, provide all required services at no additional cost. Service shall include parts and labor and shall be available through an attended telephone number on a 24-hour-a-day basis with a guaranteed response time as follows:
 - 1. Telephone contact of qualified technician within four (4) hours.
 - 2. Qualified technician on site within twelve (12) hours.

3.5 FIELD TESTS

- A. Performance Test
 - 1. The Contractor shall prove the capacity and performance and/or demonstrate operating controls and safety devices of each piece of equipment by field tests as requested and/or specified in various sections of these specifications. All equipment and instruments required for tests shall be provided at no additional

cost to the Owner. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests if he so desires.

- 2. The Contractor shall notify the Owner, Architect, Engineer, and Inspectors Having Jurisdiction in writing, at least two (2) weeks prior to the day of the test that arrangements may be made for their presence to witness the tests.
- 3. Furnish and pay for all devices, materials, supplies, labor, and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- 4. Hydrostatic Tests: Test all systems in full accordance with applicable Underwriters' and Municipal requirements, but in no case shall the system be tested at less than 300 psi (20.7 bar) hydrostatic pressure or 50 psi (3.5 bar) above the normal operating pressure, whichever is greater. Apply for the test for a minimum of two (2) consecutive hours with no loss in pressure. Prior to applying the hydrostatic test, the system shall be tested with 50 psi (3.5 bar) compressed air for a period of ten minutes with no loss in pressure.
- 5. Pumps shall be tested to check impeller trim and operating characteristics. The following data shall be recorded and submitted to the Engineer for review:
 - a. Flow at operating conditions.
 - b. Shutoff pressure required to check impeller trim.
 - c. Discharge pressure at operating conditions.
 - d. Suction pressure at operating conditions.
 - e. Motor amperage and voltage on each phase at operating conditions.
 - f. Record coupling alignment data, both face and radial, to verify alignment is within coupling tolerances.
- 6. Flow Test: Perform a complete performance test of each fire pump to verify functionality as specified below.
 - a. The Contractor shall test the fire pumps in accordance with NFPA 20 on both normal utility power and standby power, in the presence of the Engineer and representatives of the local Fire Department and the Owner's insurance agency.
 - b. Test data shall include impeller trim check, capacity performance check at design flow and 150% of design flow at not less than 65% of the total rated head, including suction and discharge pressures at each flow condition, and demonstration of the automatic control sequences and motor amperage in each phase at the design and 150% flow conditions.
 - c. The Contractor shall provide the required lengths of fire hose and an acceptable flow device for testing. At the Contractor's option, subject to

the approval of the Authorities Having Jurisdiction, a "Hose Monster" manufactured by Fire Sprinkler Fabricators (Riverside, MO) may be utilized for flow testing.

- d. Plot flow test data on the pump curve and submitted to the Engineer, Owner and the Owner's insurance agency for review.
- 7. Field alignment measurements shall be taken on each fire pump as specified below.
 - a. Readings shall include shaft alignment, equipment vibration, bearing housing vibration, foundation vibration, building structure vibration and other tests as directed by the Engineer.
 - b. Readings will be made using portable IRD (or approved equal) equipment capable of filtering out various unwanted frequencies and standard reporting forms.
 - c. Maximum vibration at any point listed above or specified shall not exceed 2 mils on pumps unless otherwise specified. The equipment manufacturer shall certify in writing that the field readings which do not exceed the maximum specified are acceptable to them.
- 8. The Contractor shall prove the capacity and performance and/or demonstrate operating controls and safety devices of each piece of equipment by field tests as requested and/or specified in various sections of these specifications. The following miscellaneous tasks shall be completed:
 - a. Submission of certified tests shall in no way relieve fulfillment of the guarantee provided by this Contractor.
 - b. The automatic control systems and fire detection systems shall be properly adjusted and left in good working condition.
 - c. Verify that overload heaters installed in motor starters are properly sized for the motors they serve.
 - d. Verify that all motors, pumps, fans, compressors, etc., have been properly lubricated and left ready for operation.
 - e. All gauges, instruments, thermometers, and meters shall be checked and tested. Notify both the Owner and the General Contractor of deficiencies.
 - f. All alarms shall be tested to fulfill satisfactory operating conditions. Verify proper operation of all alarms including, but not limited to, power failure, pump run operation, phase reversal and automatic transfer switch position.
- 9. Allow sufficient time to perform all tests, adjustments, etc., necessary to place the various systems in final operation condition, verify performance requirements and check all safety devices. Labor, instruments, etc., required for various tests

shall be provided. See that all manufacturers' representatives necessary to check and adjust various systems are present with sufficient labor to perform all this work without delay. All test data shall be recorded on suitable forms and submitted to the Owner for approval.

- 10. Unless otherwise specified, equipment shall be adjusted in accordance with manufacturers' recommendations to function properly with capacities required and/or specified.
- B. Integrated Test
 - 1. Test the communication between the fire pump controllers and the fire alarm systems. Verify that alarms are fully functional prior to final acceptance testing.
 - 2. Verify that overload heaters installed in motor starters are properly sized and adjusted for the motors they serve.
 - 3. Verify that all motors have been properly lubricated and left ready for operation.
 - 4. All alarms shall be tested to fulfill satisfactory operating conditions. Verify proper operation of electrical safety interlocks and limit switches.
- C. Final Acceptance Test
 - 1. Schedule the final acceptance test to be witnessed by the Authority Having Jurisdiction, Owner's insurance underwriter, Owner's representative, Commissioning Agent and/or Engineer.
 - 2. The procedures for final acceptance shall be as follows:
 - a. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
 - b. Points and areas for recheck shall be selected by the Owner's representative.
 - c. Measurements and tests shall be same as the original test procedures.
 - d. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.
- D. Commissioning: Provide on-site presence of a factory service representative to participate in the final commissioning test(s) as required.

3.6 ADJUSTING AND BALANCING

- A. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- B. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- C. The building fire alarm system devices shall be properly adjusted and left in good working condition.
- D. Adjust motor overload protection devices and main pressure-relief valve.
- E. Unless otherwise specified, equipment shall be adjusted in accordance with manufacturer's recommendations to function properly with capacities required and/or specified.
- F. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
- G. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.

END OF SECTION 213113

SECTION 213413 PRESSURE MAINTENANCE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all pressure maintenance pumps for the fire suppression system as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Pressure Maintenance (Jockey) pumps.
 - 2. Lubrication.
 - 3. Miscellaneous piping accessories.
 - 4. Tools.

1.2 RELATED SECTIONS

- A. Refer to Divisions 22, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 21 00 00 Table of Contents for Fire Suppression for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Each pressure maintenance pump and all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for NYC.
 - a. New York City Building Code.
 - b. New York City Fire Code.
 - 2. Reference Standards
 - a. National Electrical Manufacturers Association (NEMA)
 - 1) NEMA MG 1: Motors and Generators.
 - 2) NEMA 250: Enclosures for Electrical Equipment.

- b. National Fire Protection Association (NFPA)
 - 1) NFPA 13: Standard for the Installation of Sprinkler Systems.
 - 2) NFPA 14: Standard for the installation of Standpipe, Private Hydrants and Hose Systems.
 - 3) NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection.
 - 4) NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
 - 5) NFPA 70: National Electrical Code.
 - 6) NFPA 72: National Fire Alarm Code.
 - 7) NFPA 101: National Life Safety Code.
- c. Underwriters Laboratories (UL)
 - 1) UL448: Centrifugal Stationary Pumps for Fire Protection Service.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 21 00 00 and shall include, but not be limited to:
 - 1. Pressure maintenance (jockey) pump, complete with Underwriters Laboratories and FM Standards certification, capacity curves, test data, seals, construction details, motor horsepower, coupling and guard, rotation, accessories, etc.
 - 2. Pressure maintenance (jockey) pump accessories including but not limited to the fire pump flow meter, main relief valve, site glass, hose valve header and gauges.
- B. Product Data: Submit manufacturers literature including general assembly, pump curves showing performance characteristics with pump and system, operating point indicated, NPSH curve, controls, wiring diagrams and service connections.

Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.

- B. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for the system.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of and Section 21 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Certify that motor and fire pump selection and performance have been coordinated with the equipment that is being supplied for the project.
- F. Furnish all equipment, materials and accessories new and free from defects.
- G. Maintain one (1) copy of the approved submittals for each product on site.

1.6 FACTORY TESTING

- A. All pressure maintenance (jockey) pumps shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. The pressure maintenance (jockey) pump shall be hydrostatically tested and run tested prior to shipment, by the pump manufacturer.
 - 2. The pressure maintenance (jockey) pump shall be hydrostatically tested in accordance with NFPA 20 but at a pressure of not less than 1.5 times the no flow (shutoff) head of the pump's maximum diameter impeller plus the maximum allowable suction head, but in no case less than 250 psi (17.25 bar).
 - 3. Characteristic curve of pump performance, efficiency and brake horsepower shall be drawn from the fire pump test results and furnished to the Engineer and the Contractor.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.
- D. Handle pumps with lifting lugs are provided for this purpose.

- E. Maintain the minimum temperatures required to prevent the formation of condensation on motor windings, motor controllers and starters.
- F. For extended outdoor storage, remove motors from equipment and store separately in a weatherproof location.

1.8 COORDINATION

A. Coordinate the installation of work in this section with the following sections:

1.	Section 01 31 46	-	Special Requirements
2.	Section 26 05 19	-	Low Voltage Electrical Power Conductors and
			Cables
3.	Section 28 31 13	-	Fire Alarm and Smoke Detection System

1.9 UNIT PRICES

- A. The Contractor shall state in the proposal, unit prices in accordance with the following schedule and the requirements of Section 21 00 00.
 - 1. Service Contract: The manufacturer's authorized service representative shall provide a one (1) year service contract. The service contract period shall commence after acceptance of the equipment. The service contract shall include a complete system inspection twice a year including check of proper pump sequencing and alarm activation with adjustments, as required; and review of instructions for operating personnel, if requested. Any required service work to be noted in a formal inspection report along with a detailed proposal for the repairs. The service representative shall provide for 24-hour emergency service.

1.10 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 21 00 00.
- B. Furnish a three (3) year manufacturer's warranty for each pressure maintenance (jockey) pump and associated accessories.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the

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project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.

- C. Jockey Pump
 - 1. Grundfos Pump Co.
 - 2. MTH Tool Co.
 - 3. Peerless Pump Co.

2.2 GENERAL REQUIREMENTS

All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the Work.

Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 PRESSURE MAINTENANCE (JOCKEY) PUMPS

- A. Each jockey pump shall be designed to deliver at least 10 gpm (38 lpm) or a higher capacity as listed in the schedule on the Construction documents.
- B. Each pump shall be horizontal, single, or multi-stage, diffuser or turbine type with bronze or stainless-steel impeller, stainless steel shaft, and grease-lubricated ball bearings.
- C. Pumps, casings, flanges, and mechanical seals shall be suitable for operation with the working pressures indicated in the schedules on the Contract Documents.
- D. Pump and motor shall be mounted on a common baseplate of cast iron or structural steel with connection for field piping to drain.
- E. The pressure maintenance (jockey) pump shall be furnished with a factory-mounted bypass relief valve complete with piping. Set relief pressure above the design total dynamic head as required to prevent motor overload and damage to the system.

2.4 LUBRICATION

- A. Provide means for lubricating all bearings and other machine parts. If a part requiring lubrication is concealed or inaccessible, extend the lubrication tube and drain tube with suitable fitting to an accessible location and suitably identify it.
- B. After installation, properly lubricate all equipment and parts requiring lubrication and keep them adequately lubricated with a lubricant recommended by the equipment manufacturer until the Owner issues a Certificate of Substantial Completion for the specific equipment item or system.

2.5 MISCELLANEOUS PIPING ACCESSORIES

- A. Furnish and install all necessary miscellaneous piping accessories that are indicated on the Drawings and/or specified herein.
- B. Operating instructions shall be secured to the unit.

2.6 TOOLS

- A. All special tools needed for proper operation, adjustment and maintenance of equipment shall be delivered to Owner's representative and a receipt requested for same.
- B. Tools shall include one complete set of high-grade wrenches for pumps, and other equipment furnished in a suitable hardwood or other approved container with lock and two (2) keys. Pasted on inside cover shall be list of all tools provided in box.
- C. Furnish one pressure grease gun of approved design and size, complete with necessary adaptor to fit all lubricating fittings on installed equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.
- B. Carefully check space requirements with other trades to ensure that all fire pumps and accessories such as motor controllers can be installed in the spaces allotted thereto and that the required clearance are maintained.
- C. Wherever the installing Contractor's work interconnects with work of other Contractors, the installing Contractor shall coordinate his work with these Contractors to insure that all Contractors have the information necessary so that they may properly install all necessary connections and equipment.

3.2 INSTALLATION

- A. The pressure maintenance (jockey) pump installation shall be in accordance with the manufacturer's recommendations, NFPA 20, and the Authorities Having Jurisdiction.
- B. Install pressure maintenance (jockey) pumps with space for service access; no less than minimum of 3 ft. (1 m) clear or as mandated by code or the Authorities Having Jurisdiction, whichever is greater.
- C. Decrease from line size with long radius reducing elbows or reducers.
- D. Support piping adjacent to pump independently from pump casing. For base-mounted pumps, install supports under elbows on pump suction and discharge.
- E. Install drains for bases and seals to and discharging into floor drains.
- F. Connect to electrical service in accordance with Division 26.
- G. Lubricate all pumps before startup.
- H. Check, align, and certify base mounted pumps by qualified millwright prior to startup.

3.3 CLEANING

- A. Remove from entire installation of work all protecting materials, dirt, dust, smears, stains, paint spots, and the like, and leave in a clean condition.
- B. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting to prevent obstruction and damage.
- C. Before final connections are made and before operation of equipment and piping, thoroughly blow out, rod out, or wash out all piping, at least twice in a manner as directed and/or approved by the Architect, to remove all accumulation of dirt, chips or other deleterious material. Make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expense to the Owner.

3.4 INSPECTION AND STARTUP SERVICE

- A. The pump manufacturer's representative shall have single-source responsibility for the pumps and complete control system.
- B. Startup services, including pump alignment adjustment and field calibration of controls, operator instruction and system warranty, shall be included in the price for the system.
- C. The presence of an on-site factory service representative is required to participate in startup and final commissioning test(s) as required.
- D. Instruction of Operating Personnel

- 1. Provide a minimum of sixteen (16) hours of operating and maintenance instruction for building operators, with personal on-the-job instruction by factory trained engineers representing the fire pump and controller manufacturer.
- 2. This instruction shall be scheduled at the time(s) convenient to the Owner's personnel. Instruction shall cover all equipment and systems provided under this section. Instruction shall be comprised of both classroom type and actual hands-on operating experience.
- 3. Submit an outline of the instruction program and instruction manual to the Owner or Owner's representative for his approval at least two weeks prior to the proposed start date of the instruction sessions.
- 4. The Owner may videotape all instruction sessions for purposes of future training. Provide a review and written critique of Owner's videotape within one (1) month after completion of the instruction sessions and receipt of the Owner's videotapes. The critique shall correct all mistakes and clarify all outstanding questions, which arise during the sessions.
- 5. Furnish five (5) bound copies of operating and maintenance instructions, covering the complete operation and recommended maintenance procedures and intervals for the variable speed drive units and controls.
- 6. Include spare parts data listing; source and current price of replacement parts and supplies for each item of equipment.
- E. For the duration of the guarantee period, provide all required service at no additional cost. Service shall include parts and labor and shall be available through an attended telephone number on a 24-hour-a-day basis with a guaranteed response time as follows:
 - 1. Telephone contact of qualified technician within four (4) hours.
 - 2. Qualified technician on site within twelve (12) hours.

3.5 FIELD TESTS

- A. Performance Test
 - 1. The Contractor shall prove the capacity and performance and/or demonstrate operating controls and safety devices of each piece of equipment by field tests as requested and/or specified in various sections of these specifications. All equipment and instruments required for tests shall be provided at no additional cost to the Owner. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests, if he so desires.
 - 2. The Contractor shall notify the Owner, Architect, Engineer, and Inspectors Having Jurisdiction in writing, at least two (2) weeks prior to the day of the test that arrangements may be made for their presence to witness the tests.

- 3. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- 4. Hydrostatic Tests: Test all systems in full accordance with applicable Underwriters' and Municipal requirements, but in no case shall the system be tested at less than 300 psi (20.7 bar) hydrostatic pressure or 50 psi (3.5 bar) above the normal operating pressure, whichever is greater. Apply for the test for a minimum of two (2) consecutive hours with no loss in pressure. Prior to applying the hydrostatic test, the system shall be tested with 50 psi (3.5 bar) compressed air for a period of ten minutes with no loss in pressure.
- 5. Pumps shall be tested to check impeller trim and operating characteristics. The following data shall be recorded and submitted to the Engineer for review:
 - a. Flow at operating conditions.
 - b. Shutoff pressure required to check impeller trim.
 - c. Discharge pressure at operating conditions.
 - d. Suction pressure at operating conditions.
 - e. Motor amperage and voltage on each phase at operating conditions.
 - f. Record coupling alignment data, both face and radial, to verify alignment is within coupling tolerances.
- 6. Flow Test: Perform a complete performance test of each pressure maintenance (jockey) pump to verify functionality as specified below.
 - a. The Contractor shall test the fire pumps in accordance with NFPA 20 on both normal utility power and standby power, in the presence of the Engineer and representatives of the local Fire Department and the Owner's insurance agency.
 - b. Test data shall include impeller trim check, capacity performance check at design flow, including suction and discharge pressures at each flow condition, and demonstration of the automatic control sequences and motor amperage in each phase at the design conditions.
 - c. Plot flow test data on the pump curve and submit to the Engineer, Owner and the Owner's insurance agency for review.
- 7. Field alignment measurements shall be taken on each fire pump as specified below.
 - a. Readings shall include shaft alignment, equipment vibration, bearing housing vibration, foundation vibration, building structure vibration and other tests as directed by the Engineer.

- b. Readings will be made using portable IRD (or approved equal) equipment capable of filtering out various unwanted frequencies and standard reporting forms.
- c. Maximum vibration at any point listed above or specified shall not exceed 2 mils on pumps unless otherwise specified. The equipment manufacturer shall certify in writing that the field readings which do not exceed the maximum specified are acceptable to them.
- 8. The Contractor shall prove the capacity and performance and/or demonstrate operating controls and safety devices of each piece of equipment by field tests as requested and/or specified in various sections of these specifications. The following miscellaneous tasks shall be completed:
 - a. Submission of certified tests shall in no way relieve fulfillment of the guarantee provided by this Contractor.
 - b. The automatic control systems and fire detection systems shall be properly adjusted and left in good working condition.
 - c. Verify that overload heaters installed in motor starters are properly sized for the motors they serve.
 - d. Verify that all motors, pumps, fans, compressors, etc., have been properly lubricated and left ready for operation.
 - e. All gauges, instruments, thermometers, and meters shall be checked and tested. Notify both the Owner and the General Contractor of deficiencies.
 - f. All alarms shall be tested to fulfill satisfactory operating conditions. Verify proper operation of all alarms including, but not limited to, power failure, pump run operation, phase reversal and automatic transfer switch position.
- 9. Allow sufficient time to perform all tests, adjustments, etc., necessary to place the various systems in final operation condition, verify performance requirements and check all safety devices. Labor, instruments, etc., required for various tests shall be provided. See that all manufacturers' representatives necessary to check and adjust various systems are present with sufficient labor to perform all this work without delay. All test data shall be recorded on suitable forms and submitted to the Owner for approval.
- 10. Unless otherwise specified, equipment shall be adjusted in accordance with manufacturers' recommendations to function properly with capacities required and/or specified.
- B. Integrated Test

- 1. Test the communication between the pressure maintenance (jockey) pump controllers and the fire alarm systems. Verify that alarms are fully functional prior to final acceptance testing.
- 2. Verify that overload heaters installed in motor starters are properly sized and adjusted for the motors they serve.
- 3. Verify that all motors have been properly lubricated and left ready for operation.
- 4. All alarms shall be tested to fulfill satisfactory operating conditions. Verify proper operation of electrical safety interlocks and limit switches.
- C. Final Acceptance Test
 - 1. Schedule the final acceptance test to be witnessed by the Authority Having Jurisdiction, Owner's insurance underwriter, Owner's representative, Commissioning Agent and/or Engineer.
 - 2. The procedures for final acceptance shall be as follows:
 - a. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
 - b. Points and areas for recheck shall be selected by the Owner's representative.
 - c. Measurements and tests shall be same as the original test procedures.
 - d. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.
- D. Commissioning: Provide on-site presence of a factory service representative to participate in the final commissioning test(s) as required.

3.6 ADJUSTING AND BALANCING

- A. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- B. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.

- C. The building fire alarm system devices shall be properly adjusted and left in good working condition.
- D. Adjust motor overload protection devices and main pressure-relief valve.
- E. Unless otherwise specified, equipment shall be adjusted in accordance with manufacturer's recommendations to function properly with capacities required and/or specified.
- F. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
- G. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.

END OF SECTION 213413

SECTION 220000

GENERAL REQUIREMENTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. Division 22 of the specifications requires the furnishing and installing of all items, including every article, device or accessory reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the work include, but are not limited to, materials, labor, supervision, supplies, equipment, transportation, rigging, storage, utilities, and all required permits and licenses.
- B. Before submittal of bid, examine all drawings, specifications, addenda, alternates, special conditions, and all other bidding documents of all sections of this project, verify all governing conditions at the site, and become fully informed as to the extent and character of the work required, as well as its relation to other work in the building. Submittal of a bid is an agreement to all requirements of the Contract Documents, and no consideration will be granted for any claimed misunderstanding thereof.
- C. Submittal of a bid is a representation by the bidder that it is qualified in all respects properly to perform the work for which it is bidding and has experience with similar work. Bidders are deemed to be aware, on the basis of their background and experience, materials which may be required in their responsibilities, even though unspecified.

1.2 ABBREVIATIONS

ADA	Americans with Disabilities Act
AGA	American Gas Association
AHJ	Authority Having Jurisdiction
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
ASA	Acoustical Society of America
ASME	American Society of Mechanical Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning
	Engineers, Inc.
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BSA	New York City Board of Standards and Appeals
CDA	Copper Development Association
CISPI	Cast Iron Soil Pipe Institute
ECCCNYS	Energy Conservation Construction Code of New York State
EPA	Environmental Protection Agency

GENERAL REQUIREMENTS FOR PLUMBING

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ETL	Electrical Testing Laboratory
FM	Factory Mutual
IEEE	Institute of Electrical and Electronics Engineers
IRI	Industrial Risk Insurers
MSDS	Material Safety Data Sheet
MSS	Manufacturers Standardization Society
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code (NFPA 70)
NEMA	National Electrical Manufacturers Association
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NUSIG	National Uniform Seismic Installation Guidelines
NYCEC	New York City Electrical Code
NYCMC	New York City Mechanical Code
NYSERDA	New York State Energy Research and Development Authority
NYSGBTC	New York State Green Building Tax Credit
OSHA	Occupational Safety and Health Administration
OTCR	New York City Office of Technical Certification and Research
PDI	Plumbing and Drainage Institute
TEMA	Tubular Exchanger Manufacturers Association, Inc.
UL	Underwriters Laboratories

- 1.3 DEFINITIONS
 - A. For purposes of these specifications the following definitions apply:
 - 1. ARCHITECT: The Architect of record.
 - 2. ENGINEER: The Engineer of record.
 - 3. CONTRACTOR: The individual, partnership or corporation to whom has been awarded the contract for providing the plumbing work.
 - 4. SUBCONTRACTOR: The individual, partnership or corporation to whom has been awarded the contract for providing assistance to the Contractors work.
 - 5. PROVIDE: To "furnish" and "install".
 - 6. INSTALL: To join, unite, fasten, link, attach, set up or otherwise connect together; complete, tested and ready for normal satisfactory operation.
 - 7. FURNISH: To supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application.
 - 8. AS DIRECTED: As directed by the Architect or the Engineer.

- 9. CONCEALED: Embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings or accessible raised floor cavities.
- 10. SUBMIT: Submit to the Architect and/or the Engineer for review.
- 11. FINISHED SPACES: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- 12. EXPOSED: Exposed to view.
- 13. SUPPLY: To purchase, procure, acquire, and deliver complete with related accessories.
- 14. WORK: Includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation of complete systems.
- 15. PIPING: Includes pipe, tube, fittings, flanges, valves, controls, strainer, hangers, supports, unions, traps, drains, insulation, and all related accessories.
- 16. WIRING: Includes raceway, fittings, wire, boxes, and all related accessories.
- 17. INDICATED: As shown or noted on the drawings or specifications.

1.4 RELATED DOCUMENTS

- A. The General Conditions and Supplementary Conditions accompanying these specifications are hereby made a part of the requirements for the work under this section of the specifications.
- B. No General Conditions and/or Supplementary General Conditions clause referring to the work of this section shall be considered waived unless specifically stated herein.
- C. Refer to Owner's "Commissioning Requirements" for the scope of work related to systems furnished and installed under Division 22.

1.5 REFERENCE STANDARDS

- A. Comply with the currently enforced versions of all applicable laws, rules, regulations, codes and ordinances of New York City and shall be BSA approved or have an OTCR approval. Modifications required by the Authorities Having Jurisdiction shall be made without additional cost to the Owner.
 - 1. Secure and pay for necessary approvals, permits, inspections, carting, legal dumping, etc., and deliver the official records of the granting of permits to the Owner without additional cost to the Owner.

- 2. The drawings have been filed. The contractor shall pay all fees to obtain release of approved plans and shall complete and file all forms, tabulations, plans, etc., required for Special Inspections.
- 3. Where so required by the Building Code of the City of New York, the Owner shall employ the services of a Special Inspector to perform inspections of materials, installations, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and reference standards.
- B. All equipment, materials, and methods to be furnished and/or installed by this division shall comply with all applicable requirements of laws, codes, ordinances, legislation, standards, etc., of all federal, state, and local authorities, whether indicated on the Contract Documents or not.
- C. Where Contract Drawing and specification requirements are in excess of rules, regulations and code requirements, and are permitted under the code, the Contract Drawings and specifications shall govern. In the event of a conflict between the Contract Documents and the applicable laws, rules, regulations, codes, and ordinances of federal, state, and local Authorities Having Jurisdiction, the latter shall govern.
- D. Where alterations to and/or deviations from the Contract Drawings and specifications are required by the authorities listed above, report the requirements to the Architect and secure his written approval before starting the required modifications.

1.6 QUALITY ASSURANCE

- A. All materials and equipment shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products of the type specified herein. The manufacturer shall have been in continuous operation in the manufacture of the products specified for a minimum of ten (10) years.
- B. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- C. Make every effort to furnish all equipment of any equipment type (such as pumps, hot water heaters, storage tanks, etc.) from one manufacturer.
- D. After completion of installation, but prior to Final Completion, this Contractor shall certify in writing in a format acceptable to the Owner that products and materials installed, and processes used, do not contain asbestos, or polychlorinated biphenyls (PCB's) or other hazardous materials as determined by the Owner. A "Materials Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- E. All adhesives specified herein or utilized in the manufacture of equipment or components which are specified herein shall meet or exceed the volatile organic compound (VOC) limits of South Coast Air Quality Management District Rule No. 1168.

- F. All sealants specified herein or utilized in the manufacture of equipment or components which are specified herein shall meet or exceed Bay Area Resources Board Reg. 8, Rule 51. Submit as part of the shop drawing process for review by the Engineer and/or Owner, supporting documentation which demonstrates conformance with these requirements.
- G. In the event that products, materials and/or processes are not available that do not contain asbestos, PCB's, VOC's formaldehyde formulations, hazardous materials or may result in hazardous out-gassing as determined by the manufacturer a "Materials Safety Data Sheet", as described above, shall be submitted as part of the shop drawing process for review by the Engineer and/or Owner.
- H. Furnish all equipment, materials and accessories new and free from defects.

1.7 ENGINEERING REFERENCE POINTS

- A. The Contractor shall provide benchmarks, monuments, and other reference points on the job required to perform the work.
- B. Maintain all existing benchmarks, monuments and other reference points and perform all field engineering required to ensure that work under this section shall conform with grades, elevations and lines required.

1.8 INDEMNIFICATION

- A. Covenant and agree that this Contractor and his Subcontractors and his and their agents, servants and employees will provide and maintain a safe place to work and that he and they will comply with all laws and regulations of any governmental Authority Having Jurisdiction thereof.
- B. This Contractor agrees to indemnify, defend and hold harmless the Owner, Owner's agents and Engineer from and against any liability, loss, damage or expense, including attorneys' fees, arising from a failure or alleged failure on the part of this Contractor, his Subcontractors and his and their agents, servants and employees to provide and maintain a safe place to work or to comply with all laws and regulations of any governmental Authority Having Jurisdiction thereof.
- C. This Contractor agrees to indemnify, defend and hold harmless the Owner, Owner's agents and Engineer from and against any liability, loss, damage or expense, including attorneys' fees, arising from a failure or alleged failure on the part of this Contractor, his Subcontractors and his and their agents, servants and employees to discharge the obligations assumed by him or them in the performance of the work, including any act or omission allegedly resulting in death or personal injury or property damage, or due to improper construction, construction techniques, or the use of improper or inappropriate material or tools.

1.9 COMPLETE PERFORMANCE OF WORK

A. Work shall be executed in strict accordance with the best practice of the trades in a thorough, workmanlike manner by competent, skilled technicians and trade personnel.

- B. This Contractor shall provide a competent, experienced, full-time Superintendent who is authorized to make decisions on behalf of the Contractor.
- C. All labor, materials, apparatus, and appliances essential to the complete and proper functioning of the systems described and/or indicated herein, or which may be reasonably implied as essential, whether mentioned in the Contract Drawings and specifications or not, shall be provided by the Contractor. The entire installation shall be ready in every respect for the satisfactory and efficient operation when completed.
- D. In cases of doubt as to the work intended, or in the event of need for explanation thereof, request supplementary written instructions in the form of a Request for Information (RFI) from the Architect and/or Engineer.
- E. Coordinate the work specified herein and shown on the Contract Drawings with all other trades.
- F. Be responsible for material and workmanship until completion and final acceptance. Replace any of same which may be damaged, lost or stolen, without additional cost to Owner. Guard the building and its contents against damage by this Contractor, his employees or Subcontractors, and make good any damage free of charge.
- G. Where, due to union regulations or trade agreements, any of the work shown on the drawings or specified herein is not considered this trade's work, subcontract the work in question, but assume full responsibility for the complete installation. Except for such changes as may be specifically approved by the Consulting Engineers, in accordance with alternates or options stated hereinafter, all work must be in full accordance with the intent of the plans and specifications, complete in every way and ready for satisfactory and efficient operation when delivered to the Owner.
- H. Provide signs required by the Authorities Having Jurisdiction.
- I. Provide all rigging required for complete installation and furnish drawings showing necessary points of support, reactions and supplementary bracing. This shall be submitted for approval by the Owner. Should any shoring be required, provide same after Owner's approval.
- J. Become thoroughly acquainted with the work involved, obtain and verify at the building all measurements necessary for the proper installation of work. Furnish to other Contractors any information relating to work of this division necessary for the proper installation of their contracts. Coordinate with other Contractors for finish adjacent to work of this section and arrange to have visible portions of the work (such as access doors, escutcheons, etc.) fit in with the finish in a manner satisfactory to the Architects.
- K. Transmit to trades doing work of other sections all information required for work to be provided under their respective sections (such as fresh water connections, foundations, electric wiring, access doors, and the like) in ample time for installation.
- L. Wherever this Contractor's work interconnects with work of other Contractors, this Contractor shall coordinate his work with these Contractors to insure that all Contractors

have the information necessary so that they may properly install all the necessary connections and equipment. Identify all work items (valves, dampers, pull boxes, etc.) in an approved manner in order that the other trades may know where to install such items such as access doors, panels, etc.

- M. Provide required supports and hangers for piping and equipment, so that loading will not exceed allowable loadings of structure. Submittal of a bid shall be deemed a representation that the Contractor submitting such bid has ascertained allowable loadings and has included in his estimates the costs associated with furnishing required supports.
- N. Field drilling, cutting and/or reinforcing of holes in structural metal deck required for work under this section shall be coordinated through the Contractor and approved by the Structural Engineer. All such drilling, cutting and reinforcing costs shall be borne by this Contractor.
- O. At the conclusion of each day's work, clean up and stockpile on site, at a location designated by the Contractor, all rubbish, debris and trash, which may have accumulated during the day as a result of work of this Contractor and of his presence on the job.
 - 1. Sidewalks and streets adjoining the property shall be kept broom-clean and free of debris, rubbish, trash and obstructions of any kind caused by work of this Contractor, which will affect the condition and safety of streets, walks, utilities and property.
- P. Due to the nature of the alteration work, which requires the building to be kept operable at all times, except for those floors being actively altered, this Contractor shall coordinate his activities with the Contractor and the building Owner. Any interruption of building services must be done at the convenience of the building Owner. If temporary connections to maintain services are required or if the work must be performed after hours, this work shall be so arranged with all parties involved.
- Q. If this Contractor must perform work in occupied areas, he shall make arrangements with the Contractor and the Owner as to the time and method by which this work shall be performed. He shall arrange for all adjacent areas to be properly protected against damage, dirt and dust.

1.10 DESCRIPTION OF BID DOCUMENTS

- A. Specifications, in general, describe quality and type of materials and equipment.
- B. The drawings show the various systems schematically, no added compensation shall be permitted for variations due to field conditions.
- C. Where disagreements occur between the plans and the specifications or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the Base Bid.
- D. Work not shown on the drawings but called for in the specifications, or vice versa, shall be provided by the Contractor without additional expense to the Owner.

- E. Where a variance occurs between the drawings and specifications, or within either document itself, the Contractor shall request through the Contractor, clarification in writing from the Architect on which item and manner in which the work shall be installed.
- F. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- G. Equipment shown on the drawings with particular manufacturers identified has been coordinated for structural penetrations, electrical connection, operating and service (maintenance) requirements, and physical size with regard to the space where the equipment is shown. If they comply with the project specifications, these and the other specified manufacturers of this equipment will be acceptable contingent on the Contractor providing a complete installation and maintaining full responsibility to provide, at no additional cost, any modifications to the structure or electrical service that are required to properly install, operate, and service the equipment being used. These modifications shall not include additional area for equipment unless approved by the Architect.
 - 1. The Contractor shall note these changes on the equipment submittal and shall show all differences in equipment being supplied from that shown on the Drawings. Failure of the Contractor to provide this information with the submittal will indicate that the submitted equipment meets or exceeds the equipment shown on the Drawings in performance and is physically no larger in housing size.
 - a. Failure of the Contractor to comply with the above and any discrepancies found shall result in the Contractor providing equipment equal to that specified at the Contractor's expense.

1.11 SUBMITTALS

- A. No part of the work shall be started in the shop or in the field until the Architect and/or Engineer have reviewed the shop drawings and samples for that portion of the work. Thereafter, the work shall be executed in accordance with the Contract Documents and the indicated status of the reviewed shop drawing.
- B. All shop drawings and samples shall be identified as follows:
 - 1. Date of submittal.
 - 2. Title of project (including floor and room designations).
 - 3. Name of Contractor and date of his approval.
 - 4. Name of Subcontractor or supplier and date of submittal to Contractor.
 - 5. Number of submission.

- 6. Any qualification(s), departure(s) or deviation(s) from the requirements of the Contract Documents.
- 7. Federal specification, FM Approval, OTCR number, BSA approval number, or ASTM number or any local listing or approval where required.
- 8. Such additional information as may be required by the specifications for the particular material being furnished.
- 9. When the submitted materials modify components, styles, etc., on the same drawing, or alternate or options available for the intended material, the material shall be appropriately annotated in a manner to avoid any misunderstanding of the submission.
- C. Shop drawings and samples shall be submitted for review sufficiently in advance of the scheduled start of the work in the shop or in the field to allow ample time, in consideration of the number and complexity of the drawings in the submittal, for the Architect and/or Engineer to make an orderly review. No extension of the time to complete the work shall be granted to the Contractor by reason of his failure in this respect.
- D. The Contractor shall carefully check shop drawings and samples, including those received by him from Subcontractors and manufacturers, for accuracy, completeness of required information, and conformance with the Contract Documents. Shop drawings found to be inaccurate, incomplete or not in conformance with the Contract Documents shall be corrected before being submitted to the Architect and/or Engineer for review.
- E. Within three (3) weeks after award of the Contract, the Contractor shall submit for the Architect's and/or Engineer's review, a list of the manufacturers and Subcontractors whose products and services he proposes to use for the work. Proposed substitutions for material and equipment required by the Contract Documents shall be submitted to the Architect and/or Engineer for review during this period. Submittals proposing or requesting substitutions shall be expressly identified as such in a letter of transmittal, with the reasons for requesting the substitution stated. Submittals for this purpose shall be complete in every respect, shall conform to all the information requirements for shop drawing and sample submittals, and shall include, at no cost to the Owner, the necessary revisions to other related work required by the Contract Documents. The judgment of the Architect and/or Engineer with respect to the adequacy and acceptability of a proposed substitution shall be final and binding on the Contractor, and shall not be subject to question in any other place. After the expiration of this period, substitutions for material or equipment shall not be proposed or requested in shop drawing and sample submittals, and the Contractor shall be required to execute the work in accordance with the provisions of the Contract Documents.
- F. Within six (6) weeks after award of the Contract, the Contractor shall submit a schedule listing all shop drawings and samples with the projected date that each item will be submitted to the Architect and/or Engineer for review.

- G. Prior to Final Acceptance, the following data shall be furnished in accordance with the Conditions of the Construction Contract, Section 01 31 46 Specifications, and this Division 22 of the Specifications, and shall include, but not be limited to:
 - 1. Record drawings.
 - 2. Operating and maintenance books.
 - 3. Contract or coordination drawings.

1.12 PRODUCT DATA

A. Submit names, sizes, catalog numbers and/or samples of the following materials for approval:

Fittings	Pressure Gauges
Floor, and Funnel Drains	Sleeves and Escutcheons
Hangers	Strainers
Insulation	Valve Tags
Pipe	Valves

1.13 SHOP DRAWINGS

- A. The term "shop drawings" shall include layout, detail, and assembly drawings, diagrams, schedules, catalog sheets, printed descriptive matter, and tabular and graphical presentations of operating and performance data that describe work required by the Contract Documents. Catalogs and catalog sheets shall be clearly annotated indicating the specific items being proposed.
- B. In addition, during the installation period, submit detailed shop layout drawings for each floor of the project, including all the Mechanical Equipment Rooms, showing equipment and piping work and other distribution services described herein, including locations and sizes of all openings in cellular steel floor decks, walls and floors. Shop drawings with multiple parts shall be submitted as a package. Shop drawings will be 3/8 inch equal to 1 ft. 0 in. scale. Piping shop drawings shall also indicate the point loading and spacing of each hanger and the method of support. Drawings shall include full coordinated plans and sections for Mechanical Equipment Rooms, floor plans and risers. In addition, required detail drawings, such as anchor and guide details, etc., shall be submitted.
- C. Shop drawings for Equipment Rooms, and for piping and similar distribution services shall show by dimension the exact size and location of each element of the system in both the horizontal and vertical plane, as well as relationship to the building structure, architectural construction, equipment, and the work of other trades. Where new work is added to an existing structure, the shop drawings shall show the location of all existing services and equipment. Pads, foundations, anchorages, supports and attachments to the building structure where required for the installation of the work shall be shown in layout and detail with sizes, dimensions, materials and methods of construction noted. The work described in any shop drawing submission shall be carefully checked by this

Contractor for all clearances field conditions, maintenance of architectural conditions and proper coordination with all trades on the job.

- D. Each submitted shop drawing shall include a certification by the Contractor that all related job conditions have been checked and that no conflict exists. No shop drawing submission shall be reviewed without such certification.
- E. The Contractor shall submit shop drawings of the following work for review:
 - 1. Underground and above ground piping services.
 - 2. Construction details for piping.
 - 3. All items of manufactured material and equipment.
 - 4. Other specific items of work as required by the provisions of the technical sections of the Contract Documents should be included in the Submittal Section.

1.14 CERTIFICATION

A. Any certifications required by the specifications, in addition to those required for shop drawings, product data, equipment and other items, shall be so certified by the Owner, a Partner, or a Corporate Officer of the firm required to provide the Certification, or by another person duly authorized to sign binding agreements for and in behalf of the Owner, Partner, or Corporation.

1.15 CONTRACTOR'S COORDINATION DRAWINGS

A. Contractor shall furnish in writing, with copies to the Architect and Construction Manager any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

1.16 ARCHITECT'S AND ENGINEER'S REVIEW

- A. The Engineer shall review shop drawings and samples for conformance with the design concept of the project and the information contained in the Contract Documents. The review of shop drawings and samples shall be only for the convenience of the Owner in following the work and shall not relieve the Contractor of responsibility for deviations from the requirements of the Contract Documents. The review shall not be construed as a complete or detailed check of the work submitted, nor shall it relieve the Contractor of responsibility for errors of any sort in the shop drawings and samples, or from the necessity of furnishing any work required by the Contract Documents which may have been omitted from the shop drawing submittals. The review of a separate item shall not indicate review of the complete assembly in which it functions. Nothing in the Architect's and/or Engineer's review of shop drawings and samples shall be considered as authorizing a departure from Contract Documents or specifications; additional cost to the Owner; or increased time for completion of the work.
- B. Engineer's review is for general compliance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor

from compliance with the project plans and specifications, nor departing therefrom. The Contractor remains solely responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for coordination with other work, whether new or existing and other trades, for selecting fabrication processes, for techniques of construction and for performing his work in a safe manner.

- C. The Architect and/or Engineer shall review shop drawings and samples with reasonable promptness and shall return them to the Contractor stamped to indicate the appropriate action as follows:
 - 1. "NO EXCEPTION TAKEN" means that fabrication, manufacture or construction may proceed, providing the submittal complies with the Contract Documents.
 - 2. "EXCEPTIONS AS NOTED" means that fabrication, manufacture or construction may proceed, providing the submittal complies with the Architect's and/or Engineer's notations and the Contract Documents. A copy of the corrected submittal shall be returned to the Architect and/or Engineer for record. If, for any reason, the Contractor cannot comply with the notations, the Contractor shall resubmit as described for submittals stamped "REVISE AND RESUBMIT".
 - 3. "REVISE AND RESUBMIT" means that the Contractor must comply with the Architect's and/or Engineer's notations and resubmit before fabrication, manufacture or construction may proceed. Submittals stamped in this manner shall not be permitted on the job site.
 - 4. "REJECTED" means that the submittal does not comply with the Contract Documents and that fabrication, manufacture or construction shall not proceed. Submittals stamped in this manner shall not be permitted on the job site.
- D. Each submitted shop drawing shall bear the Contractor's stamped and signed certification that the work has been checked for all related job conditions, for maintenance of architectural conditions, and has been coordinated with the shop drawings of other affected trades for interrelated work, as required for the proper and complete performance of the work. No shop drawing submittal shall be reviewed without this certification.
- E. Shop drawings for manufactured material and equipment shall include model numbers, dimension drawings, operating weights, material specifications, operating features and controls, wiring diagrams, performance characteristics, service procedures, including clearance requirements for maintenance work, and conformance to specified codes and code ratings. Note that in addition to these requirements, other specific submittal data, and forms of data submission, are required by the Contract Documents for particular items of equipment and material.
- F. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein shall be the minimum standards acceptable. The Engineer shall retain the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require that the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.

1.17 MANUFACTURER'S RECOMMENDATIONS

- A. With the exceptions as specified and/or indicated on the drawings or in the specifications, the Contractor shall apply, install, connect, erect, use, clean, commission and condition manufactured articles, materials, and equipment per manufacturer's current printed instructions and recommendations. Copies of such printed recommendations shall be kept at the project site and made available as required.
- B. Where the manufacturer's recommendations conflict with the Contract Documents, the conflict shall be brought to the Engineer's attention immediately.

1.18 SPACE LIMITATIONS

- A. The equipment selections used in the preparation of the Contract Documents shall fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal, and replacement of parts. Adequate space shall be allowed for clearance in accordance with code requirements, the requirements of the Local Authorities Having Jurisdiction, and the equipment manufacturer's recommendations.
- B. In the preparation of drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made; however, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code-required access, and proper fit rests with the Contractor.
- C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.
- D. Coordinate the installation of piping and equipment with lighting fixtures, special ceiling construction, air distribution equipment and the structure. Provide additional risers, drops and offsets as required. If, after installed, new piping or equipment is found to be in conflict with the architecture, structure, or other trade work which is either existing or shown on the Contract Documents, the piping or equipment shall be relocated without additional cost to the Owner.
- E. The Contractor shall follow the Drawings in laying out the Work and check drawings of all trades to verify spaces in which Work will be installed. Maintain maximum headroom and, where space conditions appear inadequate, the Engineer shall be notified before proceeding with the installation.

1.19 RECORD DRAWINGS

A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of blue-line prints and AutoCAD files of the Contractor Coordination Drawings for this division. The prints shall include the updated AutoCAD files, which shall be periodically electronically updated to show the precise location of all buried or concealed work and equipment, including embedded piping and valves, and all changes and deviations in the mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without written definite instructions from the Architect or Engineer. Prior to commencing work, the Contractor shall obtain from the Architect or Engineer a set of AutoCAD format Architectural and Engineering Drawings on CD-ROM, to be used only to produce the Contractor's Coordination Drawings. The continuously updated coordination drawings shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format upon project completion. The Contractor shall give to the Engineer a written release signed by a corporate officer of the Contractor prior to receipt of the Engineer's disks.

- B. Dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.
- C. Upon completion of the work, the Contractor and his Subcontractors shall certify all "Record Drawings" on the front lower right-hand corner adjacent to the above marking with a rubber stamp impression or an AutoCAD image that states the Project name, the Contractor's name, the area covered, and the date.
- D. Prior to final acceptance of the work of this division, the Contractor shall submit properly certified "Record Drawings" to the Architect and Engineer for review and shall make changes, corrections, or additions as the Architect and/or Engineer may require to the "Record Drawings". Submit four (4) prints of each version until accepted.
- E. After the Architect's and Engineer's review, and any required Contractor revisions, the "Record Drawings" shall be delivered to the Contractor in AutoCAD format for the Owner's use. Upon acceptance, provide 3(#) prints, and 3 (#) electronic versions within sixty (60) days of Final Acceptance.

1.20 ELECTRICAL EQUIPMENT AND ELECTRICAL ROOM PRECAUTIONS

- A. In general, the Contractor shall not install piping or equipment in any switchboard, switchgear, transformer, elevator equipment, telephone, telecommunications, or electrical equipment rooms unless this piping or equipment serves only these rooms. Installation is strictly prohibited where it violates the requirements of the applicable Electrical Code.
- B. No piping or other equipment foreign to the electrical installation shall be installed within the dedicated zone above switchboards, panelboards, distribution boards, and motor control centers to a height of 6 ft. above the equipment or the structural ceiling, whichever is lower. The area above the dedicated space shall be permitted to contain foreign systems, provided protection is installed to avoid damage to the electrical equipment from condensation, leaks or breaks in such foreign systems.
- C. Caution workers both verbally and in writing as to the dangers involved in doing work within or adjacent to electrical equipment within electrical closets on various floors, the Mechanical Rooms and the Switchgear Rooms, Elevator Machine Rooms, due to dangers caused by the presence of high voltages and currents in these spaces.
- D. Provide all necessary personal protective equipment meeting OSHA requirements when working in areas within live electrical equipment.

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1.21 EQUIPMENT PADS AND MOUNTING

- A. Concrete pads for various pieces of equipment will be furnished under another division. Pads shall be provided in all Equipment Rooms. This shall include floor-mounted equipment, equipment mounted on legs, and pipe support stands. Equipment pad shall generally conform to the shape of the piece of equipment it serves with a minimum 3 in. margin around the equipment and supports. Pads shall be a minimum of 3-1/2 in. high with all external corners bull-nosed to a tooled radius. Provide equipment pad layouts to the division furnishing the pads. Shop drawings stamped "REVIEWED" shall be used for dimensional guidance in sizing the pads, anchor bolt locations, etc.
- B. Furnish and install galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs. Anchor bolts shall be located and of the size and number recommended by the manufacturer of the equipment and as required for seismic restraint. When equipment is placed on vibration isolators, the equipment shall be secured to the isolator and the isolator secured to the floor or pad, or supported as recommended by the vibration isolation manufacturer.
- C. Where allowed by this specification, equipment is mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and be securely attached to the partition studs or framework. At the Contractor's option, the mounting screws may pass through the gypsum board and be securely attached to 8 in. high, continuous length, 16 gauge galvanized metal backplates which are attached to a minimum of three (3) metal studs. Toggle bolts installed in gypsum board partitions shall not be acceptable.

1.22 CUTTING AND PATCHING

- A. In general, cutting and patching will be done under other divisions of the specifications.
- B. Furnish to the Contractor necessary information so that openings for this work can be built into the floors and walls in time. Such cooperation is required to keep cutting of walls and floors to a minimum.
- C. Set drains and sleeves for pipes accurately before concrete floors are poured, or set boxes on the forms to leave openings in the floors and subsequently set required sleeves in the openings.
- D. Should the Contractor neglect to perform preliminary work, and should cutting be required in order to install equipment, the expense of this cutting and restoring of surfaces to their original condition shall be borne by this Contractor.

1.23 UTILITY CONNECTIONS

- A. Arrange and pay costs for all specified utilities, including the following:
 - 1. Connection to municipal water mains and sewers.
 - 2. Payment of service charges.

- 3. Provisions for temporary utilities.
- 4. Connections to electric and other utility points of service interface.

1.24 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Protect from damage, water, dust all material and equipment provided under this division, both in storage and installed in accordance with manufacturer's recommendations until Notice of Completion has been filed and accepted.
- B. Arrange with Owner for storage facilities for materials and equipment.
- C. All products stored off site and delivered to the site must be kept in factory packing with positioning devices in place until installation. Equipment which is subject to damage from moisture shall be stored indoors in a suitably controlled environment with factory covering in place.
- D. Material, equipment or apparatus damaged because of improper storage or protection shall be rejected.
- E. Protect equipment from damage due to moisture, water, spray-on fireproofing, and construction debris during construction.
- F. Cover and protect all openings left in floor for passage of pipes. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting and conduits with caps to prevent obstruction and damage.
- G. Protect the system against freezing in cold weather.
- H. Prior to starting equipment, remove all protective materials, shipping bars, retainers, positioning devices.

1.25 CONSTRUCTION REVIEW

- A. Work may be reviewed at any time by the Engineer.
- B. Advise the Engineer that work is ready for review at the following times:
 - 1. Prior to backfilling buried work.
 - 2. Prior to concealment of work in walls and above ceilings.
 - 3. Testing of systems and equipment.
 - 4. When all requirements of the Contract have been completed.

1.26 EQUIPMENT NOISE AND VIBRATION

- A. Equipment and systems, as defined herein, shall be quiet and free of apparent vibration while in operation.
- B. Vibration shall not be apparent to the senses in occupied areas of the building. To this end, both the balancing of rotating machinery and the installation of vibration isolation at various locations are required.
- C. It shall be the responsibility of this Contractor to obtain equipment that is quiet in operation as compared to other available equipment of its size, capacity, and type; to install equipment so that a minimum amount of noise and/or vibration is transmitted to the building; and to fabricate the piping systems so that noises generated in the systems are held to an absolute minimum.
- D. Any additional precautions deemed necessary to provide a quiet installation shall be done as part of the work of this division, subject to review by the Engineer and without additional cost to the Owner. After the systems are in operation, it shall be the responsibility of the Contractor to make any changes to equipment or work installed that may be required to provide systems which are quiet in operation and comply with the acoustic requirements as specified herein.
- E. Except in various special areas listed herein, the system noise level, in occupied spaces, shall be equal to or less than the "lowest value in the range" of the noise criteria curves for the particular space in accordance with the current edition of Applications Volume of the ASHRAE Handbook. The noise criteria curves shall be based on ANSI Standard S1.6-1984 (R-1990) octave bands and a sound pressure level in decibels referenced to 0.002 microbars. Sound levels within the occupied spaces must meet the criteria described above and with all building, wall partition, floor, ceiling plenum depth, and ceiling construction in place as they exist for the individual spaces. The attenuation through boundary construction of Equipment Rooms must be considered in selecting equipment for acceptable noise level as described herein.
- F. The system noise level in the Tenant-occupied spaces of the project shall not exceed NC-35 (except as noted hereinbelow). This shall include all areas occupied by the Tenant, including areas directly under piping or any equipment.
- G. Areas that shall conform to noise criteria other than NC-35 shall include the following:

1.	Board Room, Auditorium and Conference Rooms	NC-30
2.	Lobby, Toilets, Corridors, General Offices and Cafete	eria NC-40
3.	Laboratory Areas	NC-40
4.	Computer Room, Print Shop and Storage	NC-50
5.	Technology Floors and Kitchens	NC-55

1.27 FINAL REVIEW

- A. At a time designated, the entire installation shall be reviewed for compliance with the Contract Drawings and specifications. The Contractor shall be available at all times during this Review.
- B. The Contractor shall demonstrate prior to the Final Review that all systems and all equipment have been properly balanced and adjusted and are in compliance with the requirements of the Contract Documents. After these demonstration tests are completed satisfactorily, but prior to the Final Review field visit by the Engineer, the Contractor shall submit to the Engineer a written certification that attests to Contract Document compliance for this Project.
- C. Certificates and documents required herein shall be in order and presented to the Architect and Engineer at least two (2) weeks prior to the Final Review.
- D. After the Final Review, any changes or corrections noted as necessary for the work to comply with these specifications and the drawings shall be accomplished without delay in order to secure final acceptance of the work.

1.28 EARLY OCCUPANCY

- A. All Contractors and Subcontractors shall be responsible for completing those systems which are necessary to allow partial occupancy of the building(s) even if the systems in the unoccupied areas are incomplete. Partial or early occupancy schedules shall be developed by the Contractor. Specific attention is necessary for any areas involving special spaces such as Technology Areas which will require early operation to allow the final occupancy to be arranged on a schedule consistent with the needs of the project. The Contractor should refer to the construction schedule for this project for the schedule of completion dates assigned to the various portions of the project and schedule his work accordingly.
- B. Requirements for temporary occupancy shall be verified with the Authorities Having Jurisdiction.

1.29 DATE OF COMPLETION AND TESTING OF SYSTEMS

- A. The date for the final performance and acceptance testing shall comply with the project construction schedule and shall be sufficiently in advance of the Contract completion date to permit the execution of the testing by the Contractor prior to occupancy and the close-out of the Contract. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper and satisfactory functioning of all equipment and systems shall be completed prior to the close-out of the Contract. Re-tests shall not relieve the Contractor of completion date responsibility.
- B. The Contractor shall provide a detailed schedule of completion indicating when each system component and entire system is to be completed and outlining when tests will be performed. Completion schedule shall be submitted to the Architect, Engineer, and Owner for review at a time requested by the Contractor after the notice to proceed has

been given by the Contractor to the respective Division 22 Subcontractors. This schedule shall be updated periodically by the Contractor as the project progresses. Each update shall be submitted to the Engineer and Owner for review.

1.30 OPERATING INSTRUCTIONS

- A. The Contractor shall provide the services of a factory-trained specialist to supervise the commissioning, startup, and operation of all equipment specified herein and to instruct the Owner's operators during a five (5) day operating instruction period at or near the project site. The operating instruction period shall be defined as straight-time working hours and shall not include nights, weekends, or travel time to and/or from the project and shall include a period for videotaping of the operating instructions. See individual sections of these specifications for additional instructions by manufacturer-trained specialists.
- B. The Owner shall be notified in writing at least two (2) weeks before each operating instruction period begins. The Contractor shall commence no instruction period until the Owner has issued his written acceptance of the starting time.

1.31 WARRANTY PERIOD

- A. The warranty period shall be for the period from beneficial use by the Owner, in accordance with the construction schedule.
- B. During the warranty period, the Contractor shall guarantee the following in a form satisfactory to the Owner:
 - 1. All work installed will be free from any and all defects in workmanship and/or materials.
 - 2. All apparatus will develop capacities and performance characteristics specified.
 - 3. The systems shall operate without malfunction.
- C. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.
- D. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion" by the Owner or the Owner's Representative for each item of material, equipment, or system.
- E. The Subcontractor shall confer with the Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.
- F. Provide complete documentation of all component and system tests prior to Owner acceptance and turnover of components or systems. In addition, the Owner reserves the

right to review all test objectives, test plans and test cases, and witness all preoperational tests. Provide the Owner with a comprehensive schedule detailing the preparation of testing documentation and the conduct of all component or system tests.

G. Warrant that all components, subsystems and systems will perform their specified functions from the date of turnover and commercial operation through the useful life of the system, as determined by the various equipment manufacturers and installing Contractor. In the event components fail for any reason, be responsible to repair/replace said components, and reimburse the Owner for all costs associated with the component, subsystem or system that failed to perform the specified function.

1.32 GUARANTEE

- A. Submit a single guarantee stating that all portions of the work are in accordance with Contract requirements. Guarantee all work against faulty and improper material and workmanship for a period of one year from date of final acceptance by the Owner; except that where guarantees or warranties for longer terms are specified herein, such longer term shall apply. At no additional cost to Owner, within 24 hours after notification, correct any deficiencies which occur during the guarantee period, all to the satisfaction of the Owner and Architect. Require similar guarantees from his Subcontractors.
- B. Guarantee that the materials and workmanship supplied under these specifications will be of the best grade, that the apparatus will be erected in a practical and first class manner, that it will be complete in operation, nothing being omitted in the way of labor and material required to make this so, although not specifically shown or mentioned herein and that it will be delivered in well working order, complete and perfect in every respect without additional cost whether or not shown in detail on the drawings or described in detail in this specification.
- C. Be responsible for all damage to or caused by the work performed under this division for a period of one (1) year from date of the acceptance of work under this Contract. Repair at no cost to Owner all such damage which occurs within 24 hours' notice thereof by the Owner. Damage which occurs prior to the completion of this work shall be repaired at once. Be responsible for any damage and repair thereof and reimburse Owner for all expense incurred thereby. Indemnify the Owner, the Consulting Engineers and the Contractor against loss, liability, damage or expense, including reasonable attorneys' fees, in connection with any claim resulting from such leaks which may be asserted by tenants or any other third person.

1.33 DELIVERY, STORAGE AND HANDLING

A. Include all delivery, hauling, hoisting, shoring, and placement in the building of equipment and materials specified herein, including any equipment pre-purchased by the Contractor for installation by this Contractor. The Contractor shall be responsible for the timely delivery and introduction of equipment to the Project as required by the construction schedule for this Project. If any item of equipment is received prior to the time it is required, the Contractor shall be responsible for its proper storage and protection until such time as it may be required. The Contractor shall pay for all costs of demurrage or storage in a bonded warehouse.

B. If any item of equipment is not delivered to or installed at the project site in a timely manner as required by the project construction schedule, the Contractor shall be solely responsible for disassembly, re-assembly, manufacturer's supervision, shoring, general construction modifications, delays, overtime costs, etc. No additional cost or delays shall be incurred by the Owner.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB's) or other hazardous materials identified by the Owner.

2.2 GENERAL

A. Refer to specific specification sections for additional equipment and system piping requirements.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with the specification section pertaining to the individual equipment and system piping.

END OF SECTION 220000

SECTION 220500

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Contractor and his Subcontractors shall provide all labor, materials, tools, scaffolding, machinery, equipment, appliances, and services necessary to complete the plumbing work under this Contract. All systems and equipment shall be complete in every respect and all items of material, equipment and labor shall be furnished and installed for a fully operational system. This Contractor shall coordinate his work with the work of the other trades so as to resolve conflicts without impeding job progress or the project construction schedule. Provide notice with the bid proposal of any concrete work required by this division that is not indicated on the Structural or Architectural Drawings or Drawings of other trades.
- B. This Contractor shall examine all Contract Documents for all divisions of the specifications in order to determine the extent of work required to be completed under this division. Failure to examine all the Contract Documents for this project will not relieve this Contractor of the responsibility to perform all the work required for a complete, fully operational and satisfactory installation.
- C. Provide all miscellaneous common plumbing products required for a complete plumbing installation as indicated, in accordance with the requirements of the Contract Documents.
- D. Section includes:
 - 1. Sleeves.
 - 2. Formed steel channel.
 - 3. Escutcheons.

1.2 RELATED SECTIONS

- A. Refer to Division 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

1.	Section 22 00 00	-	General Requirements for Plumbing
2.	Section 22 05 23	-	General-Duty Valves for Plumbing Piping
3.	Section 22 05 29 Equipment	-	Hangers and Supports for Plumbing Piping and
4.	Section 22 05 33	-	Heat Tracing For Plumbing Piping

5.	Section 22 05 53 Equipment	-	Identification	for	Plumbing	Piping	and
6.	Section 22 07 00	-	Plumbing Insul	lation			
7.	Section 22 11 16	-	Domestic Wate	er Pipi	ng		
8.	Section 22 13 16	-	Sanitary Waste	and V	/ent Piping		

1.3 REFERENCES

- A. Each product required for the common plumbing work shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.
 - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - b. ISO 9000:2001: Quality Management.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46 and Section 22 00 00 and shall include, but not be limited to:
 - 1. Product cut sheets and schedule of sleeves and mechanical sleeve seals used for the project. The schedule shall include the material, diameter, length, number of links, location and service the sleeve and sleeve seal will be provided.
 - 2. Product cut sheets and schedule of access doors used for the project. The schedule shall include the material, size, finish type, location and purpose of installation the access door will be provided.
 - 3. Product cut sheets of formed steel channel.
 - 4. Product cut sheets of escutcheons. The cut sheets shall indicate the size, finish and location, which the escutcheons will be installed.

- B. Product Data: Submit manufacturer's literature including general assembly.
- C. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for each product and system for which they are installed.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.
- B. All materials and equipment shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products of the type specified herein. The manufacturer shall have been in continuous operation in the manufacture of the products specified for a minimum of ten (10) years.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all materials of any type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.

1.6 WORK INCLUDED

- A. The work includes, but is not limited to, the following systems, equipment and services:
 - 1. Domestic water supply piping.
 - 2. Sanitary waste piping.
 - 3. Floor drains.
 - 4. Insulation, safety devices, vibration isolation, etc.
 - 5. Pressure-reducing devices.
 - 6. All domestic and fire protection system water services for the building, including all required fees, except that water access charges are paid by the Owner.
 - 7. Provide all miscellaneous supports for Division 22 work and equipment.
 - 8. Furnishing of shop drawings, product data and samples.
 - 9. Furnishing of "Record Drawings".
 - 10. Furnishing of Contractor "Coordination Drawings".
 - 11. Furnishing of operating and maintenance books.

- 12. Miscellaneous items as required for complete and functioning systems as specified herein.
- 13. All systems, equipment, and services specified herein shall be furnished and installed completely and ready for use.
- 14. Provide all sleeves for the Plumbing work complete with seals and firestop as specified herein and as required by the Authority Having Jurisdiction.
- 15. Patching or replacement of all fireproofing if it is damaged or removed during the installation of the Division 22 work.
- 16. Instruments as required for operating and testing the various systems shall be furnished and installed complete as specified herein.
- 17. Hydrostatic testing, operational testing and adjusting of all systems.
- 18. Complete flushing and chemical treatment and initial water treatment for all water systems.
- 19. Complete all tests required by all rules, regulations, etc., of all Authorities Having Jurisdiction and prepare, complete and file all forms, tabulations, plans, etc., pertinent thereto with the referenced authorities, and accomplish such work with personnel of proper caliber, in particular, Professional Engineers, where so required.
- 20. Participate in and provide all labor as required for "off-hour" testing of equipment and systems if required by job conditions or by Authorities Having Jurisdiction and as required to obtain the "Temporary Certificates of Occupancy (TCO)."
- 21. Participate in and provide all labor as required for system commissioning including any time required for a detailed review of the commissioning process as requested by the Engineer or the Owner.

1.7 WORK OF OTHER DIVISIONS

- A. All concrete work indicated on the Mechanical/Electrical Drawings.
- B. Painting, except touch up painting and as otherwise specified herein.
- C. Wiring for automatic controls and interlocks.
- D. Subsurface and landscape drainage.

1.8 VERIFYING EXISTING CONDITIONS

A. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship according to the intent of this specification, and report to the Construction Manager any condition, which prevents performance of first-

class work. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.

B. Become thoroughly familiar with actual existing conditions at the building of the present installations to which connections must be made or which must be changed or altered. The intent of the work is shown on the drawings and described hereinafter, and no consideration shall be granted by reason of lack of familiarity on the part of the Contractor with actual physical conditions at the site. Inspect each and every area affected by the total alteration of the building before submitting bid.

1.9 SUBCONTRACTS

A. Where Contract Documents require manufacturers' services, and wherever the staff of this Contractor performing the work of this section cannot adequately perform such services, this Contractor shall stipulate such performance in its contracts with its Subcontractors or Sub-Subcontractors, vendors, manufacturers, and the like, or else subsequently pay them any additional fees required therefor.

1.10 FACTORY TESTING

A. All mechanical sleeve seals and access doors shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.

1.12 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Warranty period shall commence upon final acceptance by the Owner.
- C. Furnish a one (1) year manufacturer's warranty for each mechanical sleeve seal and access door.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.

- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Escutcheons
 - 1. Chicago Specialty.
 - 2. Producers Specialty.
 - 3. Sanitary-Dash.
- D. Formed Steel Channel
 - 1. Allied Tube & Conduit Corp.
 - 2. B-Line Systems.
 - 3. Unistrut Corp.
- E. Sleeves
 - 1. Calpico, Inc.
 - 2. Metraflex Co.
 - 3. Pipeline Seal & Insulator Inc. (Link-Seal).

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment that conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs,

preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 SLEEVES

- A. Furnish sleeves for all pipes passing through floors, walls and concrete, or concrete fireproofed beams.
- B. Sleeves in concrete beams, through concrete walls, and exposed pipes penetrating floors: Schedule 40 steel pipe.
- C. Provide sleeves in foundation walls and in concrete pits with anchor flange.
- D. Sleeves within furred-out enclosures in floors, through partitions, steel beams and walls: 18 gauge (1.2 mm) thick galvanized steel.

2.4 FORMED STEEL CHANNEL

- A. Provide formed steel channel as required to sufficiently support piping and equipment in accordance with the Contract Documents.
- B. Formed steel channel shall be galvanized 12 gauge (2.8 mm) thick steel, with holes 1-1/2 inches (38 mm) on center.

2.5 ESCUTCHEONS

- A. Provide escutcheons as required to sufficiently enclose penetrations in fire and smoke rated walls and partitions in accordance with the Contract Documents.
- B. Where pipes penetrate fire or smoke rated walls provide metal escutcheons on both sides of the wall penetration.
- C. Escutcheons shall be either one-piece or two-piece construction, chrome-plated brass or stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and returned to the manufacturer for replacement.

3.2 INSTALLATION

- A. Installation shall be in accordance with the specification section pertaining to the individual equipment.
- B. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the drawings shall be followed as closely as possible, but the right is reserved by the Architect to change locations and elevations to accommodate conditions

which may arise during the progress of the work, prior to installation, without additional compensation for such changes. The responsibility for accurately laying out the work and coordinating the installation with other trades rests with this Contractor. Should it be found that any work is laid out so that interferences will occur, report that to the Architect before commencing work.

- C. Carry fixture connections, concealed in building construction, to points above floor, break out close to the underside or adjacent to fixture and continue exposed to fixture.
- D. Piping Installation
 - 1. Install pipes approximately as shown on the drawings and as directed during installation, as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced. Erect pipe risers plumb and true, and parallel with walls and other pipes and neatly spaced.
 - 2. Keep all horizontal runs of piping, except where concealed in partitions, as high as possible and close to walls. Maintain minimum 1/8 inch fall per foot on all soil, waste and leader lines.
 - 3. Do not install pipes or other apparatus in a manner, which interferes with the full swing of the doors.
 - 4. Ream all pipe smooth before installation. Do not bend, flatten, split or otherwise injure pipe.
 - 5. Use reducing fittings, unless otherwise approved in special cases, in making reduction in size of pipe. Bushings shall not be allowed unless specifically approved.
 - 6. Where chrome-plated piping is installed, cut and thread pipe so that no unplated pipe threads are visible when the work is completed.
 - 7. Do not install exterior piping in water or when trench or weather conditions are unsuitable for the work, as decided by the Architect.
- E. Sleeves
 - 1. Set sleeves in position in forms. Provide reinforcing around sleeves.
 - 2. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
 - 3. Extend sleeves through floors 1 in. (25 mm) above finished floor level. Caulk sleeves tight.
 - 4. Where piping penetrates the floor, ceiling or wall, close off space between pipe and adjacent work with firestopping and caulk airtight. Provide close-fitting metal collar or escutcheon covers at both sides of penetration.

- 5. Sleeves passing through fire-rated floors or walls shall be sealed with an intumescent formulation similar to Metraflex Metraseal 120 FireSeal or approved.
- 6. Sleeves passing through foundation walls or pit walls shall be sealed utilizing a mechanical seal similar to Link-Seal or approved.
- 7. Install chrome-plated steel escutcheons at finished surfaces.
- 8. Set sleeves as construction progresses and secure in place during pouring of concrete.
- 9. Fire stopping shall be installed as specified under Section 07 84 00.
- F. Escutcheons
 - 1. Provide pipe escutcheons with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings, and pipe sleeve extensions, if any. Furnish pipe escutcheons with chrome finish for occupied areas, prime paint finish for unoccupied areas.
 - 2. Escutcheons for waterproof floors, and areas where water and condensation can be expected to accumulate shall be stainless steel or chrome plated cast brass, solid or split hinged.
 - 3. Escutcheons for dry areas shall be chrome plated cast brass or galvanized sheet steel, solid or split hinged.

3.3 CLEANING

- A. Before final connections are made and before operation of equipment and piping, thoroughly blow out, rod out, or wash out all piping at least twice, in a manner as directed and/or approved by the Architect, to remove all accumulation of dirt, chips or other deleterious material. Make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expense to the Owner.
- B. Clean up all equipment and leave in condition for finish painting before acceptance.
- C. Disinfect underground water mains after installation and test in accordance with AWWA Standard C-601 and requirements of the local Authorities Having Jurisdiction.
- D. Disinfect interior potable water distribution system in accordance with requirements of the local Authorities Having Jurisdiction. Provide the following procedure where no prescribed method exists:
 - 1. After the system is flushed, fill with either 50 ppm chlorine-water solution and let stand for 24 hours, or 200 ppm chlorine-water solution and let stand for 3 hours.

- 2. Flush system with clean potable water until no excess chlorine remains in system.
- 3. Repeat procedure if contamination persists after further test.

3.4 PROTECTIVE PAINTING

- A. Painting, except as specified herein or indicated otherwise, shall be done under another division. This division shall cooperate with the other divisions to determine the size of equipment, sizes and lengths of pipes, etc., to be painted.
- B. Equipment and materials furnished under this section shall be factory-finished as specified. If the factory finish is damaged during shipment, storage, installation, etc., it shall be repainted by this Contractor subject to the Engineer's approval. Touch-up painting is acceptable only for minor finish damage.
- C. Paint products for identification of plumbing systems shall be exterior grade, alkyd-based products.
- D. Repair damaged and marred factory-painted finishes with materials and procedures to match original factory finish.

3.5 FIELD TESTS

- A. Test all systems in full accordance with applicable Underwriters' and Municipal requirements.
- B. Notify the Architects and Inspectors Having Jurisdiction at least 48 hours in advance of performing the required tests, so that arrangements may be made for their presence to witness the tests.
- C. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architects, plumbing and other inspectors of the city, applicable Insurance Association and Public Utilities Inspectors Having Jurisdiction.
- D. Repair or, if required by the Architects, replace defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- E. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- F. Test the systems before any paint or insulation is applied.
- G. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.
- H. Test all fixtures for soundness, stability of support and satisfactory operation.

I. Performance Tests

- 1. Gravity Drainage Systems: Subject the sanitary and storm drains, waste, and vent piping inside the building to a standing water test. The standing water test shall include the entire system from the lowest to the highest point of the system. The system shall be tested to a hydrostatic pressure equivalent to at least a ten foot head of water. After filling, shut off water supply and allow it to stand two (2) consecutive hours, with no leakage.
- 2. Pressure Systems
 - a. Prior to applying the pressure test, the system shall be tested to 50 psig with compressed air or dry nitrogen for a period of ten minutes with no loss in pressure.
 - b. All interior water distribution systems shall be tested to a pressure not less than 150 psig or 50 psig above the normal operating pressure, whichever is greater. Apply the test for a minimum of two (2) consecutive hours with no loss in pressure.
- J. Final Acceptance
 - 1. Prior to final acceptance the Contractor shall submit all performance test reports for each test performed. The reports shall be bound in a three ring binder and submitted to the Engineer and Owner for review.
 - 2. Final acceptance testing shall comply with the project construction schedule and shall be sufficiently in advance of the Contract completion date to permit the execution of the testing by the Contractor prior to occupancy and the close-out of the Contract.
 - 3. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper and satisfactory functioning of all equipment and systems shall be completed prior to the close-out of the Contract. Re-tests shall not relieve the Contractor of completion date responsibility.

END OF SECTION 220500

SECTION 220523

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all valves required for equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Air release valves.
 - 2. Alarm devices.
 - 3. Backflow preventer.
 - 4. Ball valves.
 - 5. Butterfly valves.
 - 6. Chainwheels.
 - 7. Check valves.
 - 8. Gate valves.
 - 9. Valve schedule.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

1.	Section 22 00 00 Section 22 05 00	General Requirements for PlumbingCommon Work Results for Plumbing
2.	Section 22 05 29	- Hangers and Supports for Plumbing Piping and Equipment
3. 4.	Section 22 05 53 Section 22 07 00	 Identification for Plumbing Piping and Equipment Plumbing Insulation
5. 6.	Section 22 11 16 Section 22 13 16	Domestic Water PipingSanitary Waste and Vent Piping

1.3 REFERENCES

- A. Each valve and all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.
 - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. American Society of Mechanical Engineers (ASME)
 - 1) ASME/ANSI B16.5: Pipe Flanges and Fittings.
 - 2) ASME B16.34: Valves Flanged Threaded and Welding End.
 - 3) ASME PTC 25: Pressure Relief Devices.
 - b. American Water Works Association (AWWA)
 - 1) AWWA C500: Standard for Metal Seated Gate Valves for Water Supply Service.
 - 2) AWWA C504: Standard for Rubber Seated Butterfly Valves.
 - 3) AWWA C508: Standard for Swing Check Valves for Waterworks Service.
 - 4) AWWA C510: Standard for Double Check Valve Backflow Prevention Assembly.
 - 5) AWWA C511: Standard for Reduced Pressure Principle Backflow Prevention Assembly.
 - c. ASTM Society for Testing and Materials (ASTM)
 - 1) ASTM F1508: Standard Specification for Angle Style, Pressure Relief Valves for Steam, Gas and Liquid.
 - d. Manufacturers Standardization Society (MSS)
 - 1) MSS SP-6: Standard Finishes for Contact Faces of Pipe Flanges and Connecting-end Flanges of Valves and Fittings.

- 2) MSS SP-25: Standard Marking System for Valves, Fittings, Flanges and Unions.
- 3) MSS SP-53: Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and Other Piping Components.
- 4) MSS SP-55: Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components.
- 5) MSS SP-61: Pressure Testing Steel of Valves.
- 6) MSS SP-67: Butterfly Valves.
- 7) MSS SP-68: High Pressure Offset Seat Butterfly Valves.
- 8) MSS SP-70: Cast Iron Gate Valves, Flanged and Threaded Ends.
- 9) MSS SP-71: Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- 10) MSS SP-72: Ball Valves with Flanged or Butt-welding Ends for General Service.
- 11) MSS SP-78: Cast Iron Plug Valves, Flanged and Threaded Ends.
- 12) MSS SP-80: Bronze Gate, Globe, Angle and Check Valves.
- 13) MSS SP-82: Valve Pressure Testing Methods.
- 14) MSS SP-85: Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.
- 15) MSS SP-110: Ball Valves Threaded, Socket-welding, Solder Joint, Grooved and Flared Ends.
- e. National Sanitation Foundation International (NSF)
 - 1) NSF/ANSI Standard 61: Drinking Water System Components.
- f. United States Environmental Protection Agency (USEPA)
 - 1) Safe Drinking Water Act (SDWA).
 - 2) Reduction of Lead in Drinking Water Act (Federal Public Law 111-380).

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 22 00 00 and shall include, but not be limited to:
 - 1. Schedule of valves, complete with typical mill reports.
 - 2. Valves in the plumbing system for cold water and other valves as specified herein.
- B. Product Data: Submit manufacturer's literature including general assembly, including but not limited to the following:
 - 1. Dimension and specification sheets.
 - 2. Model number.
 - 3. Pressure rating.
 - 4. Working pressure.
 - 5. List of materials.
 - 6. Manufacturer's installation instructions.
- C. Schedule of Valves: Submit a single well-organized schedule for all valves indicating the following:
 - 1. Valve type/model number.
 - 2. System type.
 - 3. Location/floor.
 - 4. Pressure rating.
 - 5. Pipe size.
 - 6. Connection method.
- D. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- E. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for the system.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.

- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials, and accessories new and free from defects.

1.6 FACTORY TESTING

- A. All valves shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. The valve manufacturer shall provide documentation that all valves have been factory tested and performs to the performance and pressure ratings specified.
 - 2. All valves shall be factory tested in accordance with the latest applicable standards.
 - 3. All valves provided by this Contractor for use by Division 21 shall be FM Approved, UL Listed and approved for use in fire suppression systems.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water and construction debris.
- D. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves and weld ends.
 - 3. Set angle, gate and globe valves closed to prevent rattling.
 - 4. Set ball valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- E. 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.
- 3. Use sling to handle large valves and rig sling to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

1.8 COORDINATION

A. Coordinate the installation of work in this section with the following sections:

1.	Section 21 00 00	-	General Requirements for Fire Suppression
2.	Section 21 05 23	-	General Duty Valves for Water-Based Fire Suppression
			Piping
3.	Section 01 31 46	-	Special Requirements
4.	Section 26 05 00	-	Common Work Results for Electrical
5.	Section 26 05 19	-	Low Voltage Electrical Power Conductors and Cables
6.	Section 28 31 13	-	Fire Alarm and Smoke Detection System

B. The installation of all wiring for monitoring devices furnished under this section shall be installed as specified under Divisions 26 and 28.

1.9 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Furnish a five (5) year manufacturer's warranty for all manual valves and relief valves.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Air Release and Vacuum Valves

- 1. Cla-Val Co.
- 2. Danfoss.
- 3. Singer Valve Inc.
- 4. Val-Matic Co.
- D. Chainwheels
 - 1. Babbit Steam Specialty Co.
 - 2. Roto Hammer Industries.
 - 3. Trumbull Industries.
- E. Check Valves
 - 1. Crane.
 - 2. Hammond (I.B. Series only).
 - 3. Flomatic Corporation.
 - 4. Kennedy.
 - 5. Mueller Steam Specialty.
 - 6. Nibco.
 - 7. Val-Matic Valve & Manufacturing Corp.
 - 8. Walworth.
- F. Gate Valves
 - 1. Crane.
 - 2. Hammond (I.B. Series only).
 - 3. Jenkins.
 - 4. Kennedy.
 - 5. Milwaukee.
 - 6. Nibco.
 - 7. Stockham.
 - 8. Walworth.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs,

preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

- D. Shut-off valves, isolation valves, pressure-reducing valves and check valves shall be provided as indicated on the Construction Documents or as required by the Authorities Having Jurisdiction on the drawings, required or directed.
- E. Air release valves shall be provided at the high points of all domestic hot water systems and where trapped sections of horizontal piping exist in the field due to Contractor coordination.
- F. Pressure-relief valves shall be provided on each hot water pressure vessel, heat exchanger or pump discharge as specified herein. Temperature and pressure ratings for pressure-relief valves shall be appropriate for the system in which they are installed and in accordance with the requirements of the Authority Having Jurisdiction.
- G. Direct acting pressure-relief valves shall be provided on pilot controls for all automatic control valves.
- H. Valve pressure ratings shall not be less than indicated and as required for system pressures.
- I. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- J. Valves used in potable water systems and valves supplying water for potable use shall be compliant with the Reduction of Lead in Drinking Water Act (Federal Public Law 111-380) limiting the lead content of the wetted surfaces to a weighted average of 0.25% or less.
- K. Valves bodies shall be identified as lead-free by a symbol or letters "LF" casted into the body. Valve handles shall be distinctively identified by white handles with blue graphics.
- L. The use of NRS gate valves and butterfly valves shall be limited to shutoff services only and only where specifically permitted by the Engineer.
- M. Unless otherwise noted, all valves for shutoff and bypass service shall be ball valves, 3 in. (75 mm) and below, and gate or butterfly valves, 4 in. (100 mm) and above.
- N. All end connections shall be the same as are used for fittings for 3 in. (75 mm) and below. 4 in. (100 mm) and above, valves shall be flanged.
- O. Valve-End Connections
 - 1. Flanges on iron valves shall meet ASME B16.1.
 - 2. Flanges on steel valves shall meet ASME B16.5.
 - 3. Flanges on bronze and/or brass valves shall meet ASME B16.24.
 - 4. Threaded ends shall meet ASME B1.20.1.

5. Soldered lines double union ends with solder joints ASME B16.18.

P. Valve Operators

- 1. Provide gear operators on quarter-turn valves 5 in. (125 mm) and larger.
- 2. Provide lever handles on quarter-turn valves, (except plug valves) 4 in. (100 mm) and smaller.
- 3. Handwheels shall be provided on valves other than quarter-turn types.
- 4. Provide wrenches for plug valves 4 in. (100 mm) and smaller. Furnish one (1) wrench for every five (5) plug valves for each size plug-valve head.
- 5. Chain wheels shall be provided for attachment to valve handwheels, stems, or other operators on all valves installed more than 7 feet 0 in. (2.1 m) above floors and/or working platforms.
- Q. Valves in insulated piping shall be provide with 2 in. (50 mm) stem extensions having the following features:
 - 1. Extended operating handle of non-thermal-conductive material.
 - 2. Extended differential measuring ports.
 - 3. Protective sleeve that allow operation of valve and access to the measuring ports without breaking the vapor seal or disturbing insulation.
 - 4. Memory stops that are fully adjustable after insulation is applied.
- R. Provide bypasses for gate valves as tabulated below. Install bypasses so that the bypass valve is accessible.

	Pressure Differential Above Which a	
Valve Size	Bypass Should Be Used	Bypass Size
4 in.	200 psi (13.8 bar)	1 in.
5 in., 6 in.	200 psi (13.8 bar)	1-1/4 in.
8 in.	100 psi (6.9 bar)	1-1/2 in.
10 in.	75 psi (5.2 bar)	1-1/2 in.

- S. Floor Stands for Valves: With or without position indicator, as approved.
- T. Valves used on the fire standpipe system shall be listed by UL/FM and approved by the municipal Authorities Having Jurisdiction. Where the valve manufacturer selected cannot furnish an IBBM valve with such approval, substitute an approved cast steel valve.

2.3 BACKFLOW PREVENTER AND VACUUM BREAKERS

A. Backflow preventers and vacuum breakers shall be provided as required by the local Authority Having Jurisdiction.

- B. Atmospheric Vacuum Breakers
 - 1. Atmospheric vacuum breakers must assure positive protection against backsiphonage in the event that pressure loss causes vacuum conditions. Poppets are to be Selcon plastic. Vacuum breakers are to be rough brass unless otherwise noted.
 - 2. Atmospheric vacuum breakers shall be used as protection against crossconnections where the vacuum breaker is not subjected to back pressures due to pumps or gravity (open end service) and must be installed on the discharge side of last shutoff and be of non-spilling type. Install at a minimum of 6 in. (152.4 mm) above the highest overflow level, with the air inlet in a level position and a check valve in line after vacuum breaker. No valves shall be installed after vacuum breaker. They shall be rated to 150 psi (10.3 bar) working pressure and shall withstand water temperature to 110°F (43.3°C). Atmospheric vacuum breakers shall be Watts Model No. LF288A or Apollo Model No. AVB1LF.
- C. Pressure Vacuum Breakers
 - 1. Pressure vacuum breakers must be installed where subject to continuous pressure 12 in. (305 mm) above the highest outlet they are protecting. Install accessibly for periodic testing, and unit shall not become inoperative if subject to long periods under pressure. The vacuum breaker shall render positive protection against back-siphonage and incorporate a check valve and a vacuum relief with inlet and discharge shutoffs and field-testing cocks in one assembly. In sizes above 2 in. (50.8 mm), two check valves are required.
 - 2. All valves, check valves, nipples and other fittings shall be all-bronze construction. Units 6 in. (152.4 mm) and larger must be internally epoxy coated. Vacuum breakers shall be rated to 150 psi (10.3 bar) working pressure and shall withstand water temperatures to 180°F (82.2°C) for units up to 2 in. (50.8 mm) and to 140°F (60°C) for units 3 in. to 10 in. (76.2 mm to 254 mm). The vacuum relief valve must have a spring-loaded member to assure positive opening of air inlet when back-siphonage occurs. Pressure vacuum breakers shall be Watts Model No. LF800M4QT (1/2 in. to 2 in.) (12.7 mm to 50.8 mm).
- D. Double Check Valve Assembly
 - Backflow preventer, 3/4 in. (19 mm) through 4 in. (100 mm) shall consist of two (2) bronze independently operated internally spring-loaded check valves, two brass gate valves and four test cocks for field testing. Check valves must be loaded to withstand 1 psi (0.07 bar) in direction of flow. All internal parts must be readily accessible for maintenance without removing device from line, must be installed in a horizontal position and be accessible for periodic testing. Units 5 in. to 10 in. (127 mm to 254 mm) shall be of similar construction, but have "Y" type check valves and be of internally epoxy coated cast iron construction.
 - 2. Assembly shall be Watts Model No. LF709 rated to 150 psi (10.3 bar) minimum working pressure and shall withstand water temperatures to 140°F (60°C), or as

approved. Unit shall be shipped completely assembled and all valves, check valves, nipples and other fittings.

- E. Reduced Pressure Backflow Preventer
 - 1. Unit shall prevent contamination of water lines due to pressure reversal. This shall be accomplished by automatically reducing the pressure through the unit by means of the "reduced pressure principle". Unit shall consist of two (2) "Y" pattern spring-loaded check valves, a differential pressure-relief valve having two diaphragms separated by a spacer, two shutoff valves, and test cocks for field testing. Under normal flow conditions, both check valves shall be open and the differential relief valve shall remain closed. Under backflow conditions and when one of the check valves leaks, the differential relief valve shall open and discharge to atmosphere to maintain the zone at 2.0 psi (0.15 bar) lower than inlet pressure.
 - 2. Device shall automatically reduce the pressure in the zone" between the check valves. Should the pressure differential, normally 9 psi (0.63 bar), drop to 2.0 psi (0.15 bar), the relief valve shall open, discharge the liquid to floor or funnel drain and maintain the proper differential. A small hole in the spacer shall bleed to atmosphere if either diaphragm is damaged, giving visual evidence or diaphragm failure. Both check valves and relief valve shall be constructed so they may be serviced without removing device from the line. Unit shall be rated to 175 psi (12 bar) working pressure at 180°F (82.2°C) water temperature. Backflow preventers 2 in. (50 mm) and smaller, Watts Model No. LF709, shall have bronze bodies and trim. 2-1/2 in. (63.5 mm) and larger shall have cast iron bodies with epoxy coating and bronze trim, Watts Model No. LF709.

2.4 CHECK VALVES

- A. Provide check valves as required to prevent the reversal of water, air or gas flow in the plumbing systems as identified on the Construction Documents and required by the Authority Having Jurisdiction.
- B. Provide non-slam swing or spring-loaded center-guided check valves for the pump discharges of all water pumps, except pumps used in circulating systems.
- C. Provide swing check valves on circulating pump discharges.
- D. Provide ball check or swing check valves on the cold and hot water supplies to all lavatory and pantry faucets, shower valves and mixing valves where the backflow of hot or cold water can migrate across the supplies to the fixture.
- E. Provide non-slam lever weighted check valves or ball check valves on all sump and ejector discharges.
- F. Check valves shall be threaded, flanged or grooved ends suitable for the system, which it is being installed.
- G. Check valves shall be a horizontal swing check with renewable bronze seat and disc.

- H. Valve must be factory tested and certified to seat bubble tight.
- I. Spring loaded check valves shall be center guided globe type constructed as follows:

Body	Carbon steel/ductile iron
Body Style	Lug type/flanged
Trim	316 stainless steel
Spring	Stainless steel
Body P/T Rating Class 150	285 psig (19.6 bar) at 100°F (38°C) minimum
Body P/T Rating Class 300	740 psig (51 bar) at 100°F (38°C) minimum

J. Bronze swing check valves shall be constructed as follows:

Body	Bronze
Body Style	Y pattern horizontal flow
Disc	Bronze
Ends	Threaded or solder end
Body P/T Rating	600 psig (41.7 bar) at 250°F (120°C) minimum
Seat P/T Rating	300 psig (20.7 bar) at 100°F (38°C) minimum
WOG Rating	600 (41.7 bar) psig minimum

K. Class 150 cast steel swing check valves shall be constructed as follows:

Body	Carbon steel
Body Style	Bolted cover
Disc	Stainless steel
Seat	Steel/stellite facing
Trim	Carbon steel
Ends	Flanged
Body P/T Rating	ASME B 16.34
WOG Rating	150 psig (17 bar) minimum

L. Class 300 cast steel swing check valves shall be constructed as follows:

Body	Carbon steel
Body Style	Bolted cover
Disc	Stainless steel
Seat	Steel/stellite facing
Trim	Carbon steel
Ends	Flanged
Body P/T Rating	ASME B 16.34
WOG Rating	300 psig (20.7 bar) minimum

M. Class 600 cast steel swing check valves shall be constructed as follows:

Body	Carbon steel
Body Style	Bolted cover

Disc	Stainless steel
Seat	Steel/stellite facing
Trim	Carbon steel
Ends	Flanged
Body P/T Rating	ASME B 16.34
WOG Rating	600 psig (41.4 bar) minimum

2.5 GATE VALVES

- A. All gate valves 4 in. (100 mm) and over shall be of the OS&Y type.
- B. Gate valves 2-1/2 in. (65 mm) and smaller shall be Class 150 bronze valves providing positive shutoff.
- C. Bronze gate valves shall be constructed as follows:

Body	Bronze
Body Style	Screw in bonnet rising stem
Trim	Bronze
Wedge	Bronze
Packing	Asbestos free
Ends	Threaded or solder
WOG Rating	300 psig (20.7 bar) minimum

D. Ductile Iron Class 150 and 300 gate valves 2-1/2 in. (65 mm) and larger shall be constructed as follows:

Body	Cast Iron
Body Style	Outside screw and yoke rising stem
Trim	Bronze
Wedge	Cast Bronze
Packing	Asbestos free
Ends	Flanged
Body P/T Rating	ASME A536
WOG Rating	175 psig (12.1 bar) minimum

E. Steel Class 150 gate valves 3 in. (75 mm) and larger shall be constructed as follows:

Body	Carbon steel
Body Style	Outside screw and yoke rising stem
Trim	Stainless steel
Wedge	Carbon steel/chrome faced
Packing	Asbestos free
Ends	Flanged
Body P/T Rating	ASME B 16.34
WOG Rating	200 psig (13.8 bar) minimum

F. Steel Class 300 gate valves 3 in. (75 mm) and larger shall be constructed as follows:

Body	Carbon steel
Body Style	Outside screw and yoke rising stem
Trim	Stainless steel
Wedge	Carbon steel/chrome faced
Packing	Asbestos free
Ends	Flanged
Body Working P/T Rating	ASME B 16.34
WOG Rating	300 psig (20.7 bar) minimum

G. Steel Class 600 gate valves 4 in. (100 mm) and larger shall be constructed as follows:

Body	Carbon Steel
Body Style	Outside screw and yoke rising stem
Trim	Steel
Wedge	Carbon Steel
Packing	Asbestos free
Ends	Flanged
Body P/T Rating	ASME A216
WOG Rating	800 psig (55.2 bar) minimum

2.6 GLOBE VALVES

- A. Globe valves used for circuit balancing shall be all bronze body and trim, provided with memory locking stops.
- B. Globe valves 2-1/2 in. (65 mm) and smaller shall be Class 150 bronze valves providing positive shutoff.
- C. Bronze globe valves shall be constructed as follows:

Body	Bronze
Body Style	Screw in bonnet rising stem
Trim	Bronze
Disc	Bronze
Packing	Asbestos free
Ends	Threaded or solder
WOG Rating	300 psig (20.7 bar) minimum
Body P/T Rating	ASME B 16.34
WOG Rating	200 psig (13.8 bar) minimum

2.7 PRESSURE-RELIEF VALVES

- A. Pressure-relief valves shall be provided on each hot water pressure vessel, heat exchanger or pump discharge, as identified on the Construction Documents, required by the Authority Having Jurisdiction and as specified herein.
- B. Valve pressure settings, working pressure and temperature ratings shall not be less than indicated and as required for system pressures and temperatures.

- C. Pressure settings on valves for domestic hot water systems shall be no greater than 5 psi above the pressure required at the inlet to the equipment being served.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. All end connections shall be the same as are used for fittings for 2 in. (50 mm) and below. All end connections 2-1/2 in. (65 mm) and above, valves shall be flanged.
- F. Valve-End Connections
 - 1. Flanges on iron valves shall meet ASME B16.1
 - 2. Flanges on bronze and/or brass valves shall meet ASME B16.24
 - 3. Threaded ends shall meet ASME B1.20.1.
- G. Temperature and pressure-relief valves for hot water pressure vessels.
- H. Direct Acting Pressure-Relief Valves
 - 1. Direct acting pressure-relief valves shall be provided as pilot controls for pilot operated automatic control valves or as a self-contained pressure-relief valve to protect against over-pressure in the domestic water system.
 - 2. Direct acting pressure-relief valves shall be spring loaded, diaphragm type valves, which can be installed in any position and open and close within very close pressure limits.
 - 3. Direct acting pressure-relief valves shall have a cast bronze ASTM B62 or stainless steel ASTM A743 body and cover, with brass or T303 stainless steel trim. The valve shall have threaded ends and shall have a maximum working pressure of {400 psi (27.5 bar)} {600 psi (40.6 bar)}.
 - 4. In order to prevent tampering the adjustment cap shall be {wire sealed, using lock wire holes provided in the cap and cover} {provided with a stainless steel security cap with six pin cylinder lock and key, Cla-Val Model No. X140-1}.
 - 5. Direct-acting pressure-relief valves shall be Model No. CRL, as manufactured by Cla-Val Company.

2.8 VALVE SCHEDULE

A. Provide valves for the plumbing systems as specified herein and in accordance with the schedule below.

Service	Size	Fig. #	Туре	Material
Hot and Cold Water	1/4 in. to 3 in.	Nibco T-113-LF	NRS Gate, Threaded	Bronze B-62

Service	Size	Fig. #	Туре	Material
	1/4 in. to 3 in.	Nibco S-113-LF	NRS Gate, Soldered	Bronze B-62
	1/4 in. to 2 in.	Nibco T-585-66- LF	Full Port Ball 2-Piece Style, Threaded	Bronze B-584
	1/4 in. to 2 in.	Nibco S-585-66- LF	Full Port Ball 2-Piece Style, Soldered	Bronze B-584
	1-1/4 in. to 2-1/2 in.	Nibco T-595-Y- 66-LF	Full Port Ball 3 Piece Style, Threaded	Bronze B-584
	1-1/4 in. to 2-1/2 in.	Nibco S-595-Y- 66-LF	Full Port Ball 3 Piece Style, Soldered	Bronze B-584
	3 in.	Nibco T-580-Y- 66-LF	Conv. Port Ball 3 Piece Style, Threaded	Bronze B-584
	3 in.	Nibco S-580-Y- 66-LF	Conv. Port Ball 3 Piece Style, Soldered	Bronze B-584
	Over 3 in.	Nibco F-617-0 Nibco F-619	OS&Y Gate NRS Gate	IBBM IBBM
	3 in 6 in.	Nibco F-918-B Nibco LD-2000-3	Swing Check Butterfly	IBBM Ductile Iron Body Alum. Bronze Disc EPDM Seat
	3 in 6 in. > 6 in.	Nibco LCS-6822- 3 Nibco LCS -6822- 3 Nibco LCS - 7822-3 Nibco LCS - 7822-5	High Performance Butterfly ANSI Class 150 Class 300 Class 150 Class 300	Carbon Steel Body Stainless Stee Disc, PTFE Seat

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

A. Install shutoff valves, isolation valves and/or balancing at connections to each piece of equipment, arranged and installed with unions or flanges to allow service, maintenance, and equipment removal without system shutdown.

- B. High performance butterfly valves or gate valves shall be provided on the discharge of all pumps.
- C. The use of butterfly valves is limited to shutoff services only and only where permitted by the Construction Documents. Butterfly and ball valves will not be permitted in those services, which require balancing or throttling.
- D. Locate valves for easy access and provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above center of pipe in a position that allows full stem movement. Butterfly valves may be installed with stem horizontal to allow support for the disc and the cleaning action of the disc.
- F. All water piping connections to equipment shall include all necessary isolation valves, air vent valves, drain connections, balancing valves and the automatic valves arranged as detailed on the drawings.
- G. All valve installations shall be in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- H. Valves in finished portions of the building, except in mechanical equipment rooms, or where otherwise indicated on the Drawings shall be concealed and provided with access doors.
- I. All piping shall be carefully graded so as to eliminate traps and pockets. Where water traps cannot be avoided, provide drain valves.
- J. All valves throughout the building shall be thoroughly and substantially supported with approved hangers and support devices.
- K. All valves shall be installed according to the Local Authority rules and an inspection certificate furnished.
- L. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Balanced Check Valves (center-guided): In horizontal or vertical position, with stem upright and plumb.
- M. Install pressure-relief valves as required by code, where shown on the drawings and/or in the following locations:
 - 1. In each step of each pressure-reducing station.
 - 2. Both the shell and tube side of all steam-to-water heat exchangers.
 - 3. The hot water discharge of each hot water heater, pre-heater and heater exchanger.
- N. Relief piping shall be sized according to outlet size of relief valve.

- O. The pressure drop between the protected vessel and/or pipe shall not be greater than 3% of the set pressure.
- P. Elbows on the discharge of pressure-relief valves shall be supported to withstand reaction forces and the weight of the piping.

3.3 CLEANING

A. Before final connections are made and before operation of all valves, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all valves in condition suitable for finish painting, before final acceptance.

3.4 INSPECTION AND STARTUP SERVICE

- 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 material composition is suitable for service, and that it is free from defects and damage.
- E. A factory representative from the pressure-reducing valve and control valve Manufacturer shall be present for start-up service, inspection and any necessary adjustments.
- F. Defective valves shall be replaced with new valves.
- G. Each actuator shall be supplied with a startup kit comprising installation instruction, electrical wiring diagram, and sufficient spare cover screws and seals to make good any site losses during the commissioning period.
- H. Verify that pressure settings for all relief valves and pressure-reducing valves are correct.

3.5 FIELD TESTS

- A. Performance Test: Each pressure-reducing valve shall be field flow tested and certified to meet the design conditions by authorized factory personnel.
- B. Integrated Test
 - 1. Verify that all valves have been properly lubricated and left ready for operation.
 - 2. All alarms (BMS, fire alarms, etc.) shall be tested to fulfill satisfactory operating conditions. Verify proper operation of electrical safety interlocks and limit switches.

- C. <u>Final Acceptance Test</u>
 - 1. <u>Reserved.</u>
- D. <u>Commissioning</u>
 - 1. <u>Reserved.</u>

3.6 ADJUSTING AND BALANCING

- A. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- B. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- C. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- D. Notify the Architect and Inspectors Having Jurisdiction at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.
- E. The building fire alarm system devices shall be properly adjusted and left in good working condition.
- F. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.
- G. Where required, adjust pressure setting of all relief valves and pressure-reducing valves as necessary prior to being put into service.
- H. Adjust valve stops to ensure positive shutoff.
- I. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
- J. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.

END OF SECTION 220523

SECTION 220529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all hangers, supports and anchors required for piping and equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. The Division 22 Subcontractor shall assume complete responsibility for the anchoring of the equipment, piping systems, specified hereinafter to the concrete foundation pads, to the concrete inertia bases, and to the supporting structural steel and concrete beams.
- C. Section includes:
 - 1. Pipe hangers and supports.
 - 2. Attachments to structure.
 - 3. Formed steel channel supports and accessories.
 - 4. Concrete pads for equipment.

1.2 RELATED SECTIONS

- A. Refer to Section 01 31 46 and Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

5.	Section 22 00 00	-	General Requirements for Plumbing
6.	Section 22 05 00	-	Common Work Results for Plumbing
7.	Section 22 07 00	-	Plumbing Insulation
8.	Section 22 11 16	-	Domestic Water Piping
9.	Section 22 13 16	-	Sanitary Waste and Vent Piping

1.3 REFERENCES

- A. All hangers and supports, including all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.

- 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. American Society of Mechanical Engineers
 - 1) ASME B31.1: Power Piping.
 - 2) ASME B31.9: Building Services Piping.
 - b. ASTM International
 - 1) ASTM A 36: Standard Specification for Carbon Structural Steel.
 - 2) ASTM A 47: Standard Specification for Ferritic Malleable Iron Castings.
 - 3) ASTM A 48: Standard Specification for Gray Iron Castings.
 - 4) ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5) ASTM A 240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 6) ASTM A 283: Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 7) ASTM A 536: Standard Specification for Ductile Iron Castings.
 - 8) ASTM A 575: Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
 - 9) ASTM A 668: Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
 - 10) ASTM A 1011: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 11) ASTM B 633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 - 12) ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.
 - 13) ASTM E 119: Method for Fire Tests of Building Construction and Materials.
 - 14) ASTM E 814: Test Method of Fire Tests of Through Penetration Firestops.

- 15) ASTM F 708: Standard Practice for Design and Installation of Rigid Pipe Hangers.
- c. American Welding Society
 - 1) AWS D1.1: Structural Welding Code Steel.
- d. FM Global
 - 1) FM Approval Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research for Property Conservation.
- e. Manufacturers Standardization Society of the Valve and Fittings Industry
 - 1) MSS SP 58: Pipe Hangers and Supports Materials, Design and Manufacturer.
 - 2) MSS SP 77: Guidelines for Pipe Support Contractual Relationships.
 - 3) MSS SP 89: Pipe Hangers and Supports Fabrication and Installation Practices.
 - 4) MSS SP 90: Guidelines on Terminology for Pipe Hangers and Supports.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 22 00 00 and shall include, but not be limited to:
 - 1. Provide shop drawings indicating system layout with location showing critical dimensions, sizes, pipe hanger and support locations and detail of trapeze hangers.
 - 2. Method of attachment to and load imposed on building structures by hangers, anchors, supports, guides and supplemental steel shall be submitted for review and approved by the project Architect and Structural Engineer.
 - 3. Shop drawings indicating support methods, point loadings to the building structure and hanger locations shall be submitted for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes to hanging and support methods.
- B. Product Data: Submit manufacturer's literature including general assembly,
 - 1. Hangers and Supports: Submit manufacturer's catalog data including load capacity and sizing schedules specific to this project.

- 2. Inserts: Submit manufacturer's catalog data including load capacity.
- C. Design Data: Indicate load-carrying capacity of trapeze, multiple pipe, and riser support hangers. Indicate calculations used to determine load-carrying capacity of trapeze, multiple pipe, and riser support hangers. Submit sizing methods and calculations sealed by a Professional Engineer licensed in the State of New York.
- D. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- E. Manufacturer's Installation Instructions: Submit support details, installation instructions, connection requirements, for the system.
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.

1.6 FACTORY TESTING

A. All hangers, rods, supports and accessories shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.

1.8 COORDINATION

- A. Coordinate with other trades to use common means of support. Submit for approval all pertinent design data relating to the support as well as verification of the responsibility for the support.
- 1.9 UNIT PRICES
 - A. Reserved.
- 1.10 WARRANTY
 - *A.* Comply with the requirements of Section 01 31 46 and Section 22 00 00.
 - B. Furnish a five (5) year manufacturer's warranty for all pipe hangers and supports.
 - C. The warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Anchors and Inserts (Undercut Wedge Type)
 - 1. Hilti.
 - 2. MKT Fastening, LLC.
 - 3. Simpson StrongTie.
- D. Formed Steel Channel Supports
 - 1. Anvil International.
 - 2. Cooper B-Line.
 - 3. Carpenter & Patterson.
 - 4. Empire Industries, Inc.
 - 5. Erico Caddy.
 - 6. Hilti.
 - 7. National Pipe Hanger Corporation.
 - 8. PHS Industries, Inc.

- 9. Piping Technology and Products.
- 10. Thomas & Betts Kindorf.
- 11. Tolco Inc.
- E. Pipe Hangers, Supports and Guides
 - 1. Anvil International.
 - 2. Cooper B-Line.
 - 3. Carpenter & Patterson.
 - 4. Empire Industries, Inc.
 - 5. Erico Caddy.
 - 6. Hilti.
 - 7. National Pipe Hanger Corporation.
 - 8. PHS Industries, Inc.
 - 9. Piping Technology and Products.
 - 10. Thomas & Betts Kindorf.
 - 11. Tolco Inc.
 - 12. Witch Co.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 PIPE HANGERS AND SUPPORTS

- A. Provide suitable and substantial hangers and supports for all piping and equipment. Hangers and supports shall be of the type, size and spacing specified or as required by the Authority Having Jurisdiction.
- B. Comply with maximum load ratings with consideration for allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- C. Pipe hangers, anchors, supports and guides shall be manufactured, selected, fabricated and installed in accordance with MSS SP-58, MSS SP-69 and MSS SP-89.

- D. Provide supports, guides and anchors that do not transmit unacceptable vibration to building structure.
- E. The support systems shall provide for, and control, the free or intended movement of the piping, including its movement in relation to that of connected equipment.
- F. In addition to the short-term frame shortening anticipated during the initial construction period, all systems shall be installed with provisions to accommodate long-term frame shortening equivalent to 1/16 in. (1.6 mm) per foot in addition to any expansion and/or contraction of the systems as a result of thermal changes.
- G. Provide for vertical adjustments after installation of supported material and during commissioning, where feasible, to ensure pipe is at design elevation and slope.
- H. Select hangers and supports to perform under all conditions of operation, allowing free expansion and contraction, and to prevent excessive stresses being introduced into piping system and connected equipment.
- I. Where piping is required to be seismically restrained, the yoke on clevis hangers and/or roller hangers shall be reinforced to prevent the yoke from deforming. In the case of clevis hangers providing nuts on the inside and outside of the threaded rod connecting the yoke and clevis is acceptable.
- J. Anchorage shall be provided to restrain drainage piping from axial movement. Piping sizes greater than 4 in. (100 mm), restraints shall be provided for drain pipes at all changes in direction and at all changes in diameter greater than two (2) pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.
- K. Piping subject to shock loads, such as thrust or water hammer, shall include shock absorbing and sway suppressing devices of approved design and construction.
- L. Provide drawings indicating pipe loads, including method of suspension and hanger location, and submit them for approval prior to proceeding with installation. Provide all the supplementary steel required to support, guide and anchor piping within shafts, Mechanical Equipment Rooms and all the other floors.
- M. Particular care shall be taken to support all pipes in a manner approved by the Architect, including the providing of supplementary steel, if required.
- N. Where insulation is provided, protect the insulation, the length of the sleeve with a galvanized 20 gauge shield (360 deg.).
- O. Support vertical risers from the building construction by means of pipe clamps at every floor. Provide channels of approved sizes where pipe clamps are too short to connect to the building construction.
- P. Provide rigid support sway bracing for all horizontal piping 4 in. (100 mm) and larger and piping which is supported greater than 2 ft. (610 mm) from the slab above, measured from the top of the pipe.

- Q. Provide additional support for all sanitary and storm house drain offsets consisting of riser clamps and threaded rod to anchor all fittings in the horizontal offset. This method of anchoring and support shall be provided in addition to the sway bracing described in the paragraph above.
- R. Finishes
 - 1. Hangers and clamps for uninsulated copper pipes shall be coated with coppercolored epoxy paint and an additional PVC coating.
 - 2. Hangers, anchors, inserts, supports and guides (swivel ring, split ring, roller, wrought pipe clamp, or adjustable wrought clevis-type hangers, roller supports, floor stands, wall brackets, etc.) installed within the building shall be hot dipped galvanized in accordance with ASTM A123 or stainless steel.
 - 3. All hangers, supports, inserts, etc., utilized to support piping below the slab on grade or buried shall be stainless steel.
 - 4. Strut channels installed indoors shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90.
 - 5. Hangers, anchors, supports, guides and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123 or stainless steel. All hanger hardware shall be hot-dip galvanized or stainless steel. Zinc-plated hardware shall not be acceptable for outdoor or corrosive use.
- S. Hangers
 - 1. Pipes 2 in. (50 mm) and smaller shall be supported with one of the following:
 - a. Adjustable steel swivel ring (band type) hanger.
 - b. Malleable iron split ring hanger.
 - c. Adjustable steel clevis hanger.
 - 2. Pipes 2-1/2 in. (63.5 mm) and larger shall be supported with one of the following:
 - a. Adjustable steel swivel ring (band type) hanger.
 - b. Adjustable steel clevis hanger.
 - 3. Insulated pipes shall be supported adjustable steel clevis hangers and preinsulated sheet metal insulation shields.
- T. Trapeze Hangers
 - 1. Shall be constructed of one of the following:

- a. 12 gauge roll-formed 1-5/8 in. (40 mm) by 1-5/8 in. (40 mm) minimum structural steel channel.
- b. Two (2) structural steel channels secured together with 1/2 in. (12.5 mm) or 3/4 in. (20 mm) steel pipe sections.
- 2. Pipes shall be secured to trapeze by one of the following methods:
 - a. Uninsulated Pipe: 2-piece pipe straps with thermoplastic elastomeric liner sized for outside diameter of pipe.
 - b. Insulated Pipe: 2-piece pipe straps sized for outside diameter of pipe and insulation using insulation shields.
- U. Floor and/or Roof Supports
 - 1. Shall be one of the following:
 - a. Adjustable pipe saddles and nipples welded or screwed to steel base stands secured to floor or roof.
 - b. Adjustable roller stands with base plates secured to floor or roof.
 - 2. Pipes shall be secured to supports by one of the following methods:
 - a. Uninsulated Pipe: 2-piece pipe straps with thermoplastic elastomeric liner sized for outside diameter of pipe.
 - b. Insulated Pipe: 2-piece pipe straps sized for outside diameter of pipe and insulation using insulation shields.
- V. Accessories
 - 1. Pipe protection saddles shall be formed from carbon steel, 1/8 in. (3 mm) minimum thickness, sized for insulation thickness.
 - 2. Preinsulated shields shall be 180 degree, 18 gauge minimum galvanized sheet metal, minimum 12 in. (305 mm) long, with high density water-repellant Kaylo insulation, foam glass or high-density polyisocyanurate inserts minimum thickness to match outside diameter of the insulated pipe.

2.4 ATTACHMENTS TO STRUCTURE

- A. All piping shall be carried by pipe hangers and supports attached to building structure. All supports and restraints requiring connections to steel-plated building construction shall be welded to steel plating.
- B. Method of attachment to and load imposed on building structures by hangers, anchors, supports, guides and supplemental steel shall be submitted for review.
- C. In no case shall hangers be supported by means of vertical expansion bolts.

HANGERS AND SUPPORTS FOR LUMBING PIPNG AND EQUIPMENT

- D. Powder and power-actuated devices, grip nails, and/or expansion nails shall NOT be permitted.
- E. Structural Steel Attachments
 - 1. Center-loaded beam clamps or welded beam attachments shall be used where piping is to be suspended from building steel. Clamp shall be forged steel or malleable iron with cross bolts sized as required to fit beams and selected on the basis of load configuration and load to be supported.
 - 2. Where allowed by Structural Engineer, C-clamps with locknuts, cup point set screws and retaining straps shall be used. Top flange C-clamps shall be used when attaching a hanger rod to the top flange of structural shapes. Set screw torque shall be in accordance with manufacturer's recommendation.
- F. Concrete Inserts
 - 1. Cast-in-place continuous or spot concrete inserts shall be used where applicable.
 - 2. Continuous inserts shall be made of 12 gauge, ASTM A1011 SS Grade 33 structural quality carbon steel, complete with styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs./ft. in concrete.
 - 3. Spot inserts shall be constructed of one of the following:
 - a. Malleable iron or pressed steel having a space for rods of all sizes. All inserts for pipes 3 in. (75 mm) and larger in size shall be installed with a reinforcing rod 5/8 in. (16 mm) in diameter, run through a slot in the insert specifically provided for this purpose.
 - b. Internally threaded machined steel insert with large, flanged heads suitable for installation on wood forms and/or formed metal decking.
- G. Mechanical Anchors (After Sets)
 - 1. If any pipe has to be hung in space where no inserts have been provided, drill a hole from below through concrete slabs, and provide a rod and hanger attached to an approved fishplate.
 - 2. Mechanical anchors of the undercut type may be used in stone concrete slabs only. The carrying capacity and size of each mechanical anchor shall be calculated on the basis of the spacing indicated in the hanger spacing table hereinbelow.
 - 3. Undercut wedge anchors for pipes 6 in. (150 mm) and smaller shall be Hilti "HDA" Undercut Anchor or Simpson StrongTie Strong-Bolt. For pipes 8 in. (200 mm) and over, provide two (2) undercut or wedge-type anchors with the corresponding rods and hangers fastened to the slab as specified above with a 2

in. x 2 in. (50 mm x 50 mm) angle or uni-strut to support the piping. Anchors shall not be smaller than 3/8 in. (10 mm.)

4. The rods on all hangers shall be of adequate size to support the load, which they carry. The minimum size shall be 3/8 in. (10 mm.)

2.5 FORMED STEEL CHANNEL SUPPORTS AND ACCESSORIES

- A. Formed steel channel supports shall be capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3 and shall comply with NFPA 13 requirements.
- B. Channel shall be made of minimum 12-gauge ASTM A570 Grade 33 steel electro galvanized after fabrication. Channel sections may be formed by single or factory welded multiple sections of any of the following:
 - 1. 1-5/8 in. (41.25 mm) x 1-5/8 in. (41.25 mm) channel.
 - 2. 2-7/16 in. (62 mm) x 1-5/8 in. (41.25 mm) channel.
 - 3. 3-1/4 in. (82.5 mm) x 1-5/8 in. (41.25 mm) channel.
- C. Grip/Lock nuts shall be made of 3/8 in. (10 mm) thick case hardened mild steel bars electro galvanized after fabrication.
- D. All angle brackets connectors and washers shall be made of 1/4 in. (6.35 mm) steel plate electro galvanized after fabrication.

2.6 CONCRETE PADS FOR EQUIPMENT

- A. Pumps for the service listed below shall be installed on reinforced concrete pads with minimum thickness as specified below and designed for support of the pump and pump elbows as listed hereinafter. The following pumps and equipment require this type of installation:
- B. Concrete pads for various pieces of equipment will be furnished under another section. Pads shall be provided in all Equipment Rooms. This shall include floor mounted equipment, equipment mounted on legs and pipe support stands. Equipment pads shall generally conform to the shape of the piece of equipment it serves with a minimum 3 in. (75 mm) margin around the equipment and supports.
- C. General equipment pads shall be a minimum of 4 in. (100 mm) high, with all external corners bull-nosed to a tooled radius. All floor-mounted equipment located on the lowest level of the project shall be mounted on a 12 in. (308 mm) concrete pad unless otherwise noted on the plans.
- D. Shop Drawings stamped "REVIEWED" shall be used for dimensional guidance in sizing pads and anchor bolt locations.
- E. Furnish and install hot-dipped galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs.

- F. Bolts shall be of the size and number recommended by the manufacturer of the equipment and as required for seismic restraint. Anchor bolts shall be located by means of suitable templates.
- G. When equipment is placed on vibration isolators, the equipment shall be secured to the isolator and the isolator secured to the floor, pad, or supported as recommended by the vibration isolation manufacturer.
- H. Wherever vibration isolation devices and/or concrete inertia blocks are specified, these items shall in all cases be mounted upon or above the concrete pads.
- I. Pumps with vibration isolation devices shall be bolted and grouted to a spring supported concrete inertia base reinforced as required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

- A. Hanger, rods, supports and accessories shall be installed in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
- B. Furnish and install all necessary supports for equipment furnished under this section. To meet the varying conditions in each case, these supports shall consist of pipestands, steel angle or strap hangers, saddles, brackets, as required for a complete installation.
- C. All such supports shall have substantial flanges bolted to floor construction; hangers shall be supported from the framing as described hereinabove. Supports shall be properly located with reference to any supporting pads, legs of the equipment carried and must be distributed as not to bring any undue strains to the equipment.
- D. All hanger and support details shall be submitted for review and approval.
- E. Guarantee that the work, as installed under this section of the specifications, will not result in the transmission of objectionable noise or vibration to any occupied parts of the building, and take full responsibility for any necessary modifications of this equipment, or of the foundations and supports for the same, necessary to secure this result.
- F. Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom beam flanges.
- G. Proper care and ventilation should be given when welding galvanized components.
- H. Clamps on Riser Piping

- 1. Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
- 2. Bolt tightening torques shall be to industry standards.
- 3. Cast Iron Pipes: Install clamp below joint.
- 4. Steel Pipes: Clamp is fitted preferably below coupling or welded pipe lug.
- 5. Clamps on riser piping shall maintain the insulation and vapor barrier as piping passes through the support.
- I. Support from Structural Members: Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- J. Field welding of supports should be done by qualified welders using qualified welding procedures.
- K. Support cast iron bell and spigot and No-Hub pipe and fittings with a minimum of two (2) hangers per each length of pipe. The maximum hanger spacing shall be in accordance with the hanger spacing schedule herein below. Hangers shall be installed on each side of joint. Where an excessive number of fittings are installed between hangers, provide additional hangers, channel supports or reinforcing as required. Securely anchor fittings to the building construction at changes of direction to eliminate all horizontal movement.
- L. Provide for each floor drain trap receiving waste from a pressurized discharge additional support consisting of channels, two (2) hanger rods and anchored to the slab above.
- M. Horizontal piping shall be supported in accordance with the following schedules:

SINGLE ROD SUPPORT - STEEL AND CAST IRON PIPE			
Pipe Size	Maximum Hanger Spacing	Rod Size	
1 to 2 inches (25 mm to 50 mm)	10 feet 0 inches (3,048 mm)	3/8 inch (10 mm)	
2-1/2 and 3 inches (63 mm to 75 mm)	12 feet 0 inches (3,658 mm)	1/2 inch (12.5 mm)	
4 to 5 inches (100 mm to 125 mm)	12 feet 0 inches (3,658 mm)	5/8 inch (16 mm)	
6 to 10 inches (150 mm to 250 mm)	12 feet 0 inches (3,658 mm)	3/4 inch (20 mm)	
DOUBLE ROD SUPPORT			
Pipe Size	Maximum Hanger Spacing	Rod Size	
6 to 8 inches (150 mm to 200 mm)	12 feet 0 inches (3,658 mm)	1/2 inch (12.5 mm)	
10 to 12 inches (250 mm to 300 mm)	12 feet 0 inches (3,658 mm)	5/8 inch (16 mm)	

SINGLE ROD SUPPORT - COPPER PIPE				
Pipe Size	Maximum Hanger Spacing	Rod Size		
1 to 1-1/4 inches (25 mm to 32 mm)	7 feet 0 inches (2,133 mm)	3/8 inch (10 mm)		
1-1/2 to 3 inches (37 mm to 75 mm)	8 feet 0 inches (2,438 mm)	1/2 inch (12.5 mm)		

- N. Maximum hanger spacing may not be exceeded; however, actual installed spacing will depend on location of structural framing and floor slab construction. Where building construction does not permit the above spacing, provide additional steel supports.
- O. Install lock nuts at the bottom of all hanger rods.
- P. Vertical pipe risers shall be supported independently of connected horizontal piping.
- Q. Support vertical risers from the building construction by means of pipe clamps, Grinnell Model No. 261, at every story height; however, the maximum spacing of supports for vertical copper piping shall not exceed 10 ft. 0 in.
- R. Where hangers cannot be supported from building framing, they may be supported from concrete inserts, subject to the approval of the Structural Engineer. Furnish, locate and set such inserts and make sure that such inserts are in place when the concrete is poured.
- S. Set all inserts for all pipes in ample time to allow the work of the other trades to be performed on scheduled time.
- T. Smaller pipes may be suspended from cross-pieces of pipe or steel angles, which, in turn, shall be hung from building concrete construction by means of rods and inserts. The intention is to provide supports which, in each case, shall be amply strong and rigid for the load, but which shall not weaken or unduly stress the building construction.
- U. Provide approved roller supports, floor stands, wall brackets, etc., for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls. Pipelines near walls may also be hung by hangers carried from approved wall brackets at a higher level than the pipe.
- V. No piping shall be hung from other piping or ductwork. In no case shall hangers be supported by means of vertical expansion bolts.
- W. Hangers for piping shall support the pipe without piercing the insulation. Pre-insulated pipe shields shall be used to protect the insulation on pipes. It is the intent that the insulation shields shall bear only on the insulation, which is of such density that the insulation will not be compressed, crushed or deformed.

3.3 CLEANING

- A. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all hangers and supports in condition suitable for finish painting, before final acceptance.
- B. Touch up, repair or replace damaged products before Substantial Completion.

3.4 INSPECTION AND STARTUP SERVICE

A. Inspect each hanger, rod and support for piping and equipment for proper installation according to the manufacturer's instructions.

3.5 FIELD TESTS

A. Performance Test: All hanger and support devices and components shall be tested in accordance with the latest applicable industry standards.

3.6 ADJUSTING AND BALANCING

- A. Adjust all pipe hangers, miscellaneous supports and equipment supports to equalize load for the piping and equipment they carry and to ensure that rods are vertical under operating conditions.
- B. Hangers at equipment shall be adjusted to ensure that there are no loads imposed on the equipment by the piping connected to the equipment.
- C. Hangers and Supports
 - 1. Ensure that rod is vertical under operating conditions.
 - 2. Equalize loads for all piping and equipment supports.
- D. Adjustable Clevis
 - 1. Tighten hanger load nut securely to ensure proper hanger performance.
 - 2. Tighten upper nut after adjustment.
- E. Beam Clamps: Tighten all set screws and lock nuts.
- F. Riser Clamps
 - 1. Ensure all riser clamps are securely resting on the concrete slab or kindorf after system is tested and pressurized.
 - 2. Tighten riser clamp nuts after vertical adjustments are made.

END OF SECTION 220529

SECTION 220533

HEAT TRACING FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all heat tracing for hot water temperature maintenance, freeze protection or to maintain flow of grease waste as indicated on and in accordance with the requirements of the Contract Documents.
- B. The Division 22 Subcontractor shall assume complete responsibility for the installation of heat tracing including but not limited to electrical power, securing of heat tracing to piping and insulation requirements.
- C. Section includes:
 - 1. Self-Regulating Parrallel-Resistance Heating Cables.
 - 2. Controls for heat tracing systems.
 - 3. Accessories.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:
 - 1. Section 220000 General Requirements for Plumbing
 - 2. Section 220500 Common Work Results for Plumbing
 - 3. Section 220700 Plumbing Insulation
 - 4. Section 221116 Domestic Water Piping

1.3 REFERENCES

- A. All heat tracing, including all components shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.

- 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. American Society of Mechanical Engineers
 - 1) ASME B31.1: Power Piping.
 - 2) ASME B31.9: Building Services Piping.
 - b. ASTM International
 - 1) ASTM A 36: Standard Specification for Carbon Structural Steel.
 - 2) ASTM A 47: Standard Specification for Ferritic Malleable Iron Castings.
 - 3) ASTM A 48: Standard Specification for Gray Iron Castings.
 - 4) ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5) ASTM A 240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 6) ASTM A 283: Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Division 01, and Section 220000 and shall include, but not be limited to:
 - 1. Provide shop drawings indicating system layout with location showing locations of all controllers and interconnections and splice points.
 - 2. Shop drawings indicating support methods, point loadings to the building structure and hanger locations shall be submitted for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes to hanging and support methods.
- B. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.
 - 1. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.
 - 2. Heating cable data sheet.
 - 3. UL, CSA, or FM approval certificates for the intended uses.
 - 4. Application design guide.
 - 5. System installation and operation manual.
 - 6. System installation details.

- 7. Connection kits and accessories data sheet.
- 8. Controller data sheet.
- 9. Controller wiring diagram.
- C. Shop Drawings: For electric heating cable. Include plans, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.
- F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Regulatory Requirements and Approvals
 - 1. The system (heating cable, connection kits, and controller) shall be UL Listed, CSA Certified or FM Approved for the intended use.
- C. Manufacturers Qualifications
 - 1. Manufacturer to show minimum of thirty (30) years' experience in manufacturing electric self-regulating heating cables.
 - 2. Manufacturer will be ISO-9001 registered.
 - 3. Manufacturer to provide products consistent with UL 515, CSA 22.2 No 130-03 and IEEE 515.1 requirements.
- D. Installer Qualifications
 - 1. System installer shall have complete understanding of product and product literature from manufacturer or authorized representative prior to installation. All electrical connections shall be performed by a licensed electrician including all cable to cable splice, tee and power connections.

1.6 DELIVERY, STORAGE AND HANDLING

- A. General Requirements: Deliver, store and handle products to prevent their deterioration or damage due to moisture, temperature changes, contaminates or other causes.
- B. Delivery and Acceptance Requirements: Deliver products to site in original, unopened containers or packages with intact and legible manufacturers' labels identifying the following:
 - 1. Product and Manufacturer
 - 2. Length/Quantity
 - 3. Lot Number

- C. Storage and Handling Requirements
 - 1. Store the heating cable in a clean, dry location with a temperature range 0°F (-18°C) to 140°F (60°C).
 - 2. Protect the heating cable from mechanical damage.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.
- B. This Contractor must properly completed online warranty form within 30 days from the date of installation
 - 1. Warranty Period:
 - a. Heating Cable: Ten (10) years from date installation
 - b. Controls: One (1) year from date installation.

PART 2 - PRODUCTS

2.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

- 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. Basis-of-Design Product: as indicated on drawings
 - 2. Subject to compliance with requirements, provide NVENT, (Raychem, Pentair Thermal Management), XL-Trace-Edge Series, or approved equal.
- C. Heating Element: Pair of parallel No. 16 AWG, tinned stranded copper bus wires embedded in a continuous core of radiation cross-linked conductive polymer core, which varies heat output in response to temperature along its length. Cable shall be capable of crossing over itself once without overheating.
- D. Electrical Insulating Inner Jacket: Flame-retardant polyolefin.
- E. Cable Cover:
 - 1. Freeze Protection: Tinned-copper braid and Fluoropolymer outer jacket with UV inhibitor, XL-Trace-CT.
- F. The heating cable shall be capable of operation on line voltage of up to 277 volts without the use of transformers.
- G. The outer jacket of the heating cable shall have the following markings:
 - 1. Heating cable model number
 - 2. Agency listings
 - 3. Meter mark

- 4. Lot/Batch ID
- H. Maximum Operating Exposure Temperature: 150 deg F (65 deg C).
- I. Capacities and Characteristics:
 - 1. The heater shall be sized according to the manufacturer's recommendation for particular pipe size and insulation thickness at the minimum ambient temperature. This insulation schedule supersedes the insulation schedule shown in any other section of the contract documents. The heater output rating is to be given in watts per foot at 50 °F.
 - a. Freeze Protection for general and Plumbing Piping Design: Minimum maintenance temperature of 40 °F at the minimum ambient temperature shall be -20 °F.
 - 1) Heat trace and insulate as shown on the plans, otherwise adhere to this schedule:
 - a) Up though 1-1/2" pipe, 1/2" insulation, 1 strip 5XL (5 watt/ft)
 - b) Up through 3" pipe, 1" insulation, 1 strip 5XL (5 watt/ft)
 - c) Up through 12" pipe, 2" insulation, 1 strip 8XL (8 watt/ft)
 - d) Up through 18" pipe, 2" insulation, 1 strip 12XL (12 watt/ft)
 - b. Heat trace and insulate as shown on the plans, otherwise adhere manufacturer's recommendations.
 - 2. Maximum Circuit Ampacity: 30 amps.
 - 3. Power: Single phase,
 - a. Voltages: Freeze Protection 120 277 volts.
 - 4. GFI circuit breaker having a 30-mA trip unless this protection is provided in the heat tracing controls.

2.2 CONTROLS FOR HEAT TRACING SYSTEMS

- A. The control system shall be of distributed control design, comprised of a central user interface display connected to smart contactors located as indicated on the drawings and as associated with the specified heating cable applications, similar to the NVENT (Raychem) ACCS-30 system.
- B. The distributed system shall provide for independent control functions at each smart contactor allowing for maximum system reliability and redundancy.
- C. The user interface shall allow parameters and algorithms to be selected for any or all of the following applications: general freeze protection, fire suppression piping, greasy waste flow maintenance, domestic hot water temperature maintenance (HWAT), floor warming, snow melting and ice prevention. Refer to the drawings and other specification sections for product descriptions, installation and testing requirements for the NON XL-Trace products and applications.
 - 1. In all applications each heater cable shall be individually controlled by a line temperature sensing device. The RTD shall be located on each pipe as indicated on the contract drawings. The RTD shall be provided with armored lead wires to prevent damage. Failure of a temperature sensor shall be indicated at the system monitor panel and shall result in activation of the heater cable. Mechanical thermostats shall not be used.
 - 2. Freeze Protection:

- a. The control system shall energize each heater cable independently when the pipe temperature drops to 40 °F. The system shall indicate an alarm condition when the pipe temperature drops to 35 °F.
- D. The system shall be field-mounted and shall have FM or CSA approval for Class I, Division 2, Groups A, B, C, D when using a solid-state switching device.
- E. The system shall provide the user with the option of line-sensing control with a user-selectable dead band, ambient sensing, proportional ambient sensing (PASC), and power limiting control modes.
- F. Enclosure type shall be NEMA 4X fiberglass reinforced plastic (FRP) for corrosion resistance and protection from moisture.
- G. The monitor system shall provide UL Listed GFI protection for all branch heater cable circuits per NEC 1996 Section 423-22. GFI shall have a 30 mA trip level. Monitor system shall provide High GFI Current warning at 20 mA.
- H. Each heater cable including all tees shall be monitored and provide alarms for high and low current.
- I. The system shall have autocycling capability for monitoring cable during the entire year. All setpoints and diagnostics shall be stored in non-volatile memory. Alarms shall be provided for memory and SCR failures.
- J. The system shall provide ground-fault monitoring, trip alarm and fault protection for every heat-tracing circuit and fulfills the requirements of agency certifications and the National Electrical Code.
- K. The user interface terminal shall be a LCD color display with touch screen technology. The UIT shall display and allow programming of all settings and be password protected to prevent unauthorized access to the system. The system shall be capable of controlling all heating applications independently by circuit.
- L. The control system shall be capable of setting different temperatures based on user defined input with 24 hour, 7 day/week programmable options.
- M. The control system shall have a user selectable option to save energy by lowering floor temperature during low use periods.
- N. The control system shall provide as standard the following alarm outputs:
 - 1. Dry contact to BMS for common alarm (Low Pipe Temperature, Ground Fault Alarm/Trip, and Loss of Power);
 - Digital control system will also be able to communicate with BMS by one of the following protocols using the DigiTrace ProtoNode multi-protocol gateway.
 a. BACnet®
 - 3. The following variables will be monitored by the digital controller and reported back to the BMS.
 - a. Temperature
 - b. Ground-fault
 - c. Current draw

- d. Power consumption
- e. Associated alarms

2.3 ACCESSORIES

- A. Cable Installation Accessories: Power Connection, end seal, splice and tee kits components shall be UL Listed and FM Approved, RayClic, quick connect type rated for 30 AMPS, all components shall have power test points, power connections shall be factory terminated and supplied with 10' of cold leads. Enclosures shall be re-enterable to allow for testing, rated as NEMA 4X to prevent water ingress and corrosion. Installation shall require only standard hand tools and shall be completed without stripping of the bus wires, use of crimps, silicone sealant or terminal blocks. Furnish all power connections, tees, splices, end seals (silicone gel type), fiberglass tape and electric traced labels, as required. Lighted end seals shall be installed for critical end of line power verification where indicated. All components, except the power connections and any lighted end seals, shall be installed under the thermal insulation. All of the above plus Fiberglass tape (or, Aluminum tape (if plastic piping)) shall be furnished by the cable manufacturer for unit responsibility.
- B. Warning Labels: Refer to Division 22 Section 22 05 33 "Identification for Plumbing Piping and Equipment."
- C. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils (0.08 mm) thick, and with pressure-sensitive, permanent, waterproof, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): 3/4 inch (19 mm) minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches (150 mm) or Larger: 1-1/2 inches (38 mm) minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install electric heating cable across expansion, construction, and control joints according to manufacturer's written recommendations using cable protection conduit and slack cable to allow movement without damage to cable.
- B. Install electric heating cables after piping has been tested and before insulation is installed.
- C. Install electric heating cables according to IEEE 515.1.

- D. Install the heater linearly on the pipe. Provide additional cable per the manufacturer's recommendations at high heat loss locations such as valves, flanges, and instrumentation. Secure the heater to piping with cable ties or fiberglass tape. When heat tracing plastic piping, install a continuous strip of AT-180 aluminum tape over the heater cable.
- E. The system must be installed per the manufacturer's recommendations. The insulation and heating cable must be kept dry. All connections and terminations must be accessible. If buried piping, the cable ends must be run through conduit to an above grade junction box or end seal. Seal the area where the conduit enters the insulation and the conduit end.
- F. Install insulation over piping with electric cables according the manufacturer's recommendation and the insulation schedule above in this section. If no insulation schedule is included refer to Division 22 Section 22 07 00 "Plumbing Insulation." Prior to proceeding with the installation, the Contractor shall issue an RFI seeking clarification of requirements should the manufacturer's insulation schedule differ from the project specifications.
- G. Install warning tape on piping insulation where piping is equipped with electric heating cables.
- H. Install temperature sensor(s) in worst case location or as indicated by the engineer. The sensor(s) shall be installed in conduit, loose, allowing for future removal and replacement if needed, <u>under the insulation</u>. Extend the conduit a minimum of five (5) feet along the buried piping run and seal the seal both ends. Pipe mounted sensors to be located on opposite side of pipe from heater cable. Avoid installation of temperature sensors near vents, steam lines or other heated locations.
- I. Set field-adjustable switches and circuit-breaker trip ranges.
- J. Protect installed heating cables, including non-heating leads, from damage and exposed cable ends from moisture during construction.
- 3.3 CONNECTIONS
 - A. Ground equipment according to Division 26 Section 26 05 26 "Grounding and Bonding for Electrical Systems."
 - B. Connect wiring according to Division 26 Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- 3.4 FIELD QUALITY CONTROL
 - A. Testing: Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
 - 1. Test cables for electrical continuity and insulation integrity using a 2500 volt DC megger before energizing. The minimum insulation resistance shall be 1,000 megohms.
 - 2. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.
 - B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipemounting cables.

- C. Remove and replace malfunctioning units and retest as specified above
- D. Submit test reports and register the project with the manufacturer to initiate the Warranty Extension. To extend the standard two (2) year warranty, from date of shipment, to TEN (10) years, the online warranty form must be completed by the contractor within 30 days from completion of the installation at http://pentairthermal.com/application/warranty-10-Year/.

END OF SECTION 220533

SECTION 220553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all identification nameplates and tags required for equipment and piping as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Charts.
 - 2. Equipment nameplates.
 - 3. Pipe identification.
 - 4. Signage.
 - 5. Valve tags.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21,26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

1.	Section 22 00 00	-	General Requirements for Plumbing
2.	Section 22 05 00	-	Common Work Results for Plumbing
3.	Section 22 05 23	-	General-Duty Valves for Plumbing Piping
4.	Section 22 07 00	-	Plumbing Insulation
5.	Section 22 11 16	-	Domestic Water Piping
6.	Section 22 13 16	-	Sanitary Waste and Vent Piping

1.3 REFERENCES

- A. All nameplates, signs and valve tags shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.

- 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. American Society of Mechanical Engineers
 - 1) ASME A13.1: Scheme for the Identification of Piping Systems.
 - b. American National Standards Institute
 - ANSI Z535: Safety Color Code Environmental Facility Safety Signs - Criteria for Safety Symbols - Product Safety Sign & Labels - Accident Prevention Tags.
 - c. ASTM International
 - 1) ASTM D 882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Division 01, and Section 22 00 00 and shall include, but not be limited to:
 - 1. Schedule of valve tags, including catalog cut, color, model number and diagrammatic charts.
 - 2. Schedule of nameplates for all equipment, including model number, reference name and diagrammatic charts.
 - 3. Catalog cuts of pipe markers.
 - 4. Catalog cuts of nameplates for all equipment.
- B. Submit two (2) samples of each type of the following:
 - 1. Equipment labels.
 - 2. Tags, including colors and lettering styles.
 - 3. Piping markers.
 - 4. Tags for valves and controls.
- C. Product Data: Submit manufacturer's literature for each product submitted.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for the system.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Furnish all equipment, materials and accessories new and free from defects.
- E. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories and ANSI Z535 Safety Color Code Environmental Facility Safety Signs Criteria for Safety Symbols Product Safety Sign & Labels Accident Prevention Tags.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.
- D. Store tapes, adhesives, mastics, and labeling materials in ambient conditions acceptable to and in accordance with the recommendations of the manufacturer.
- E. Labeling and markers which become damaged in the opinion of the Engineer may be rejected and shall be repaired or replaced by the Contractor at no additional expense to the Contract.

1.7 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Furnish a one (1) year manufacturer's warranty for all system tags and nameplates.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.

- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Equipment Nameplates and Signage
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.
- D. Pipe Identification
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.
- E. Valve Tags
 - 1. Brady Corporation.
 - 2. Brimar Industries Incorporated.
 - 3. Marking Services Incorporated.
 - 4. Seton Nameplate Corp.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment, which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

2.3 CHARTS

- A. Provide diagrammatic charts of all piping systems and schedules of all valves.
- B. Provide two (2) copies of charts and schedules in laminated form, suitable for wall mounting.
- C. Provide three (3) copies of charts and schedules, printed on bond and bound in booklets.
- D. Valve numbering system shall indicate service and shall indicate floor level where valve is installed. Valve charts and schedules must indicate size and type of valve.

2.4 EQUIPMENT NAMEPLATES

- A. Mechanical equipment shall be identified by means of nameplates permanently attached to the equipment.
- B. Equipment nameplate designations shall correspond to the system identification on the Contract Drawings and "Record Drawings".
- C. Equipment nameplates shall conform to the following:
 - 1. Equipment nameplates located within the building shall be made of laminated three-layer matte finish flexible acrylic sheet, with cap and core permanently fused together to form a break-resistant, stain-resistant, chip-proof and shatterproof product with black surface and white core engraved letters and numbers. Equipment nameplates shall have contact-type permanent adhesive backing and be pre-drilled or punched for attachment.
 - 2. Equipment nameplates located outside of the building shall be 20 mil (0.5 mm) black enameled aluminum and pre-drilled or punched for attachment.
 - 3. Equipment nameplates shall be a minimum of 3 in. (75 mm) long by 1 in. (75 mm) wide with white letters a minimum 1/4 in. (6.25 mm) high.

2.5 PIPING IDENTIFICATION

- A. All piping shall be identified as to type of use, service and direction of flow in accordance with ANSI A13.1.
- B. Pipe markers shall meet ANSI and OSHA requirements for identifying the service, direction of flow, system and zone, for the various piping systems.
- C. They shall be factory-fabricated, flexible, semi-rigid UV-resistant heavy-duty vinyl, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
- D. Each marker shall consist of one (1) label with direction-of-flow arrows and the name of the service printed in black letters not less than 1 in. (25 mm) high for pipe 2-1/2 in. (60

mm) and smaller, 2 in. (50 mm) high for 3 in. (75 mm) pipe and larger. Markers shall have backgrounds of different colors for the various service groups.

- E. Locate markers at each valve, at each entry through walls, within access doors, on 20 foot (6,096 mm) centers for straight runs of pipe, and at least every story height traversed by risers.
- F. Painting
 - 1. All paint products shall comply with environmental requirements and shall be certified as being in compliance with Low VOC (Volatile Organic Compound) regulations and OTC (Ozone Transport Commission) specifications. Paint products shall meet GS-11 standards and be qualified for LEED-certified projects.
 - 2. Paint products for identification of plumbing systems shall be exterior grade, alkyd-based products.

2.6 SIGNAGE

A. Provide all designating signs for curb valves, control valves, alarms, and equipment as required by Contract Documents and the Authorities Having Jurisdiction.

2.7 VALVE TAGS

- A. Provide a valve tag for each valve.
- B. Each valve tag shall be 3 in. (75 mm) diameter, brass or aluminum, stamped with designating numbers, minimum 2 in. (50 mm) high, prefixed by the letter's "P", painted with white enamel, and background painted with red enamel.
- C. Attach each valve tag to valve handle or spindle with a brass chain.
- D. All valves and controls shall be designated with corresponding numbers on the valve charts or diagrams.
- E. The nomenclature to be used on these tags shall be submitted to the Consulting Engineer for approval.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.

3.2 INSTALLATION

A. Valve tags and nameplates shall be installed in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.

- B. Install nameplates with adhesive.
- C. Install valve tags with corrosion-resistant brass chain.

3.3 CLEANING

- A. Clean and remove all accumulation of dirt, chips or other deleterious material on equipment nameplates, valve tags and signage. Leave all valve tags and equipment nameplates in clean and legible condition before final acceptance.
- B. Touch up, repair or replace damaged tags and nameplates before final acceptance.

END OF SECTION 220553

SECTION 220700

PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all insulation required for piping and equipment as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Accessories.
 - 2. Adhesives and sealants.
 - 3. Pipe insulation.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

1.	Section 22 00 00	- General Requirements for Plumbing
	Section 22 05 00	- Common Work Results for Plumbing
2.	Section 22 05 23	- General-Duty Valves for Plumbing Piping
3.	Section 22 05 29	- Hangers and Supports for Plumbing Piping and Equipment
4.	Section 22 11 16	- Domestic Water Piping

1.3 REFERENCES

- A. All insulating products and accessories shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.
 - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
 - a. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

- 1) ASHRAE 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings.
- b. ASTM International
 - 1) ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2) ASTM C177: Standard Test Method for Steady-state Heat Flux Measurements and Thermal Transmission Properties by Means of Guarded-Hot-Plate Apparatus.
 - 3) ASTM C335: Standard Test Method for Steady-state Heat Transfer Properties of Horizontal Pipe Insulation.
 - 4) ASTM C411: Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - 5) ASTM C533: Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
 - 6) ASTM C547: Standard Specification for Mineral Fiber Pipe Insulation.
 - 7) ASTM C552: Standard Specification for Cellular Glass Thermal Insulation.
 - 8) ASTM C585: Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing.
 - 9) ASTM C612: Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 10) ASTM C871: Standard Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate and Sodium Ions.
 - 11) ASTM C1136: Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
 - 12) ASTM E84: Standard Test Methods for Surface Burning Characteristics of Building Materials.
 - 13) ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials.
- c. Greenguard Environmental Institute.
- d. Manufacturers Standardization Society of the Valve and Fittings Industry

- 1) MSS SP 69: Pipe Hangers and Supports Selection and Application.
- 2) MSS SP 89: Pipe Hangers and Supports Fabrication and Installation Practices.
- e. National Fire Protection Association (NFPA)
 - 1) NFPA 255: Standard Method of Test of Surface Burning Characteristics of Building Materials.
- f. Underwriters Laboratories, Inc.
 - 1) UL 723: Standard for Test for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 22 00 00 and shall include, but not be limited to:
 - 1. Schedule of materials indicating the type of system which it is installed, insulation type, insulation jacket, thickness for each pipe size and each type of equipment.
- B. Product Data: Submit manufacturer's literature including general assembly, for each type of product indicated. Include thermal conductivity, water-vapor permeance, thickness, and type of insulation jacket.
- C. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for the system.
 - 1. In addition, provide detailed installation procedures for the following:
 - a. Application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - b. Application of insulation at elbows, fittings, specialties and flanges for each type of insulation.
 - c. Application of field-applied jackets.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- 1.5 QUALITY ASSURANCE
 - A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.

- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. Furnish all equipment, materials and accessories new and free from defects.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.
- D. Store tapes, adhesives, mastics, cements, and insulation materials in ambient conditions acceptable to and in accordance with the recommendations of the manufacturer.
- E. Store products and materials off floors on raised platforms to protect from water damage.
- F. Products and materials which have been exposed to water damaged shall be replaced by the Contractor at no additional expense to the Contract.

1.7 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Furnish a one (1) year manufacturer's warranty for all insulation products.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the

project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.

- C. Accessories
 - 1. Buckaroos, Inc.
 - 2. Insul-Shield.
 - 3. Pipe Shields, Inc.
 - 4. Thermal Pipe Shields, Inc.
 - 5. Value Engineered Products, Inc.
- D. Adhesives and Sealants
 - 1. Benjamin Foster Company.
 - 2. Centiva.
 - 3. Duro Dyne.
 - 4. Elgen.
 - 5. ITW TACC.
- E. Equipment Insulation
 - 1. Certain Teed Corp.
 - 2. Johns-Manville.
 - 3. Knauf Insulation.
 - 4. Owens-Corning.
- F. Pipe Insulation and PVC Covers
 - 1. Certain Teed Corp.
 - 2. Johns-Manville (Zeston).
 - 3. Knauf Insulation.
 - 4. Owens-Corning.
 - 5. Proto Corporation.
 - 6. Speedline Corporation.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment, which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the

Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.

- D. Insulation materials furnished shall meet the minimum thickness requirements of ASHRAE Standard 90.1 Energy Efficient Design of New Buildings.
- E. All thermal and acoustical insulation jackets, facings, membrane, adhesives, mastics, coatings and accessory materials shall be tested in compliance with the latest versions of ASTM E-84, MSS SP-69, NFPA 255 and/or UL 723 procedures.
- F. All materials shall comply with the requirements of NFPA 90A and shall be listed and labeled by Underwriters Laboratories, Inc. for a fire hazard classification, not to exceed the following:
 - 1. Insulation installed indoors: Flame Spread 25, Smoke Developed 50.
 - 2. Insulation installed outdoors: Flame Spread 75, Smoke Developed 150.
- G. The rating for insulation with factory-applied jackets or facings shall be on a composite basis of insulation, jacket or facing, and the adhesive used to adhere the jacket or facing to the insulation.
- H. Materials and products required for work of this section shall not contain asbestos, formaldehyde, lead, mercury or mercury compounds, polychlorinated biphenyls (PCB's) or other hazardous materials.
- I. All insulation shall contain a minimum of 50% post-consumer recycled material.
- J. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 parts per million (ppm) when tested according to ASTM C 871.
- K. Insulation for fittings, valves, flanges, and accessories shall maintain the same thermal conductivity as the adjacent pipe insulation.
- L. Shipping containers for insulation and accessory materials shall be labeled to indicate conformance to the fire hazard classification.
- M. All vapor barriers shall be completely sealed against moisture penetration.

2.3 ACCESSORIES

- A. Pipe protection saddles shall be formed from carbon steel, 1/8 in. (3 mm) minimum thickness, sized for insulation thickness. Saddles for pipe sizes greater than 12 in. (305 mm) shall have a center support rib.
- B. Pre insulated shields shall be 180 degree, 18 gauge minimum galvanized sheet metal with high density water repellant Kaylo insulation, foam glass or high-density polyisocyanurate inserts minimum thickness to match outside diameter of the insulated pipe.

C. Pre insulated shields shall be no less than the following lengths:

Pipe Size	Shield Length
3/4 in. to 2-1/2 in. (63.5 mm to 19	10 in. (254 mm)
mm)	
3 in. to 6 in. (150 mm to 75 mm)	12 in. (305 mm)
8 in. to 10 in. (254 mm to 203 mm)	16 in. (405 mm)
12 in. (305 mm) and over	22 in. (555 mm)

2.4 ADHESIVES AND SEALANTS

- A. Provide adhesives and sealants conforming to the requirements of ASTM C 916, ASTM E 84 and UL 273.
- B. Adhesives and sealants shall be listed and labeled by Underwriters Laboratories, Inc. for a fire hazard classification, not to exceed the following:
 - 1. Flame Spread 25
 - 2. Fuel Contribution 50
 - 3. Smoke Developed 50

2.5 EQUIPMENT INSULATION

- A. Equipment insulation shall be:
 - 1. 2 in. (50 mm) thick, 6 lbs/cu.ft. (96 kg/m3) density, fiber glass, rigid insulation board with white Kraft, fiber glass, aluminum foil laminate, All-Service Jacket (ASJ).
- B. Bring edges of insulation boards on tanks into firm contact and cut or score where necessary to fit the shape and contour of the vessel. Fill all voids in the insulation with insulating cement.
- C. Hold insulation in place with 1/2 in. (13 mm) wide, 25 gauge galvanized steel bands on not more than 12 in. (305 mm) centers. When insulation has been installed, apply a flooding brush coat of Benjamin Foster 30-36, or as approved, to the entire surface.
- D. Into the wet coating embed one layer of open weave glass cloth smoothed out in wallpapering manner to avoid wrinkles and holidays, and overlap at all fabric seams to a minimum of 2 in. (50 mm.) Apply a final finish coat of BF 30-36, or as approved.
- E. Equipment insulation shall be furnished and installed in accordance with the following schedule:

Service	Thickness - Type		
Cold Water and Hot Water	2 in. (50 mm) thick, 6 lb. (96 kg) density, fiber		
Meters	glass, with foil facings sealed and tied with copper-		
	plated annealed steel wire, a smooth coat of cement		

Service	Thickness - Type
	with an open weave glass cloth jacket applied with BF 30-35 adhesive.

2.6 PIPE INSULATION

- A. Pipe insulation shall be molded fiber glass one-piece insulation with white Kraft, fiber glass reinforced, and aluminum foil laminated, All-Service Jacket (ASJ). Pipe insulation shall be capable of continuous service at a pipe temperature of 450°F (232° C) without oxidation or burnout of binders or the development of odors or smoke by any constituent of the material. Physical characteristics shall be as follows:
 - 1. Minimum Density: 4 lbs/cu.ft. (64 kg/cu.m).
 - 2. Thermal Conductivity: 0.23 Btu-in./hr/ft2 /°F (0.033 W/m at 24°C).
 - 3. Maximum Service Temperature: 850°F (454°C).
 - 4. Jacket Vapor Permeability: 0.02 perms.
 - 5. Jacket Puncture Resistance: 50 units (Beach).
- B. Pipe fittings and valves shall be insulated with pre-molded fiber glass sections and premolded thermoplastic covers for the sizes manufactured. For other types and sizes, fittings and valves shall be insulated with radially mitered segments of pipe covering secured in place with 16-gauge copper-plated, annealed steel wire. Pre-molded (PVC) fitting covers shall be suitable for same service temperature as pipe insulation.
- C. Install a vapor barrier on fittings, valves and flanges consisting of open weave glass cloth applied with BF 30-35 adhesive and finished with a flooding brush coat of the same adhesive.
- D. Insulation exposed to weather shall be provided with a weatherproof jacket of corrugated aluminum with a 3 in. lap that will shed water. Fittings, valves and flanges shall be weatherproofed with a weatherproof mastic reinforced with a glass cloth membrane and further coated with mastic.
- E. Insulation for piping systems shall be furnished and installed in accordance with the following schedule:

Service	Pipe Size	Temp	Thickness
Cold Water Mains and Branches	1-1/4 in. (32 mm) and below	450°F (232°C)	1 in. (25 mm)
Cold Water Mains and Branches	1-1/2 in. (38 mm) and above	450°F (232°C)	1 in. (25 mm)
Cold and Hot Water Mains and Branches (Subject to Freezing)	All	450°F (232°C)	2 in. (50 mm)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.
- 3.2 INSTALLATION
 - A. Installation of all insulation, pre-molded fiber glass insulation and thermoplastic covers for fittings and the use of adhesives and sealants shall be in accordance with the manufacturer's recommendations and the Authorities Having Jurisdiction.
 - B. Before applying insulation, all surfaces shall be free of dust, grease and foreign matter. Insulation shall not be applied to any piping and equipment until required pressure testing has been completed and the system approved for tightness.
 - C. Where a vapor seal must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor retarder.
 - D. All pipe insulation shall be continuous through walls, ceiling and/or floor openings.
 - E. Install multiple layers of insulation with longitudinal and circumferential joints staggered.
 - F. Pipe Insulation
 - 1. Pipe insulation sections shall be firmly butted together at all joints with jacket laps and joint butt strips pulled tight and smooth. Longitudinal joints shall have a minimum 2 in. (50 mm) overlap. Butt joint strips shall be a minimum of 3 in. (75 mm) wide.
 - 2. Insulation for fittings, valves, flanges, and accessories shall maintain the same thermal conductivity as the adjacent pipe insulation.
 - 3. Valves, expansion joints and other specialties requiring periodic servicing or inspection shall be insulated with factory fabricated removable and reusable covers.
 - 4. Flanges shall be insulated with built-up sleeves of pipe covering overlapping the adjacent pipe insulation.
 - G. Piping within mechanical equipment rooms, in addition to the insulation and jacket specified, all piping, including fittings, flanges and valves, shall be covered with a 30 mil (0.8 mm) thick thermoplastic jacket.
 - H. Cold service piping shall be insulated in accordance with the following:
 - 1. Insulation jacket laps and joint butt strip shall be sealed with lap-sealing adhesive. At all fittings, valves and at intervals of every 5 sections of straight run

pipe insulation, apply a vapor barrier coating, 1/16 in. (1.7 mm) thick, to all butt joints and on the bore of the pipe insulation for a minimum of 2 in. (50 mm) from the joint. Position insulation and press firmly into place, making certain that a complete unbroken seal is obtained.

- 2. Insulation shall be protected from hangers by a 180 degree galvanized steel shield on the outside of the insulation and vapor barrier. A half-section of waterproof, high-density insulation of the same thickness as the pipe insulation, and full length of the shield, shall be used to support the weight of the pipe at the shield. Factory-assembled thermal protection shields may also be used.
- I. Equipment Insulation
 - 1. Insulation shall be cut, scored and mitered to fit contour of equipment and secured with weld pins and speed washers on 12 in. (305 mm) centers maximum.
 - 2. Pins shall not be more than 3 in. (75 mm) from insulation joints or corners.
 - 3. Seal all joints on heat exchangers, hot water heaters, hot water pre-heaters with 4 in. (100 mm) wide self-sealing ASJ tape.

3.3 CLEANING

- A. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all insulation in suitable condition, before final acceptance.
- B. Touch-up, repair or replace damaged insulation, insulation jackets and vapor barriers before final acceptance.

3.4 ADJUSTING AND BALANCING

A. Upon completion of insulation, hangers for piping, and supports for equipment shall be adjusted to ensure that the loads are distributed evenly and that there are no loads imposed by the piping and equipment on the insulation that it is provided with.

END OF SECTION 220700

SECTION 221116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all domestic water piping required for the project as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Materials of piping systems.
 - 2. Miscellaneous accessories.
 - 3. Pipe joints and fittings.
 - 4. System material schedule.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all Work herein:

1.	Section 22 00 00	- General Requirements for Plumbing
	Section 22 05 00	- Common Work Results for Plumbing
2.	Section 22 05 23	- General-Duty Valves for Plumbing Piping
3.	Section 22 05 29	- Hangers and Supports for Plumbing Piping and Equipment
4. 5.	Section 22 05 53 Section 22 07 00	 Identification for Plumbing Piping and Equipment Plumbing Insulation

1.3 **REFERENCES**

- A. All domestic water piping shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for the City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.
 - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:

- a. American Society of Mechanical Engineers
 - 1) ASME B16.15: Cast Bronze Threaded Fittings
 - 2) ASME B16.18: Cast Copper Alloy Solder Joint Pressure Fittings.
 - 3) ASME B16.22: Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - 4) ASME B16.23: Cast Copper Alloy Solder Joint Drainage Fittings DWV.
 - 5) ASME B16.26: Cast Copper Alloy Fittings for Flared Copper Tubes.
 - 6) ASME B16.29: Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings DWV.
 - 7) ASME B31.9: Building Services Piping.
 - 8) ASME Section IX: Boiler and Pressure Vessel Code Welding and Brazing Qualifications.
- b. American Society of Sanitary Engineers
 - 1) ASSE 1010: Performance Requirements for Water Hammer Arresters.
 - 2) ASSE 1018: Performance Requirements for Trap Seal Primer Valves Potable Water Supplied.

c. ASTM International

- 1) ASTM A312: Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
- 2) ASTM A778: Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products.
- 3) ASTM B42: Specification for Seamless Copper Pipe, Standard Sizes.
- 4) ASTM B43: Specification for Seamless Red Brass Pipe, Standard Sizes.
- 5) ASTM B75/B75M: Standard Specification for Seamless Copper Tube.
- 6) ASTM B88/B88M: Standard Specification for Seamless Copper Water Tube.

- 7) ASTM B251: Specification for General Requirements for Wrought Seamless Copper and Copper Alloy Tube.
- 8) ASTM B302: Specification for Threadless Copper Pipe, Standard Sizes.
- 9) ASTM B447: Specification for Welded Copper Tube.
- 10) ASTM B813: Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
- 11) ASTM B828: Standard Specification for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
- 12) ASTM F1476: Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.
- d. American Water Works Association
 - 1) AWWA C104: Standard for Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.
 - 2) AWWA C110: Standard for Ductile-Iron and Gray-Iron Fittings, 3 Inches through 48 Inches, for Water.
 - 3) AWWA C115: Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Fittings.
 - 4) AWWA C151: Standard for Ductile-Iron Pipe Centrifugally Cast for Water.
 - 5) AWWA C153: Standard for Ductile-Iron Compact Fittings for Water Service.
- e. American Welding Society
 - 1) AWS A5.8: Specification for Filler Metals for Brazing and Braze Welding.
- f. Manufacturers Standardization Society
 - 1) MSS SP6: Contact Faces of Pipe Flanges and Connecting-end Flanges of Valves and Fittings.
 - 2) MSS SP9: Spot Facing for Bronze, Iron and Steel Flanges.
 - 3) MSS SP43: Wrought Stainless Steel Butt-welding Fittings.
 - 4) MSS SP44: Steel Pipe Line Flanges.

- 5) MSS SP-73: Brazing Joints for Copper and Copper Alloy Pressure Fittings.
- 6) MSS SP-83: Steel Pipe Unions Socket-Welding and Threaded.
- 7) MSS SP-97: Forged Carbon Steel Branch Outlet Fittings-Socket Welding, Threaded and Butt-welding Ends.
- 8) MSS SP104: Wrought Copper Solder Joint Pressure Fittings.
- 9) MSS SP106: Cast Copper Alloy Flanges and Flanged Fittings (Class 125, 150 and 300).
- 10) MSS SP 123: Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube.
- g. National Sanitation Foundation
 - 1) NSF Standard 61: Drinking Water System Components.
- h. Plumbing and Drainage Institute
 - 1) PDI WH201: Water Hammer Arresters.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract and Section 22 00 00 and shall include, but not be limited to:
 - 1. Schedule of pipe and fitting materials, complete with typical mill reports.
 - 2. Schedule of pipe and fitting materials identifying the system and location, which the products are intended to be used.
 - 3. Pipe cleaning certification.
 - 4. Copper, brass, stainless steel and ductile iron pipe and fittings.
 - 5. Cut or roll grooved couplings and fittings.
 - 6. Threaded brass or bronze fittings.
 - 7. Copper, brass, stainless steel and ductile iron pipe flanges and gaskets.
 - 8. Schedule of locations where water hammer arresters shall be installed.
 - 9. Schedule of locations where trap primer valves shall be installed.
- B. Product Data: Submit manufacturers literature including general assembly, for each type of product indicated. Include all piping, fittings, water hammer arresters, trap primer

valves, mechanical couplings, flanges, solder, materials of construction and dimensional characteristics.

- C. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for all products submitted.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Section 01 31 46 and Section 22 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all equipment of any equipment type from one manufacturer.
- E. After completion of installation, but prior to Final Completion, this Contractor shall certify in writing in a format acceptable to the Owner that products and materials installed, and processes used, do not contain asbestos, or polychlorinated biphenyls (PCB's) or other hazardous materials as determined by the Owner. A Materials Safety Data Sheet (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- F. To ensure uniformity and compatibility of piping components in grooved in piping system all grooved products and grooving tools must be the products of a single manufacturer.
- G. The manufacturer of grooved piping fittings shall provide on-site training for Contractor's field personnel by a factory trained representative in the proper use of grooving tools, application of groove, and product installation. In addition, the manufacturer's representative shall periodically visit the job site and inspect installation. Contractor shall remove and replace any improperly installed products.
- H. Furnish all equipment, materials and accessories new and free from defects.

1.6 FACTORY TESTING

A. All piping, fittings, flanges, couplings and accessories shall be fully assembled, and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:

- 1. All pipes, fittings, mechanical couplings, flanges and accessories shall be tested in accordance with the latest applicable industry standards before accepting delivery at the jobsite.
- 2. All water hammer arresters, trap primer valves and accessories shall be tested in accordance with the latest applicable industry standards before accepting delivery at the job site.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water and construction debris.
- D. Store all products and materials off floors on raised platforms to protect from water damage.
- E. Products and materials, which have been exposed to water damage shall be replaced by the Contractor at no additional expense to the Contract.

1.8 COORDINATION

- A. Certain materials will be furnished, installed, or furnished and installed, under other sections of the specifications. Examine the Construction Documents to ascertain these requirements.
- B. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto. Finished suspended ceiling elevations are indicated on the general Construction Drawings.
- C. Transmit to trades doing work of other sections all information required for work to be provided under their respective sections (such as foundations, electric wiring, access doors, and the like) in ample time for installation.
- D. Set all inserts for all pipes in ample time to allow the work of the other trades to be performed on scheduled time.
- E. Furnish and set all sleeves for passage of pipes through structural masonry and concrete walls and floors and elsewhere as required for proper protection of each pipe passing through building surfaces.
- F. Field drilling, cutting and/or reinforcing of holes in structural metal deck required for work under this section shall be coordinated with all trades and must be approved by the Structural Engineer.

G. Should the Contractor neglect to perform preliminary work and should cutting be required in order to install equipment, the expense of this cutting and restoring of surfaces to their original condition shall be borne by this Contractor.

Due to the type of the installation, a fixed sequence of operation is required to properly install the complete systems. It shall be the responsibility of this Contractor to coordinate, protect and schedule his work with other trades in accordance with the construction sequence.

I. Architectural drawings shall be checked for ceiling height requirements.

1.9 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Furnish a one (1) year manufacturer's warranty for the entire domestic water system.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

- 2.1 ACCEPTABLE MANUFACTURERS
 - A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
 - B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
 - C. Brass Pipe
 - 1. American Brass Co.
 - 2. Bridgeport Brass Co.
 - 3. Lewin Matheis.
 - 4. Mueller Industries
 - 5. Phelps Dodge.
 - 6. Reading Tube Corp.
 - 7. Revere.
 - 8. Wolverine Tube Co.
 - D. Brass and Bronze Fittings
 - 1. American Brass Co.
 - 2. Bridgeport Brass.

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- 3. Chase Brass.
- 4. Elkhart Products Corp.
- 5. Lewin Matheis.
- 6. Stockham Co.
- 7. Walworth Co.
- E. Copper Pipe, Tube and Fittings
 - 1. American Brass Co.
 - 2. Bridgeport Brass.
 - 3. Chase Brass.
 - 4. Elkhart Products Corp.
 - 5. Lewin Matheis.
 - 6. Mueller Industries
 - 7. Phelps Dodge.
 - 8. Reading Tube Corp.
 - 9. Revere.
 - 10. Wolverine Tube Co.
- F. Ductile Iron Pipe & Fittings
 - 1. Charlotte Pipe & Foundry.
 - 2. Tyler Pipe.
 - 3. US Pipe.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment, which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment, which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.
- D. All piping materials, fittings and couplings shall be of Unites States origin and manufactured in accordance with the latest applicable standards for its intended use.

2.3 MATERIALS OF PIPING SYSTEMS

- A. Use the following materials in the various piping systems, in accordance with the Construction Documents.
- B. Pressure Copper Tubing (P.C.T.): Copper Tubing shall be seamless drawn or extruded tubing Type "L" or "K" as scheduled, hard temper in accordance with ASTM Specification B42 and or ASTM Specification B88/B88M.
- C. Ductile Iron Water Pipe (D.I.W.P.)
 - 1. Ductile iron pipe shall be Class 52 for up to 4 inch and Class 56 greater than 4 inch, bell and spigot pipe with mechanical joints, equivalent to AWWA Specification C-151.
 - 2. Each length marked with Manufacturer's name, weight and class.
 - 3. Pipe shall be coated on the outside with a bituminous seal coat and lined on the inside with a hard smooth cement surface in accordance with AWWA Specification C-104.
- D. Red Brass Pipe (R.B.P.): Red brass pipe shall be seamless annealed drawn tubing, iron pipe size (I.P.S.), containing a mixture of not less than 85% copper, in accordance with ASTM Specification B43.

2.4 PIPE JOINTS AND FITTINGS

- A. All fittings shall be of a type, which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends.
- B. Use the following materials in the various piping systems, in accordance with the Construction Documents.
- C. Pressure Copper Tubing (P.C.T.)
 - 1. Solder Fittings for Use with P.C.T. shall be wrought or cast brass fittings in accordance with ASME B16.18 or ASME B16.22.
 - 2. Soldered joints for copper tubing shall be made with 95-5 (tin and antimony) solder in accordance with ASTM Specification B32. No other solder is to be used for any purpose on the job.
 - 3. Solder must meet the requirements of the Federal Safe Drinking Water Act and NSF Standard 61.
 - 4. Fittings for P.C.T. or brass pipe where brazed joints are required shall be bronze fittings or wrought copper fittings designed for use with the scheduled pipe or tubing in accordance with ASME B16.18 and ASME B16.22.
- D. Ductile Iron Water Pipe (D.I.W.P.)

- 1. Fittings for Use with D.I.W.P. shall be Class 52 for up to 4 inch and Class 56 greater than 4 inch in accordance with AWWA Specifications C-110, C-115 or C-153.
- 2. Fittings shall be "push-on" type or mechanical joint type in accordance with AWWA Specification C-111 as specified or scheduled.
- 3. Fittings shall be coated and lined in accordance with AWWA Specifications C-104.
- E. Red Brass Pipe (R.B.P.)
 - 1. Fittings for use with threaded R.B.P. shall be made with 125 lb. brass in accordance with ASME B16.15 and threads shall meet ASME B1.20.1.
 - 2. No plain-end couplings shall be permitted.
 - 3. Make joints in brass pipes without the use of lampwick or filler except "utility compound" or Permacel Teflon tape, applied to male threads only.
- F. Flanges and Flanged Fittings
 - 1. The pressure-temperature rating of the pipe flanges shall match the pressuretemperature rating of the flanges on the equipment to which the piping connects.
 - 2. Copper piping flanges shall be Class 150, slip-on bronze flanges.
 - 3. Flanged fittings for D.I.W.P. shall be in accordance with AWWA C-115.
 - 4. Flanges and flanged fittings for bronze pipe shall be of the required working pressure, as scheduled.
- G. Unions
 - 1. Unions shall be permitted for pipe 2 in. (50 mm) and smaller.
 - 2. Copper piping unions shall be Class 150, bronze unions with soldered or brazed joints. Soldered piping unions shall be American Brass No. 1733. Brazed piping unions shall be Flagg No. 5425.
 - 3. Dielectric unions shall be galvanized or stainless steel threaded end, copper solder end, water-impervious isolation barrier.
- H. Elbows
 - 1. All elbows shall be of long radius pattern except where space conditions do not permit.
 - 2. Welding elbows shall be 45 degree mill beveled or machine beveled.

- 3. Copper elbows shall be full-flow type wrought copper in accordance with ASTM B-75 alloy C12200. Fittings for 5 in. (125 mm) and 6 in. (150 mm) copper pipe shall be cast bronze in accordance with ASTM B-584-7 requirements.
- I. Gaskets: Gaskets used in domestic cold water systems shall be Grade "E" EPDM rated for a maximum temperature of 230°F (110°C) and maximum pressure of 400 psig (27.5 bar).

2.5 SYSTEM MATERIAL SCHEDULE

Service	Size	Pipe Type	Weight	Fitting Type
Domestic Water Service	3/4 in. through 2 in. (19 mm	Seamless Drawn Copper Tube	Туре К	Wrought Copper - Brazed
	through 50 mm) 2-1/2 in. through 4	Cement Lined	Class 52	Push-On
	in. (63 mm	Ductile Iron	Class 52	r usii-Oli
through 100 mm)				
	6 in. through 12	Cement Lined	Class 56	Push-On
	in. (150 mm	Ductile Iron		
	through 300 mm)			

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.
- B. Verify existing conditions prior to starting work.
- C. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto.
- D. Wherever this Contractor's work interconnects with work of other Contractors, this Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary to properly install all the necessary connections and equipment. Identify all work items in an approved manner in order that the Ceiling Trade may know where to install access doors and panels.
- E. The Contractor will provide benchmarks, monuments and other reference points on the job.
- F. Maintain all existing benchmarks, monuments and other reference points and perform all field engineering required to ensure that work under this section shall conform with grades, elevations and lines required.

3.2 INSTALLATION

- A. All piping and materials shall be as specified herein and shall be installed in accordance with the latest industry standards, per the manufacturer's recommendations, and as indicated on the drawings.
- B. All piping shall be made up and installed in a manner that permits expansion and contraction caused by changes in temperature and pressure. This shall be accomplished by the use of expansion loops as required and as shown on the drawings, and by installation of supports that will permit the movement of the pipe without undue stress, and by any other precautions that might be deemed necessary by the Engineer.
- C. Run and arrange piping approximately as indicated on the Construction Documents and as coordinated with other trades.
- D. Install piping as neatly spaced, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes.
- E. Erect all risers plumb and true, parallel with walls and other pipes.
- F. Ream all pipe smooth before installation. Do not bend, split, flatten or otherwise injure pipe.
- G. The Contractor shall provide all equipment and appurtenances necessary to complete the installation according to code requirements, whether indicated on the drawings or not.
- H. The Contractor shall provide all trap primers for floor drains necessary to complete the installation according to code requirements, whether indicated on the drawings or not.
- I. Do not install pipes or other apparatus in a manner which interferes with the full swing of the doors.
- J. It is the responsibility of this Contractor for accurately laying out the work. Should it be found that any work is laid out so that interferences will occur, report that to the Architect before commencing work.
- K. No piping shall pass over high voltage (440V) electrical bus duct or switchgear equipment. Where required, provide protective pans under or over individual pipes and construct the pans of 16-gauge stainless steel with a 6 in. (150 mm) lip, the corners being welded to make the pans watertight. Give each pan three (3) coats of Rust-O-Leum paint and support with pipe hangers and drain clear of the equipment below.
- L. Route piping in an orderly manner parallel and perpendicular to walls maintaining gradient and headroom without interfering with use of space or taking more space than necessary. Whenever practical group piping at common elevations.
- M. Furnish and install sleeves for pipe passing through partitions, walls and floors. Piping penetrating roofs must maintain integrity of roof assembly.

- N. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- O. Provide clearance in hangers and from structure and other equipment for installation and access to water hammer arresters and trap primers.
- P. Install valves in accordance with the specifications and provide access where valves and fittings are not accessible. Coordinate size and location of access doors with valves.
- Q. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- R. All trap primers shall be of the sizes indicated and shall be routed as indicated on the drawings, or as required, to prevent trap evaporation of floor drains.
- S. All piping shall be carefully graded so as to eliminate traps and pockets. Provide means for drainage by valved connections with pipe plugs for water traps.
- T. Piping exposed in all rooms shall be installed as nearly as possible parallel with or at right angles to the building walls. Install all pipe straight and true. Springing or forcing piping into place will not be permitted unless specifically called for. Install piping in such a manner as to prevent strain on equipment connections. Install piping in such a manner as to eliminate all static and dynamic conditions of loading on equipment connections.
- U. Piping in finished portions of the building, except in mechanical equipment rooms or where otherwise indicated on the Drawings, shall be concealed.
- V. Install unions or flanges at all equipment connections and elsewhere as indicated on the Drawings. Unions shall be of the same pressure rating as the respective piping system and shall be of the ground joint type.
- W. All piping shall be of the sizes indicated and shall be routed as indicated on the Drawings, or as required, to serve all equipment and systems.
- X. Pitch all piping to low points. Provide all low points and any pockets caused by changes in elevation required by structural or other interferences with 1/2 in. (13 mm) drain valve capped with a screwed nipple.
- Y. Pitch piping to high points for venting purposes and install vent valves at all inversely trapped high points in the system, including those points where piping has changed elevation to clear structure or other interferences.
- Z. Provide air release valves as specified. Pipe the discharge of all vent valves to funnel drain, floor drain, and as indicated on the drawings.
- AA. Brazed Piping

- 1. Filler metal shall conform with the requirements of the latest edition of ANSI/AWS A5.8 Specifications for Brazing Filler Metal with the following classifications: BCuP-2, BCuP-3, BCuP-4, BCuP-5, BAg-5 or BAg-7.
- 2. Flux shall be compatible with the materials brazed and with the filler metal used and shall conform to the requirements of the latest edition of ANSI/AWS A5.31 Specifications for fluxes for Brazing and Braze Welding. All flux residue must be removed after joint is completed.
- 3. Brazing shall be performed in accordance with the Copper Tube Handbook of the Copper Tube Development Association as well as the latest edition of ANSI/AWS B2.2 Standard for Brazing Procedure and Performance and ANSI/AWS C3.4 Specifications for Torch Brazing.
- 4. All joints shall be made by personnel meeting the requirements of ASME Boiler Pressure Vessel Code, Section IX.
- BB. Soldered Piping
 - 1. Filler metal shall conform with the requirements of the latest edition of ASTM B 32 Specifications for Solder Metal.
 - 2. All joints, except for refrigerant piping, shall be made with 95% tin and 5% antimony solder, having a melting point of not less than 460°F (238°C). Refrigerant piping joints shall be made with silver solder.
 - 3. All soldered joints shall be thoroughly cleaned before the application of the solder. Flux shall be compatible with the materials brazed and with the filler metal used and shall conform with the requirements of the latest edition of ASTM B 813 Specifications for Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Tube. All flux residue must be removed after joint is completed.
 - 4. Soldered joints shall be assembled in accordance with the Copper Tube Handbook of the Copper Tube Development Association and ASTM B 828 Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
 - 5. All soldered joints for tubing larger than 2 in. (50 mm) in size shall be made with the simultaneous application of two or three blow torches.

3.3 CLEANING

A. During construction, properly cap all lines, so as to prevent the entrance of sand, dirt, etc. Each system of piping shall be blown through after completion (for the purpose of removing grit, dirt, sand, etc., from coils and piping), for as long a time as required to thoroughly clean the apparatus.

- B. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all domestic water piping and appurtenances in suitable condition, before final acceptance.
- C. Cover and protect all openings left in floor for passage of pipes. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting to prevent obstruction and damage.
- D. Protect the system against freezing in cold weather.
- E. The Contractor shall furnish all required pipe cleaning chemicals, chemical feed equipment, materials, and labor necessary to sterilize the domestic water piping as herein specified. In addition, the Contractor shall permanently install necessary chemical injection fittings complete with stop valves, etc.
- F. After each hydrostatic leak testing procedure is complete, drain the system until empty. Liquid for hydrostatic testing of domestic water systems shall be clean domestic water from the municipal water supply.
- G. All domestic water piping and tanks shall be thoroughly flushed.
- H. Upon completion of the flushing operation, samples shall be tested by a Department of Health recognized laboratory. If samples show bacterial contamination, sterilize the potable water system in accordance with the New York City Plumbing Code, Chapter 6, Section PC610.
- I. Under no circumstances shall the Contractor permit the use of any portion of the domestic water system until it has been properly sterilized and certified same by the local water department or the Authorities Having Jurisdiction.
- J. A minimum of two (2) weeks' notice shall be given to the Engineer and Owner prior to testing and sterilization.

3.4 INSPECTION AND STARTUP SERVICE

- A. All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for by this Subcontractor, as necessary to obtain complete and final acceptance of the system as installed.
- B. The certificates of inspection shall be provided in quadruplicate and shall be delivered to the Architect for distribution.
- C. Inspect all piping, hangers, rod and support for piping and equipment for proper installation according to the manufacturer's instructions.
- D. Inspect all water hammer arresters and trap primers for installation according to the manufacturer's instructions.
- E. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.

- F. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- G. Notify the Architect and Inspectors Having Jurisdiction at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.
- H. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these specifications for such equipment.

3.5 FIELD QUALITY CONTROL

- A. Soldering and Brazing Quality Control
 - 1. An independent testing agency shall observe the fitting up and making of soldered and brazed joints as prescribed in ASTM B 828 for soldered joints and in ANSI/AWS B2.2 and ANSI/AWS C3.4 for all brazed joints. The inspection and testing protocol requirements shall be as follows:
 - a. Both shop-made and field-made soldered and/or brazed joints in piping 1-1/2 in. and larger shall be subjected to random visual inspections during setup and at various stages of completion.
 - b. The first twenty (20) in pipes 2 in. (50 mm) and larger, soldered and/or brazed joints made in the field shall be subjected to ultrasonic flaw testing.

Ten percent (10%) of the remaining soldered and/or brazed joints, on a random basis determined by the independent testing agency, shall also be subjected to either ultrasonic flaw testing.

d. Based on the results of the tests performed on each of the twenty (20) soldered and/or brazed joints, a determination of the extent of the subsequent testing beyond the minimum ten percent (10%) noted above shall be established by the Engineer.

3.6 FIELD TESTS

A. Performance Test

1. Allow sufficient time to perform all tests, adjustments, necessary to place the various systems in final operation condition, verify performance requirements and check all safety devices. Labor and instruments, required for various tests shall be provided. See that all manufacturers' representatives necessary to check and adjust various systems are present with sufficient labor to perform all this work without delay. All test data shall be recorded on suitable forms and submitted to the Owner for approval.

- 2. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests, if he so desires. The Contractor shall notify the Engineer and Owner in writing, at least two (2) weeks prior to the day of the test.
- 3. Test all systems before any paint is applied, piping is insulated, furred in or otherwise covered.
- 4. Test all systems in full accordance with applicable Municipal requirements, but in no case shall the system be tested at less than 150 psig (10.5 bar) hydrostatic pressure or 50 psig (3.5 bar) above the normal operating pressure, whichever is greater. Apply the test for a minimum of two (2) consecutive hours with no loss in pressure. Prior to applying the hydrostatic test, the system shall be tested with 50 psig (3.5 bar) compressed air for a period of ten minutes with no loss in pressure.
- 5. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors Having Jurisdiction.
- B. Final Acceptance Test
 - 1. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
 - 2. Points and areas for recheck shall be selected by the Owner's representative.
 - 3. Measurements and tests shall be same as the original test procedures.
 - 4. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.
 - 5. The Contractor shall demonstrate to the Engineer and the Owner, prior to acceptance by the Owner, that all systems and/or equipment has been balanced and adjusted properly, and that the system and/or equipment is in compliance with the Contract Documents.
 - 6. Test all trap primer valves for proper operation and filling of floor drain traps before final acceptance by the Owner.
 - 7. Test all water hammer arresters to ensure there is no pulsation or water hammer in the system due to equipment operation and other quick-closing devices before final acceptance by the Owner.

C. Commissioning: Owner or Commissioning Agent shall witness all hydrostatic tests.

END OF SECTION 221116

SECTION 221316

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install all sanitary waste, vent and indirect waste piping required for the project as indicated on and in accordance with the requirements of the Contract Documents.
- B. Section includes:
 - 1. Material of piping systems.
 - 2. Pipe joints and fittings.
 - 3. Specialty pipe fittings.
 - 4. System material schedule.
 - 5. Traps.

1.2 RELATED SECTIONS

- A. Refer to Divisions 21, 26, and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. The following specification sections apply to all work herein:

2.	Section 22 00 00 Section 22 05 00	-	General Requirements for Plumbing Common Work Results for Plumbing				
3.	Section 22 05 23	-	General-Duty Va	alves	for Plumbing	g Piping	
4.	Section 22 05 29	-	Hangers and Sup	pport	s for Plumbi	ng Piping	and
5.	Equipment Section 22 05 53 Equipment	-	Identification	for	Plumbing	Piping	and

1.3 **REFERENCES**

- A. All sanitary waste, vent and indirect waste piping shall be designed, manufactured, tested and installed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
 - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for THE City of New York.
 - a. New York City Building Code.
 - b. New York City Plumbing Code.

2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:

- a. American Society of Mechanical Engineers
 - 1. ASME A112.3.1: Stainless Steel Drainage Systems for Sanitary DWV, Storm and Vacuum Applications, Above and Below Ground.
 - 2. ASME B16.1: Cast Iron Pipe Flanges and Flanged Fittings.
 - 3. ASME B16.3: Malleable Iron Threaded Fittings.
 - 4. ASME B16.4: Gray Iron Threaded Fittings.
 - 5. ASME B16.5: Pipe Flanges and Flanged Fittings.
 - 6. ASME B16.12: Cast Iron Threaded Drainage Fittings.
 - 7. ASME B16.15: Cast Bronze Threaded Fittings.
 - 8. ASME B16.18: Cast Copper Alloy Solder Joint Pressure Fittings.
 - 9. ASME B16.22: Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - 10. ASME B16.23: Cast Copper Alloy Solder Joint Drainage Fittings DWV.
 - 11. ASME B16.26: Cast Copper Alloy Fittings for Flared Copper Tubes.
 - 12. ASME B16.29: Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings DWV.
 - 13. ASME B31.9: Building Services Piping.
 - 14. ASME Section IX: Boiler and Pressure Vessel Code Welding and Brazing Qualifications.

b. ASTM International

- 1. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- 2. ASTM A74: Standard Specification for Cast Iron Soil Pipe and Fittings.
- 3. ASTM A312: Specification for Seamless and Welded Austenitic Stainless-Steel Pipes.

- 4. ASTM A778: Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products.
- 5. ASTM A888: Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary, Storm Drain, Waste and Vent Piping Applications.
- 6. ASTM B42: Specification for Seamless Copper Pipe, Standard Sizes.
- 7. ASTM B43: Specification for Seamless Red Brass Pipe, Standard Sizes.
- 8. ASTM B75/B75M: Standard Specification for Seamless Copper Tube.
- 9. ASTM B88/B88M: Standard Specification for Seamless Copper Water Tube.
- 10. ASTM B251: Specification for General Requirements for Wrought Seamless Copper and Copper Alloy Tube.
- 11. ASTM B302: Specification for Threadless Copper Pipe, Standard Sizes.
- 12. ASTM B306: Standard Specification for Copper Drainage Tube (DWV).
- 13. ASTM B813: Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
- 14. ASTM B828: Standard Specification for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
- 15. ASTM C564: Standard Specification for Rubber Gaskets for Joining Cast Iron Soil Pipe and Fittings.
- 16. ASTM C1277: Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
- 17. ASTM C1540: Standard Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
- c. American Welding Society
 - 1. AWS A5.8: Specification for Filler Metals for Brazing and Braze Welding.
 - 2. AWS D1.1: Structural Welding Code Steel.

- d. Cast Iron Pipe Institute
 - 1. CISPI 301: Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary, Storm Drain, Waste and Vent Piping Applications.
 - 2. CISPI 310: Standard Specification for Couplings in use with Hubless Cast Iron Soil Pipe and Fittings for Sanitary, Storm Drain, Waste and Vent Piping Applications.
- e. Manufacturers Standardization Society
 - 1. MSS SP-6: Contact Faces of Pipe Flanges and Connecting-end Flanges of Valves and Fittings.
 - 2. MSS SP-9: Spot Facing for Bronze, Iron and Steel Flanges.
 - 3. MSS SP-43: Wrought Stainless Steel Butt-welding Fittings.
 - 4. MSS SP-44: Steel Pipe Line Flanges.
 - 5. MSS SP-73: Brazing Joints for Copper and Copper Alloy Pressure Fittings.
 - 6. MSS SP-83: Steel Pipe Unions Socket-Welding and Threaded.
 - 7. MSS SP-97: Forged Carbon Steel Branch Outlet Fittings-Socket Welding, Threaded and Butt-welding Ends.
 - 8. MSS SP-104: Wrought Copper Solder Joint Pressure Fittings.
 - 9. MSS SP-106: Cast Copper Alloy Flanges and Flanged Fittings (Class 125, 150 and 300).
 - 10. MSS SP-123: Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube.
- f. National Sanitation Foundation
 - 1. NSF Standard 61: Drinking Water System Components.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the Conditions of the Contract, Section 01 31 46, and Section 22 00 00 and shall include, but not be limited to:
 - 1. Schedule of pipe and fitting materials, complete with typical mill reports.
 - 2. Schedule of pipe and fitting materials identifying the system and location, which the products are intended to be used.

- 3. Copper, brass, stainless steel, cast iron and ductile iron pipe and fittings.
- 4. Heavy duty no-hub couplings and gaskets for cast iron soil pipe.
- 5. Cut or roll-grooved couplings and fittings.
- 6. Threaded brass or bronze fittings.
- 7. Copper, brass, stainless steel, cast iron and ductile iron pipe flanges and gaskets.
- B. Product Data: Submit manufacturer's literature including general assembly, for each type of product indicated. Include all piping, fittings, mechanical couplings, flanges, solder and dimensional characteristics.
- C. Test Reports: Indicate procedures and results for specified factory and field acceptance testing and inspections.
- D. Manufacturer's Installation Instructions: Submit support details, installation instructions and connection requirements for all products submitted.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. The quality assurance requirements of Division 01 and Section 22 00 00 shall apply to all work specified herein.
- B. All products and equipment specified herein shall be fabricated by companies whose primary business expertise is the manufacturing of commercial and industrial products and equipment with a minimum of ten (10) years documented experience.
- C. Each submittal shall be provided with documentation certifying that all materials, products, components and test reports are in compliance with the design requirements for this project.
- D. Make every effort to furnish all piping material from one manufacturer.
- E. After completion of installation, but prior to Final Completion, this Contractor shall certify in writing in a format acceptable to the Owner that products and materials installed, and processes used, do not contain asbestos, or polychlorinated biphenyls (PCB's) or other hazardous materials as determined by the Owner. A Materials Safety Data Sheet (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- F. To ensure uniformity and compatibility of piping components in grooved in piping system all grooved products and grooving tools must be the products of a single manufacturer.
- G. The manufacturer of grooved piping fittings shall provide on-site training for Contractor's field personnel by a factory trained representative in the proper use of

grooving tools, application of groove, and product installation. In addition, the manufacturer's representative shall periodically visit the job site and inspect installation. Contractor shall remove and replace any improperly installed products.

H. Furnish all equipment, materials and accessories new and free from defects.

1.6 FACTORY TESTING

- A. All piping, fittings, flanges, couplings and accessories shall be fully assembled and factory tested for full functionality at the manufacturer's factory prior to shipment as specified herein:
 - 1. All pipe, fittings, mechanical couplings, flanges and accessories shall be tested in accordance with the latest applicable industry standards before accepting delivery at the jobsite.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Accept all material and equipment on site in factory packing. Inspect for damage. Comply with the manufacturer's rigging and installation instructions.
- C. Protect all components from physical damage, including effects of weather, water, and construction debris.
- D. Store all products and materials off floors on raised platforms to protect from water damage.
- E. Products and materials which have been exposed to water damage shall be replaced by the Contractor at no additional expense to the Contract.

1.8 COORDINATION

- A. Certain materials will be furnished, installed, or furnished and installed, under other sections of the specifications. Examine the Construction Documents to ascertain these requirements.
- B. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto. Finished suspended ceiling elevations are indicated on the general construction drawings.
- C. Transmit to trades doing work of other sections all information required for work to be provided under their respective sections (such as foundations, electric wiring, access doors, and the like) in ample time for installation.
- D. Set all inserts for all pipes in ample time to allow the work of the other trades to be performed on the scheduled time.

- E. Furnish and set all sleeves for passage of pipes through structural masonry and concrete walls and floors and elsewhere as required for proper protection of each pipe passing through building surfaces.
- F. Field drilling, cutting and/or reinforcing of holes in structural metal deck required for work under this section shall be coordinated between trades and must be approved by the Structural Engineer.
- G. Should the Contractor neglect to perform preliminary work and should cutting be required in order to install equipment, the expense of this cutting and restoring of surfaces to their original condition shall be borne by this Contractor.
- H. Due to the type of the installation, a fixed sequence of operation is required to properly install the complete systems. It shall be the responsibility of this Contractor to coordinate, protect and schedule his work with other trades in accordance with the construction sequence.
- I. Architectural drawings shall be checked for ceiling height requirements.

1.9 WARRANTY

- A. Comply with the requirements of Section 01 31 46 and Section 22 00 00.
- B. Furnish a one (1) year manufacturer's warranty for the entire sanitary waste, drainage, and venting system.
- C. Warranty period shall commence upon final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical characteristic requirements of the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved neither the project specifications nor the Contract Documents will be revised to reflect the substitution.
- C. Copper Pipe, Tube and Fittings
 - 1. American Brass Co.
 - 2. Bridgeport Brass.
 - 3. Chase Brass.
 - 4. Elkhart Products Corp.

- 5. Lewin Matheis.
- 6. Mueller Industries.
- 7. Phelps Dodge.
- 8. Reading Tube Corp.
- 9. Revere.
- 10. Wolverine Tube Co.

D. Cast Iron Pipe and Fittings

- 11. ABI Foundry Company.
- 12. Charlotte Pipe & Foundry.
- 13. Tyler Pipe & Foundry.
- E. No-Hub Heavy Duty Couplings
 - 14. Husky Heavy Duty Couplings.
 - 15. Mission Heavy Weight Couplings.

F. Steel Pipe and Fittings

- 16. Allied Pipe & Tube.
- 17. Anvil International.
- 18. U.S. Steel.
- 19. Wheatland Pipe.

2.2 GENERAL REQUIREMENTS

- A. All materials and equipment shall be new, in good condition and free from defect. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the Work.
- B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified herein are the minimum standards acceptable. The Engineer retains the sole right to judge the equality of equipment that deviates from the Contract Documents, to reject any alternative submitted by the Contractor, and to require the specified materials and equipment, which conform to the requirements of the Contract Documents be furnished.
- C. Materials and equipment, which are found to have factory defects shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Contractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, re-commissioning of the equipment, etc.
- D. All pipe material shall be as specified herein and shall be installed as specified. The Contractor shall submit to the Engineer for review a list of the proposed manufacturers of pipe and fittings.

E. All piping materials, fittings and couplings shall be of Unites States origin and manufactured in accordance with the latest applicable standards for its intended use.

2.3 MATERIALS OF PIPING SYSTEMS

- A. Use the following materials in the various piping systems, in accordance with the Construction Documents.
- 1. Cast Iron No-Hub (C.I.N.H.)
 - a) Cast Iron Hubless Pipe shall be standard weight coated cast iron hubless pipe manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74 and CISPI 301.
 - b) Each length shall be marked with the size, weight per foot and manufacturer's name clearly cast or stamped on each length.
 - c) Pipe shall be manufactured by a member of the Cast Iron Soil Pipe Institute (CISPI).
- 2. Cast Iron Soil Pipe (C.I.S.P.)
 - a) Cast Iron Soil Pipe shall be service weight coated cast iron soil pipe, hub and spigot type manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74.
 - b) Each length shall be marked with the size, weight per foot and manufacturer's name clearly cast or stamped on each length.
 - c) Pipe shall be manufactured by a member of the Cast Iron Soil Pipe Institute (CISPI).
- 3. Extra Heavy Cast Iron (E.H.C.I.)
 - a) Extra-heavy coated cast iron soil pipe shall be heavy weight, bell and spigot pipe manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74.
 - b) Each length shall be marked with the size, weight per foot and manufacturer's name clearly cast or stamped on each length.
 - c) Pipe shall be manufactured by a member of the Cast Iron Soil Pipe Institute (CISPI).
- 4. Galvanized Steel Pipe (G.S.P.)
 - a) Galvanized steel pipe shall be seamless or welded in accordance with the latest issue of ASTM Standard A53.
 - b) Pipe shall be Schedule 40, galvanized steel as scheduled.

- c) Each length shall be hydrostatically tested at the mill and the producer's certification of said tests shall be furnished.
- d) Pipe working pressures, test pressures and finish shall be as scheduled or as indicated on the construction documents.
 - ii. 5. Non-Pressure Copper Tubing (N.P.C.T.)
- a) Indirect waste copper tubing shall be seamless drawn or extruded tubing Type "L" or "K" as scheduled or hard temper DWV copper drainage tubing.
- b) Seamless drawn or extruded tubing shall be in accordance with ASTM Specification B42 and or ASTM Specification B88/B88M.
- c) Non-pressure hard temper Type DWV copper drainage tubing shall be furnished in 20 foot straight lengths, in accordance with ASTM Specification B306.

2.4 PIPE JOINTS AND FITTINGS

- A. All fittings shall be of a type, which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends.
- B. Use the following materials in the various piping systems, in accordance with construction documents.
- C. Cast Iron No-Hub (C.I.N.H.)
 - 1. Cast iron no-hub fittings shall be standard weight coated cast iron hubless drainage fittings manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74 and CISPI 301.
 - 2. Cast iron no-hub fittings shall be joined with "Heavy Duty" no-hub couplings constructed of a shielded coupling.
 - 3. Couplings shall be constructed of Type 304 stainless steel with 305 stainless steel worm drive screws and comply with ASTM Specification C1540.
 - 4. The gasket material shall be neoprene and conform to ASTM Specification C564,
 - 5. The coupling assembly shall be torqued to manufacturer's specified requirements.
 - 6. Heavy duty no-hub couplings shall be Husky "Heavy Duty" SD4000 coupling.
- D. Cast Iron Soil Pipe (C.I.S.P.)
 - 1. Cast iron soil pipe fittings shall be service weight, coated cast iron bell and spigot type manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74.
 - 2. Cast iron soil fittings shall be joined by elastomeric compression gaskets.

- 3. Gaskets shall be Tyler "TY-Seal" neoprene elastomeric compression type gaskets conforming to ASTM Standard C564.
- E. Galvanized Steel (G.S.P.)
 - 1. Joints between lengths of galvanized steel piping shall be threaded, flanged, grooved or welded as scheduled herein below or on the Construction documents.
 - 2. Make screwed joints without the use of lampwick or filler, except "utility compound" or Permacel Teflon tape applied to male threads only.
 - 3. Fittings for use with Grooved Galvanized Steel Pipe (G.G.S.P.) shall be cast ductile iron scheduled to match the piping material the fittings will be connected to. All fittings shall be hot dip galvanized to ASTM Specification A153.
 - 4. Mechanical couplings may be used in lieu of threaded galvanized steel fittings.
 - 5. Mechanical couplings shall consist of two (2) pieces of hot dipped galvanized ductile iron housings conforming to ASTM Specification A536, grade 65-45-12, with angled pads.
 - 6. Coupling gaskets shall be Grade "E" EPDM synthetic rubber.
 - 7. Coupling bolts and nuts shall be heat-treated carbon steel, trackhead design conforming to physical properties of ASTM Specification A183.
 - 8. All mechanical couplings for galvanized steel pipe shall be Zero-Flex Rigid Coupling Style 07 with galvanized finish as manufactured by Victaulic Company of America.
 - 9. Installation of mechanical couplings shall be per manufacturer's latest recommendations.
 - 10. Supply grooved full-flow standard radius fittings with roll-grooved ends.
- F. Extra Heavy Cast Iron (E.H.C.I.)
 - 1. Extra-heavy coated cast iron soil fittings shall be heavy weight, bell and spigot type manufactured from gray cast iron with a tensile strength not less than 21,000 psi, in accordance with ASTM Specification A74.
 - 2. Extra-heavy cast iron soil fittings shall be joined by elastomeric compression gaskets.
 - 3. Gaskets shall be Tyler "TY-Seal" neoprene elastomeric compression type gaskets conforming to ASTM Standard C564.
- G. Non-Pressure Copper Tubing (N.P.C.T.)

- 1. Solder Fittings for Use with N.P.C.T. shall be wrought, cast brass or DWV drainage fittings in accordance with ASME B16.18, ASME B16.22, ASME B16.23 or ASME B16.29.
- 2. Soldered joints for copper tubing shall be made with 95-5 (tin and antimony) solder in accordance with ASTM Specification B32. No other solder is to be used for any purpose on the job.
- 3. Fittings for N.P.C.T. or brass pipe where brazed joints are required shall be bronze fittings or wrought copper fittings designed for use with the scheduled pipe or tubing in accordance with ASME B16.18, ASME B16.22, ASME B16.23 or ASME B16.29.
- H. Flanges and Flanged Fittings
 - 1. The pressure-temperature rating of the pipe flanges shall match the pressuretemperature rating of the flanges on the equipment to which the piping connects.
 - 2. Flanges for stainless steel piping shall be Class 150, forged one-piece raised face weld neck steel flanges. Slip-on flanges will not be accepted.
 - 3. Copper piping flanges shall be Class 150, slip-on bronze flanges.
 - 4. Flanged fittings for D.I.W.P. shall be in accordance with AWWA C-115.
 - 5. Flanges and flanged fittings for bronze pipe shall be of the required working pressure, as scheduled.
 - 6. Do not use cast iron screw-on flanges in pump discharge piping. For this service, use cast steel, ductile iron or copper flanges.
- I. Elbows
 - 1. All elbows shall be of long radius pattern except where space conditions do not permit.
 - 2. Welding elbows shall be 45 degree mill beveled or machine beveled.
 - 3. Grooved-end elbows shall be the long radius type manufactured from standard wall pipe conforming with the material of the system which it is installed.
 - 4. Copper elbows shall be full-flow type wrought copper in accordance with ASTM B-75 alloy C12200. Fittings for 5 in. (125 mm) and 6 in. (150 mm) copper pipe shall be cast bronze in accordance with ASTM B-584-7 requirements.
- J. Gaskets: Gaskets used in sanitary drainage systems shall be Grade "E" EPDM rated for a maximum temperature of 230°F (110°C) and maximum pressure of 400 psig (27.5 bar).
 - A. SYSTEM MATERIAL SCHEDULE

Service	Size	Ріре Туре	Weight	Fitting Type
Sanitary and Vent	2 in. (50 mm)	Cast Iron No-	Service	Heavy Duty No-Hub
Risers (Stacks) 2nd	through 10 in.	Hub	Weight	Couplings
Floor and Below	(250 mm)			
	12 in. (100 mm)	Cast Iron Soil	Service	Gasketed Bell &
	through 15 in.	Pipe	Weight	Spigot
	(375 mm)			
Sanitary and Vent	2 in. (50 mm)	Cast Iron No-	Service	Heavy Duty No-Hub
Branch Piping	through 10 in.	Hub	Weight	Couplings
	(250 mm)			
Indirect Waste Risers	All	Cast Iron No-	Service	Heavy Duty No-Hub
		Hub	Weight	Couplings
Indirect Waste	All	Seamless Drawn	Type L	Wrought Copper -
Branches (DWV)		Copper Tube		Soldered

B. TRAPS

- i. Sanitary Systems
 - 1. Traps greater than 2 in. (50 mm) used in the sanitary system shall be cast brass, cast iron and/or galvanized cast iron, one-piece pattern, 3 in. (75 mm) minimum seal, of the same material and coating and/or finish as the piping system in which they are installed.
 - 2. All traps buried in earth shall be cast iron, one-piece pattern with a 3 in. (75 mm) minimum seal.
 - 3. Traps less than 2 in. (50 mm), not buried in earth shall be cast brass.
 - 4. Fixture traps shall be cast brass one-piece "P" traps with 2 in. (50 mm) minimum trap seal and gasketed cleanout plugs made of machined bar stock.
 - 5. Locate traps per code requirements.
 - 6. Floor drain traps for use with pressurized waste discharge shall be cast iron and/or galvanized cast iron, one-piece pattern, 3 in. (75 mm) minimum seal of the same material and coating and/or finish as the piping system in which they are installed. Each trap shall be provided with additional support consisting of unistrut or kindorf, two (2) hanger rods, and be supported from the slab above.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accept all materials and equipment in factory packaging and examine for visible damage. All damaged material and equipment shall be removed from the job site and replaced by the manufacturer.
- B. Verify existing conditions prior to starting work.
- C. Carefully check space requirements with other trades to ensure that all material can be installed in the spaces allotted thereto.
- D. Wherever this Contractor's work interconnects with work of other Contractors, this Contractor shall coordinate his work with these Contractors to ensure that all Contractors have the information necessary so that they may properly install all the necessary connections and equipment. Identify all work items in an approved manner in order that the Ceiling Trade may know where to install access doors and panels.
- E. The Contractor will provide benchmarks, monuments, and other reference points on the job.
- F. Maintain all existing benchmarks, monuments and other reference points and perform all field engineering required to ensure that work under this section shall conform with grades, elevations and lines required.
- G. <u>Verify excavations are to required grade, dry, and not over-excavated.</u>
- H. <u>Verify trenches are ready to receive piping</u>.

3.2 INSTALLATION

- A. All piping and materials shall be as specified herein and shall be installed in accordance with the latest industry standards, per the manufacturer's recommendations, and as indicated on the drawings.
- B. Run and arrange piping approximately as indicated on the construction documents and as coordinated with other trades.
- C. Install piping as neatly spaced, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes.
- D. Erect all risers plumb and true, parallel with walls and other pipes.
- E. Ream all pipe smooth before installation. Do not bend, split, flatten nor otherwise injure pipe.
- F. The Contractor shall provide all equipment and appurtenances necessary to complete the installation according to code requirements, whether indicated on the drawings or not.

- G. Do not install pipes or other apparatus in a manner, which interferes with the full swing of the doors.
- H. It is the responsibility of this Contractor for accurately laying out the work. Should it be found that any work is laid out so that interferences will occur, report that to the Architect before commencing work.
- I. No piping shall pass over high voltage (440V) electrical bus duct or switchgear equipment. Where required, provide protective pans under or over individual pipes and construct the pans of 16-gauge stainless steel with a 6 in. (150 mm) lip, the corners being welded to make the pans watertight. Give each pan three (3) coats of Rust-O-Leum paint and support with pipe hangers and drain clear of the equipment below.
- J. Route piping in an orderly manner parallel and perpendicular to walls maintaining gradient and headroom without interfering with use of space or taking more space than necessary. Whenever practical group piping at common elevations.
- K. Furnish and install sleeves for pipe passing through roofs, partitions, walls and floors. Piping penetrating roofs must maintain integrity of roof assembly.
- L. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- M. Do not install underground piping when bedding is wet or frozen.
- N. All piping shall be carefully sloped so as to eliminate traps and pockets.
- O. Piping exposed in all rooms shall be installed as nearly as possible parallel with or at right angles to the building walls. Install all pipe straight and true. Springing or forcing piping into place will not be permitted unless specifically called for. Install piping in such a manner as to prevent strain on equipment connections. Install piping in such a manner as to eliminate all static and dynamic conditions of loading on equipment connections.
- P. Piping in finished portions of the building, except in mechanical equipment rooms or where otherwise indicated on the Drawings, shall be concealed.
- Q. All piping shall be of the sizes indicated and shall be routed as indicated on the Drawings, or as required, to serve all equipment and systems.
- R. Fixtures shall be vented as indicated on the drawings and as required by local codes.
- S. In each change of direction of soil and waste piping, provide a clean-out plug connected to same with Y fittings and 45° ell made flush with floor or wall.
- T. In all horizontal straight runs more than 50 feet (15.25 m) of length, provide at least one clean-out for each 50 feet (15.25 m) of length.
- U. Where pipe is buried, cleanouts shall be brought up flush with floor or grade unless otherwise shown on the drawings. The locations of all clean-outs shall be verified with the Architect.

- V. All cleanouts shall be of the same size as the pipe up to and including pipe 4 inches in diameter. All clean out will be 4 inches in size for pipes larger than 4 inches.
- W. Provide access doors in general construction for clean-outs installed in concealed locations.
- X. All back vents shall be taken off as near traps as possible and permitted by code.
- Y. All drainage lines shall have at least the minimum slope toward the main sewer as required by the local plumbing code. Pipe must be so laid that the slope will be continuous. Permission shall be secured from the engineer before proceeding with any work where existing conditions prevent the installation at the minimum grade specified.
- Z. The sewage and drainage work shall be complete and ready for use including all reducers, increases, special flanges and fittings, where required between the piping work and fixtures.
- AA. All horizontal pipe throughout the building, including that in pipe spaces and attics, shall be thoroughly and substantially supported from the building construction by means of approved expansion ring hangers or clevis hangers at each joint. Hangers shall be spaced in accordance with Section 22 05 29 Hangers and Supports for Plumbing Piping and Equipment.
- BB.All pipe shall be straight and have uniform fall.
- CC.All vertical pipes shall be substantially supported at each floor level with approved steel or iron riser clamps.
- DD. Provide sway bracing for all sanitary house drain piping which is supported greater than 2 ft. (0.6 m) from the slab above, measured from the top of the pipe.
- EE. Provide additional rod and banding at each joint for all sanitary house drain offsets consisting of riser clamps and threaded rod to anchor all fittings in the horizontal offset. This method of anchoring and support shall be provided in addition to the sway bracing described in the paragraph above.
- FF. Bell and Spigot Piping
 - 1. Bell and spigot piping shall be joined with elastomeric compression gaskets as specified.
 - 2. Joints shall be cleaned free from dirt, mud, sand, gravel or foreign materials.
 - 3. The gasket shall be folded and inserted into the hub completely, with the flange of the gasket remaining outside of the hub.
 - 4. Lubricate the joint and compress the piping into the joint so the spigot end of the pipe bottoms out in the hub.
- GG. Hubless Cast Iron Piping

- 1. Hubless cast iron piping shall be joined with heavy duty no-hub couplings as specified.
- 2. Joints shall be cleaned free from dirt, mud, sand, gravel or foreign materials.
- 3. The gasket shall be installed on one end of the pipe or fitting and the stainless steel clamp and shield on the other end.
- 4. Firmly seat the pipe or fitting ends against the center stop of the gasket and slide the shield into position over the gasket.
- 5. The stainless steel bands shall be tightened using a calibrated torque wrench set to the manufacturer's recommended settings. Bands shall be in sequence according to the manufacturer's recommendations.

HH. Brazed Piping

- i. Filler metal shall conform with the requirements of the latest edition of ANSI/AWS A5.8 Specifications for Brazing Filler Metal with the following classifications: BCuP-2, BCuP-3, BCuP-4, BCuP-5, BAg-5 or BAg-7.
- ii. Flux shall be compatible with the materials brazed and with the filler metal used and shall conform to the requirements of the latest edition of ANSI/AWS A5.31 Specifications for fluxes for Brazing and Braze Welding. All flux residue must be removed after joint is completed.
- iii. Brazing shall be performed in accordance with the Copper Tube Handbook of the Copper Tube Development Association as well as the latest edition of ANSI/AWS B2.2 Standard for Brazing Procedure and Performance and ANSI/AWS C3.4 Specifications for Torch Brazing.
- iv. All joints shall be made by personnel meeting the requirements of ASME Boiler Pressure Vessel Code, Section IX.

II. Soldered Piping

- 1. Filler metal shall conform with the requirements of the latest edition of ASTM B 32 Specifications for Solder Metal.
- All joints, except for refrigerant piping, shall be made with 95% tin and 5% antimony solder, having a melting point of not less than 460°F (238°C). Refrigerant piping joints shall be made with silver solder.
- 3. All soldered joints shall be thoroughly cleaned before the application of the solder. Flux shall be compatible with the materials brazed and with the filler metal used and shall conform with the requirements of the latest edition of ASTM B 813 Specifications for Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Tube. All flux residue must be removed after joint is completed.

- 4. Soldered joints shall be assembled in accordance with the Copper Tube Handbook of the Copper Tube Development Association and ASTM B 828 Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
- 5. All soldered joints for tubing larger than 2 inches (50 mm) in size shall be made with the simultaneous application of two (2) or three (3) blow torches.

JJ. Welded Piping

- 1. All welded joints (except pipe welded end-to-end) shall be made by the use of flanges, caps, nozzles, elbows, branch outlets and tees. Cut samples shall be submitted for approval if directed. All such fittings, etc., shall be of a type which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends. "Weld-o-lets" may be used where standard fittings of required sizes are not available and elsewhere as approved. All job welding shall be done by the electric arc welding process in accordance with the following:
 - a) Joints shall be 45 degree mill beveled or machine beveled.
 - b) All scale and oxide shall be removed with hammer, chisel, file and/or grinding wheel. Bevel shall be left smooth and clean.
 - c) Pipe lengths must be lined up straight with abutting pipe ends concentric.
 - d) Both conductors from the welding machine shall be extended to locations at which welding work is being done. The leads from welding machine to location of welding work shall be held together in an approved manner and then taped so as to prevent induced current in structural steel, in piping or in other metals within the building. The ground lead shall be connected to length of pipe with suitable clamp in such manner that welding current will not flow through joints in pipe, structural steel of building or steel pipe supports.
 - e) Weld metal must be thoroughly fused with base metal at all sections and must exhibit complete penetration to weld root. Welds shall be of sound metal, free from laps, slag inclusion or other defects.
 - f) Welders shall be certified by the National Certified Pipe Welding Bureau of the Mechanical Contractors Association of America or by ASME Section 9. Welders shall possess and maintain current Procedure Qualification Records for the service for which they are employed and on which they work.
 - g) All welds shall bear the identifying number, letter or symbol of the welder or welding operator.

KK. Grooved Piping

- 1. All grooved end components shall be the product of one manufacturer.
- 2. The manufacturer shall provide on-site training for Contractor's field personnel by a factory trained representative in the proper use of grooving tools, application of groove, and product installation. In addition, the manufacturer's representative shall periodically visit the job site and inspect installation. Contractor shall remove and replace any improperly installed products.
- 3. Piping shall have rolled or cut grooved-ends as appropriate to pipe material, wall thickness, pressures, size and method of joining. Pipe ends shall be grooved in accordance with coupling manufacturer's current listed standards.
- 4. Mechanical couplings for grooved pipe couplings shall be of the rigid type as required for the installation, with plated nuts and bolts to secure housing sections together and a synthetic rubber flush seal gasket of the cavity pressure responsive design.
- 5. Grooved piping systems shall be installed in accordance with the requirements of the manufacturer's latest published literature.
- 6. Flexible type couplings shall be installed at final connections to equipment and/or in locations where vibration attenuation and stress relief are required as determined by the Engineer.
- Coupling housings shall be cast ductile iron conforming to ASTM A 536 (Grade 65-45-12), hot-dipped galvanized finished or Type 316 stainless steel conforming to ASTM A 351, A 743 or A 744.
- 8. Flange adapters shall be cast ductile iron, hot-dipped galvanized conforming to ASTM A 536 (Grade 65-45-12), or stainless steel constructed from corrosion resistant Grade CF8M (Type 316 equivalent). Flange adapters shall engage directly into roll grooved stainless steel pipe and fittings and bolt directly to ANSI Class 125 cast iron and Class 150 steel flange components.
- 9. Gaskets for mechanical couplings and flange adapters shall be molded flush seal type conforming to the outside diameter of the steel pipe. Synthetic rubber of elastomers having properties as indicated in ASTM D 2000 shall be used. Gasket selection shall comply with the coupling manufacturer's standards, installation and design requirements and shall be suitable for the intended service and temperature range.
- 10. Gaskets for water service from -30°F (-34°C) to 230°F (110°C) shall be Grade "E" EPDM.

11. Bolts for mechanical couplings shall be zinc plated (ASTM B 633) heat treated carbon steel track head conforming to physical properties of ASTM A 183, minimum tensile strength 110,000 psi (7,585 bar).

3.3 CLEANING

- A. During construction, properly cap all lines, so as to prevent the entrance of sand, dirt, etc. Each system of piping shall be blown through after completion for as long a time as required to thoroughly clean the apparatus.
- B. Before final adjustments are made and before operation of equipment, clean and remove all accumulation of dirt, chips or other deleterious material. Leave all sanitary piping and appurtenances in suitable condition, before final acceptance.
- C. Cover and protect all openings left in floor for passage of pipes. Protect pipes with suitable coverings as soon as set. Close all open ends of pipes with a plug fitting to prevent obstruction and damage.
- D. Protect the system against freezing in cold weather.
- E. After each hydrostatic leak testing procedure is complete, drain the system until empty. Liquid for hydrostatic testing of sanitary systems shall be clean domestic water from the municipal water supply.
- F. Protect polyvinyl chloride plumbing piping exposed to sunlight.

3.4 INSPECTION AND STARTUP SERVICE

- A. All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for by this Subcontractor, as necessary to obtain complete and final acceptance of the system as installed.
- B. The certificates of inspection shall be provided in quadruplicate and shall be delivered to the Architect for distribution.
- C. Inspect all piping, hangers, rod and support for piping and equipment for proper installation according to the manufacturer's instructions.
- D. Repair, or if required by the Architect replace, defective work with new work without extra charge to the Owner. Repeat tests as directed, until all work is proven satisfactory.
- E. Restore to its original condition any work damaged or disturbed by tests, engaging the original trades to do the work of restoration.
- F. Notify the Architect and Inspectors having jurisdiction at least 48 hours in advance of making the required tests, so that arrangements may be made for their presence to witness the tests.
- G. Test equipment in service and demonstrate that the equipment performs the work intended for it and that it complies with the requirements of these Specifications for such equipment.

3.5 FIELD QUALITY CONTROL

- A. Soldering and Brazing Quality Control
 - a. An independent testing agency shall observe the fitting up and making of soldered and brazed joints as prescribed in ASTM B 828 for soldered joints and in ANSI/AWS B2.2 and ANSI/AWS C3.4 for all brazed joints. The inspection and testing protocol requirements shall be as follows:
 - i. Both shop-made and field-made soldered and/or brazed joints in piping 1-1/2 in. and larger shall be subjected to random visual inspections during setup and at various stages of completion.
 - a. The first Twenty 20 in pipes smaller than 1-1/2 in. (38 mm), twenty (20) in pipes 2 in. (50 mm)_and larger, soldered and/or brazed joints made in the field shall be subjected to ultrasonic flaw testing.
 - b. Ten percent (10%) of the remaining soldered and/or brazed joints, on a random basis determined by the independent testing agency, shall also be subjected to either ultrasonic flaw testing.
 - c. Based on the results of the tests performed on each of the twenty (20) soldered and/or brazed joints, a determination of the extent of the subsequent testing beyond the minimum ten percent (10%) noted above shall be established by the Engineer.
 - b. Welding Quality Control
 - 1. An independent testing agency shall observe the fitting-up and making of welds as prescribed in ASME B31.1 and ASME B31.9. The inspection and testing protocol requirements shall be as follows:
 - a. Both shop-made welds and field-made welds shall be subjected to random visual inspections during setup and at various stages of completing the weld.
 - b. The first twenty (20) shop-made butt welds and field-made butt welds shall be subjected to ultrasonic flaw testing. In addition, the first twenty (20) shop-made and field-made fillet welds shall be subject to magnetic particle testing.
 - c. Ten percent (10%) of the remaining welds, on a random basis determined by the independent testing agency, shall also be subjected to either ultrasonic flaw testing or magnetic particle testing.

- d. Based on the results of the tests performed on each of the twenty (20) welds of each type, a determination of the extent of the subsequent testing beyond the minimum ten percent (10%) noted above shall be established by the Engineer.
- c. Grooved Piping Installation Certification: A factory inspector shall inspect the installation of all grooved piping products to ensure that the installation has been made in accordance with the manufacturer's installation instructions as follows:
 - 1. Inspector shall perform periodic observations of coupling installations in accordance with the latest revisions of the coupling manufacturer's installation instructions. The frequency of the observations shall be adjusted with the pace of the project to insure that no less than ten percent (10%) of the installation is observed at each stage of completion.
 - 2. The inspector shall have the authority to randomly select which fittings will be inspected. The Installing Contractor must provide access to all fittings.
 - 3. The inspector's observations shall be recorded and all deficiencies noted in the installation shall be tagged for remediation.
 - 4. At the conclusion of each day's observations the inspector shall issue a report of their findings referencing the specific systems examined and describing any deficiencies requiring corrective action to the Engineer of record and the Installing Contractor.
 - 5. Based on the results of the observation reports a determination of the extent of the subsequent testing beyond the minimum shall be established by the Engineer.
 - 6. Upon conclusion of the required inspections and confirmation that any and all deficiencies have been corrected the manufacturer shall provide a report to the Engineer and Installing Contractor certifying that the entire installation is in compliance with the manufacturer's requirements.
 - 7. All costs for additional testing above and beyond the protocol requirements listed above and all costs associated with repair, replacement, schedule impacts, etc., shall be borne by the Contractor.

3.6 FIELD TESTS

A. Performance Test

1. Allow sufficient time to perform all tests, adjustments, necessary to place the various systems in final operation condition, verify performance requirements and check all safety devices. Labor and instruments, required for various tests shall be provided. See that all manufacturers' representatives necessary to check and adjust various

systems are present with sufficient labor to perform all this work without delay. All test data shall be recorded on suitable forms and submitted to the Owner for approval.

- 2. A qualified representative of the equipment manufacturer shall be present at the test. The Engineer may witness tests, if he so desires. The Contractor shall notify the Engineer and Owner in writing, at least two (2) weeks prior to the day of the test.
 - 1. Test all systems before any paint is applied, piping is insulated, furred in or otherwise covered.
 - 2. Furnish and pay for all devices, materials, supplies, labor and power required in connection with tests. Make all tests in the presence and to the satisfaction of the Architect, Insurance Underwriters and City Inspectors having jurisdiction.
 - 3. Hubless Cast Iron and Bell and Spigot Cast Iron
 - a. Subject the drains, waste, and vent piping inside the building to a water test. The water test shall include the entire system from the lowest point to the highest pipe above the roof.
 - b. Water test shall be made in accordance with all local requirements.
 - c. The system shall be tested to a hydrostatic pressure equivalent to at least a 10 foot (3 m) head of water.
 - d. After filling, shut off water supply and allow it to stand two (2) hours, under test, during which time there shall be no loss or leakage.
 - 4. Drainage Piping with Mechanical or Welded Joints
 - e. Subject the drainage piping to a hydrostatic test, but in no case shall the system be tested at less than 150 psig (10.5 bar)_hydrostatic pressure where mechanical or welded joints are installed.
 - f. Apply the test for a minimum of two (2) consecutive hours with no loss in pressure.
 - g. Prior to applying the hydrostatic test, the system shall be tested with 50 psig (3.5 bar) compressed air for a period of ten minutes with no loss in pressure.
 - 5. Ejector Discharge Piping with Mechanical, Threaded or Welded Joints
 - h. Subject the ejector discharge piping to a hydrostatic test, but in no case shall the system be tested at less than 5 psig (0.35

bar) hydrostatic pressure greater than the pump shut-off rating.

- i. Apply the test for a minimum of fifteen (15) minutes with no loss in pressure.
- j. Prior to applying the hydrostatic test, the system shall be tested with 5 psig (0.35 bar) compressed air for a period of ten minutes with no loss in pressure.

B. Integrated Test

- 1. <u>Reserved.</u>
- C. Final Acceptance Test
 - 1. The Owner and/or the Owner's representatives will make final check of all systems only after the Contractor has completed and returned to the Owner or Owner's representatives all recorded test data, together with letter that his work is to the best of his knowledge 100% complete. Field performance tests will be required by the Owner and/or the Owner's representatives at this time to verify performance and workmanship, and to make final system component adjustments.
 - 1. Points and areas for recheck shall be selected by the Owner's representative.
 - 2. Measurements and tests shall be same as the original test procedures.
 - 3. After satisfactory passing of the field tests and after all necessary adjustments have been made, test the complete systems for a minimum of seven (7) days under regular operating conditions or as long as may be required to establish compliance with Contract Documents.
 - 4. The Contractor shall demonstrate to the Engineer and the Owner, prior to acceptance by the Owner, that all systems and/or equipment has been balanced and adjusted properly, and that the system and/or equipment is in compliance with the Contract Documents.
 - 5. Commissioning: Owner or Commissioning Agent shall witness all hydrostatic tests.

3.7 ADJUSTING AND BALANCING

- A. Upon completion of piping, hangers for piping and at equipment shall be adjusted to ensure that the loads are distributed evenly and that there are no loads imposed by the piping or the equipment that it is connected to.
- B. Securely tighten clevis hanger load nuts first to ensure proper hanger performance. Tighten top nut after adjustment.

END OF SECTION 221316

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL

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. Electrical equipment coordination and installation.
 - 2. Sleeves for raceways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common electrical installation requirements.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.
- 1.4 SUBMITTALS
 - A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 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. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM, NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wallmounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestopping system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 26 05 19-E

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions and Supplementary General Conditions of the work, and Division 01 Specification Sections wherever applicable to Mechanical and Electrical Work.
- B. Section 01 31 46 Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 26 05 00 General Provisions For Electrical Work shall apply

1.2 DESCRIPTION OF WORK

- A. The requirements of this Section apply to wire and cable work specified elsewhere in these Specifications.
- B. The work includes providing wire and cable complete with all accessories in accordance with Drawings and Specifications and as required for a complete system. Wiring size referenced in this Section shall be AWG, except as noted. For special wiring for individual systems refer to respective Sections of these Specifications.

1.3 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600V or less.
 - 2. Armored cable, Type AC, rated 600V or less. Health Care rated.
 - 3. Mineral-insulated cable, TypeMI, rated 600V or less.
 - 4. UL 2-hour listed fire-rated wiring systems, rated 600V and less.
 - 5. Connectors, splices, and terminations rated 600V and less.

1.4 DEFINITIONS

- A. RoHS: Restriction of Hazardous Substances.
- B. VFC(S): Variable-frequency controller.(System)
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. NBR: Acrylonitrile-butadiene rubber.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency or manufacturer's authorized service representative.
- B. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. "Manufacturers" Firms regularly engaged in the manufacture of wire and cable of specified types and ratings, whose products have been in satisfactory use in similar service for not less than 5 years. Refer to PART 4 of this Section for "APPROVED MANUFACTURERS".
- B. Provide wire and cable which has been listed and labeled by Underwriters' Laboratories, and comply with applicable portions of National Electrical Manufacturers Association Standards.
- C. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Person currently certified by NETA to supervise on-site testing. specified in Part 3.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The minimum insulation shall be UL rated for 90°C. Types THWN, USE, RH, RHW.
- B. Insulation-rated 90°C may be used in lieu of the above. Types FEP, MI, PFA, THHN, XHHW.
- C. Conductor ampacity rating shall be based on 75°C insulation.
- D. Wire Sizes
 - 1. For General Use:
 - 2. No. 12 minimum copper wire shall be used for lighting and power.
 - 3. No. 10 minimum copper wire shall be used for 15 Ampere circuits, at 120 Volts, over 90 ft. in length, and for 20 Ampere circuit, at 120 Volts, over 60 ft. in length.

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- 4. No. 10 minimum copper wire shall be used for 20 Ampere circuits, at 265 Volts, over 175 ft. in length.
- 5. Increase raceway sizes for larger wire sizes in conformance with NEC requirements.

2.2 COLOR CODING

1.

- A. Phase wires shall be color-coded as follows:
 - 120/208 Volt system:
 - a. Black- A phase
 - b. Red B phase
 - c. Blue C phase
 - 2. 277/480 Volt system:
 - a. Brown A phase
 - b. Orange B phase
 - Yellow C phase
 - 3. Neutral conductors shall be white for 120/208 Volts and white with gray stripe for 277/480 Volts.
 - 4. Equipment ground wire shall have a green outer covering throughout.
 - 5. Where color-coded cable is not available, certify in writing and request permission for overlap color taping conductors (minimum length 6 in.) in accessible locations.

2.3 COPPER BUILDING WIRE

c.

- A. Description: Flexible, insulated, and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Bare Conductor
 - 2. Belden Inc
 - 3. Okonite Company
 - 4. Service wire Co
 - 5. Southwire Company
- C. Standards:
 - 1. Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B496 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type TC-ER: Comply with NEMAWC 0/ICEA S-95-658 and UL 1277.
 - 2. Type THHN and Type THWN-2: Comply with UL 83.

Pomerantz Center Fire Pump Replacement January 18, 2024 3. Type XHHW-2: Comply with UL 44.

- F. Shield:
 - 1. Type TC-ER: Cable designed for use with VFCs, with oversized crosslinked polyethylene insulation, dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires, and sunlight- and oil-resistant outer PVC jacket.

2.4 ARMORED CABLE, TYPE AC

- A. Description: A factory assembly of insulated current-carrying conductors with or without an equipment grounding conductor in an overall metallic sheath. Health Care rated.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Bare Conductor
 - 2. Belden Inc
 - 3. Okonite Company
 - 4. Service wire Co
 - 5. Southwire Company
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Comply with UL4.
 - 4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Circuits:
 - 1. Single circuit and multicircuit with color-coded conductors.
 - 2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.
- E. Conductors:
 - 1. Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- F. Ground Conductor: Insulated.
- G. Conductor Insulation:
 - 1. Type TFN/THHN/THWN-2: Comply with UL 83.
 - 2. Type XHHW-2: Comply with UL 44.
- H. Conductor Insulation: Type THHN/THWN-2. Comply with UL 83.
- I. Armor Steel, interlocked.

2.5 MINERAL-INSULATED CABLE, TYPE MI

- A. Description: Solid copper conductors encased in compressed metal oxide with an outer metallic sheath, rated 600V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following: 1. KME America, Inc
 - 2. Pentair
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. UL 2196 for fire resistance.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors:
 - 1. Copper, complying with ASTM B3 for bare annealed copper.
- E. Insulation: Compressed magnesium oxide
- F. Sheath: Copper.

2.6 FIRE RATED WIRING CABLE

- A. Description: ANSI/NYCEC, Type MC cable with silicone insulation, overjacket and continuously corrugated welded copper sheath.
- B. Manufacturers: VITALink MC or approved equal cabling system listed in the UL Fire Resistance Directory.
 - 1. Conductor: solid high conductivity copper
 - 2. Insulation Voltage Rating: 600 volts
 - 3. Cable Temperature Rating: 90 degrees C
 - 4. Termination Temperature Rating: 90 degrees C
- C. Fire Rating: The complete cable system shall have a 2-hour fire rating as listed and classified by Underwriters Laboratories, Inc.
- D. Overjacket: an optional overjacket must be available
- E. Polymer Insulated cable, boxes and connectors shall be UL Listed/CSA Certified

2.7 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

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- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M Electrical Products
 - 2. AFC Cable systems
 - 3. Gardnes Bender
 - 4. Hubblee Power systems
 - 5. ILSCO
 - 6. O-Z/Gedney
 - 7. Service wire Co.
 - 8. TE Connectivity
 - 9. Thomas & Betts Corp.
- B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Aluminum
 - 2. Type: One hole with long barrels.
 - 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. VFC Output Circuits Cable: Extra-flexible stranded for all sizes.
- D. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
- 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
 - A. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
 - B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway,
 - 1. Type THHN/THWN-2, single conductors in raceway
 - 2. Mineral-insulated, metal-sheathed cable, Type MI
 - C. Life Safety and Critical branch Feeders:
 - 1. Mineral-insulated, metal-sheathed cable, Type MI
 - a. Feeder ampacity indicated on drawings is based on Fire Rated Cable as indicated below. Contractor to adjust feeder ampacity if MI cable is selected by contractor as

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feeder material and submit riser indicating any changes in feeder sizing to engineer for approval.

- 2. Fire Rated Wiring Cable.
- 3. Type THHN/THWN-2, single conductors in raceway encased in UL listed 2-hour rated assembly.
 - a. Conduits for feeders on drawings are indicated where the contractor elects to use UL listed 2-hour fire rated assembly. Contractor to provide engineering drawings for such an assembly and associated special inspections required by DOB or local AHJ.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspaces:
 - 1. Type THHN/THWN-2, single conductors in raceway
 - 2. Mineral-insulated, metal-sheathed cable, Type MI
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions:
 - 1. Type THHN/THWN-2, single conductors in raceway
 - 2. Armored cable, Type AC. Install only as permitted by code and facilities standards of installation.
 - 3. Mineral-insulated, metal-sheathed cable, Type MI
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway
- H. Branch Circuits Installed below Raised Flooring:
 - 1. Type THHN/THWN-2, single conductors in raceway
 - 2. Mineral-insulated, metal-sheathed cable, Type MI
- I. Branch Circuits in Cable Tray:
 - 1. Type THHN/THWN-2, single conductors in raceway
 - 2. Armored cable, Type AC. Install only as permitted by code and facilities standards of installation.
 - 3. Mineral-insulated, metal-sheathed cable, Type MI
- J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- K. VFC Output Circuits:
 - 1. Type XHHW-2 in metal conduit
 - 2. Type TC-ER cable with dual tape shield.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."
- G. Complete cable tray systems installation according to Section 26 05 36 "Cable Trays for Electrical Systems" prior to installing conductors and cables.
- H. Not more than 3 lighting or convenience receptacle circuits shall be installed in one (1) conduit, unless otherwise indicated on Drawings. Provide dedicated neutral for each branch circuit.
- I. Separate raceways shall be provided for conductors of 120/208 Volt and 277/480 Volt systems, except for 480 Volt motor branch circuit wiring and related 120 Volt control wiring which may be installed in common raceway.
- J. Type AC armored cable (BX) shall be installed in accordance with specific NEC requirements, Article 320. Supports and hangers shall be provided every four (4) feet of cable run. 4¹/₂ ft. unless cable is fished.
- K. Provide individual raceways for two pole circuits.
- L. In certain systems, equipment furnished by an approved manufacturer may require a different number and arrangement of conductors from those indicated on the Drawings. In such cases, the Contractor for the work under this Division shall comply with such requirements at no additional cost to the Owner.
- M. In the event the Contractor for the work under this Division or Section chooses to furnish and install a system or item of equipment of different arrangement from that shown or specified, he shall furnish and install any additional wiring and conduit required by the system at no additional cost to the Owner.
- N. In wireways and large pull boxes, lace and tie off conductors in groups of 3 phases and neutral (if used) to limit conductor unbalanced loading. The conductor group shall be as installed in conduit.
- O. Tag all feeders and risers in all pull boxes and in all gutter spaces through which they pass. Tags shall be engraved white core nameplates identifying feeders as shown on the Drawings or the circuit protective device from which they originate.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Splices and joints shall be insulated with materials approved for the particular use, location, voltage, and temperature. Insulation shall be not less than that of the conductors being joined.
- D. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements:
 - a. Distribution Switchboards, if separate from the Service equipment

- b. Fire Pumps
- c. Elevator Banks
- d. ATS(s)
- e. Life Safety Panels
- f. Fire Alarm Control and associated panels
- 3. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-Vdc for 300-V rated cable and 1000-Vdc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
- 4. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- 5. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- C. Cables will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.

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3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19

<u>SECTION 26 05 26-E</u> <u>GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS</u>

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions and Supplementary General Conditions of the work, and Division 01 Specification Sections wherever applicable to Mechanical and Electrical Work.
- B. Section 01 31 46 Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 26 05 00 General Provisions For Electrical Work shall apply

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.
 - 4. Equipotential grounding pads.

1.3 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all grounding in accordance with Drawings and Specifications and as required for a complete system.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Refer to Section 01 31 46 Special Requirements for Mechanical and Electrical Work and Section 26 05 00 General Provisions For Electrical Work and submit shop drawings. Shop drawings shall include manufacturer's catalog cuts of splice kits, ground rods and ground wire, etc.
- B. Submit Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:

- 1. Ground rods.
- 2. Counterpoise loops.
- 3. Equipment pad grounding.
- 4. Grounding arrangements and connections for separately derived systems.
- 5. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section "Operation and Maintenance Data," include the following:
 - a. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1) Counterpoise loops.
 - 2) Grounding arrangements and connections for separately derived systems.
 - 3) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 4) Include recommended testing intervals.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.
- B. "Manufacturers" Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 10 years. Refer to Approved Manufacturers in this Section.
- C. Provide equipment whose performance under specified conditions is certified by the manufacturer and comply with applicable publications of NFPA and UL.
- D. Grounding shall comply with National Electrical Code (NFPA 70)] for construction and installation.
- E. For patient care area electrical power systems, grounding shall conform to Article 517 of the NEC.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- 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. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ERICO International Corporation
 - 2. O-Z/Gedney
 - 3. Thomas and Betts Corporation
 - 4. Burndy
 - 5. Galvan Industries

2.3 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
 - 1. Grounding conductors shall be UL and NEC approved types, copper, with insulation color identified green, except where otherwise shown on the Drawings, or specified.
- B. Bare Copper Conductors:
 - 1. Use for bonding jumpers only
 - a. Solid Conductors: ASTM B 3.
 - b. Stranded Conductors: ASTM B 8.
 - c. Tinned Conductors: ASTM B 33.
 - 2. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 5. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 24 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Ground clamps shall be bronze, solderless type with bronze screws suitable for receiving required or specified conductors
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- E. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- F. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tinplated or silicon bronze bolts.
- G. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with socket set screw.
- J. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- K. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- L. Straps: Solid copper, copper lugs. Rated for 600 A.
- M. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- N. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with zinc-plated bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad 5/8 by 96 inches (16 by 2400 mm).

PART 3 - EXECUTION

3.1 INITIAL INSPECTION

A. Contractor shall examine locations where grounding is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected

3.2 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches (600 mm) below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits as a secondary path to ground.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.

- 2. Lighting circuits.
- 3. Receptacle circuits.
- 4. Single-phase motor and appliance branch circuits.
- 5. Three-phase motor and appliance branch circuits.
- 6. Flexible raceway runs.
- 7. Armored and metal-clad cable runs.
- 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- 9. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.4 INSTALLATION

- A. The complete electrical installation shall be permanently and effectively grounded ahead (street side) of the cold-water meter in accordance with all code requirements, whether or not such connections are specifically shown or specified. Measured resistance to ground shall be 5 ohms, maximum.
- B. Parts of the electrical installation to be grounded shall include, but not be limited to, the following: raceway system for normal and emergency light and power distribution systems, switchgear housings, cabinets, housings and neutrals of transformers, motor frames, housings of ALL communications, alarm, and control panels and associated devices and conduits, lighting fixtures, lightning protection system, busway enclosures, motor control centers, individual starters, convenience power receptacles, wall lighting switches, and other non-current carrying metal parts of electrical equipment. The interconnecting of the service ground, system neutral, and equipment ground conductors shall be made within the service equipment assembly. For specific and additional requirements of the details of the installation see paragraphs below. After installation, the copper bars shall be painted with one coat of an approved lacquer.
 - 1. Ground interrupted metallic raceways with ground conductors connected to metallic raceway at each end.
 - 2. Ground outdoor electrical equipment to driven ground rods.
 - 3. Separately ground center taps of wye connected transformers. Provide bonding connection to the nearest metallic water piping in accordance with National Electrical Code (NFPA 70).
 - 4. For hospitals and Health Care Facilities, provide all grounding in accordance with Article 517 of National Electrical Code (NFPA 70) and as further described in other Sections of these Specifications.
 - 5. Where rock prevents the driving of vertical ground rods, install grounding electrodes in horizontal trenches to achieve the specified resistance or use sectional ground rods to extend the ground conductance.

- 6. Connect lightning arrestor grounds to the equipment ground bus, or ground rods as applicable.
- C. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- D. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.
 - 1. Steel columns may be used in lieu of ground rods provided the columns are extended minimum 10' below grade and their concrete encasement has direct contact with earth.
- E. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 - 2. Use exothermic welds for all below-grade connections.
 - 3. Where required to obtain the specified ground resistance, install multiple rods.
 - 4. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- F. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.
- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.
 - 1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
 - 2. Bury ground ring not less than 24 inches (600 mm) from building's foundation.

- J. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG.
 - 1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.
 - 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.
- K. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 - 5. Manhole Grounds: 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions and Supplementary General Conditions of the work, and Division 01 Specification Sections wherever applicable to Mechanical and Electrical Work.
- B. Section 01 31 46 Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 26 05 00 General Provisions For Electrical Work shall apply

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.

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 the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.

- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for electrical hangers and support systems.
 - 1. Hangers. Include product data for components.
 - 2. Slotted support systems.
 - 3. Equipment supports.
 - 4. 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.
 - 5. Include design calculations for seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Ductwork, piping, fittings, and supports.
 - 3. Structural members to which hangers and supports will be attached.
 - 4. Size and location of initial access modules for acoustical tile.
 - 5. Items penetrating finished ceiling, including the following:
 - a. Luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Projectors.
- B. Seismic Qualification Data: Certificates, for hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Welding certificates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Engage a qualified professional engineer, as defined in "Quality Requirements," to design hanger and support system.

- 1. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Conduit Supports for specific requirements see slotted support systems specified elsewhere in this section.
 - 1. Individual conduit hangers, shall be designed for the purpose, have pre-assembled closure bolt and nut, and provisions for receiving hanger rod.
 - 2. Multiple conduit (trapeze) hangers shall be not less than 12" by 12", 12 gauge steel, cold formed, lipped channels. Hanger rods shall be not less than d" diameter steel.
 - 3. Solid masonry and concrete anchors shall be a type approved for the purpose.
- B. Fasteners:
 - 1. Furnish all fasteners and hardware compatible with the materials and methods required for attachment of supporting devices.
 - a. Slotted-Type Concrete Inserts: Galvanized pressured steel plate complying with ASTM A 283; box-typed welded construction with slot designed to receive steel nut and with knockout cover; hot-dipped galvanized in compliance with ASTM A 386.
 - b. Masonry Anchorage Devices: Expansion shields complying with Federal Specification FF-S-325, as follows:
 - 1) Furnish lead expansion shields for machine screws and bolts 3" and smaller; head-out embedded nut type, single unit class, Group I, Type 1, Class 1.
 - 2) Furnish lead expansion shields for machine screws and bolts larger than 3" in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.
 - 3) Furnish bolt anchor expansion shields for lag bolts, zinc alloy, long-shield anchors class, Group II, Type 1, Class 1.
 - 4) Furnish bolt anchor expansion shields for bolts, closed-end bottom bearing class, Group II, Type 2, Class I.
 - c. Toggle Bolts:
 - 1) Tumble-wing type, complying with Federal Specification FF-B-588, type, class and style as required.
 - d. Nuts, Bolts, Screws, Washers:
 - 1) General: Furnish zinc-coated fasteners, with galvanized complying with ASTM A 153 for exterior use or where built into exterior walls. Furnish fasteners for the type, grade and class required for the particular installation.
 - Standard Nuts and Bolts: Regular hexagon head type, complying with ASTM A 307, Grade A.
 - 3) Lag Bolts: Square head type, complying with Federal Specification FF-B-561.

- 4) Machine Screws: Cadmium plated steel, complying with Federal Specification FF-S-92.
- 5) Wood Screws: Flat head carbon steel, complying with Federal Specification FF-W-92.
- 6) Plain Washers: Round, general assembly grade carbon steel, complying with Federal Specification FF-W-92.
- 7) Lock Washers: Helical spring type carbon steel, complying with Federal Specification FF-W-84.
- C. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel
 - 4. Channel Width: 13/16 inches (20.64 mm)
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc

- 2) ITW Ramset/Red Head
- 3) MKT Fastening, LLC
- 4) Simpson Strong-Tie Co.
- 2. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless] steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line
 - 2) Hilti, Inc
 - 3) ITW Ramset/Red Head
 - 4) MKT Fastening, LLC
- 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
- 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
- 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
- 6. Toggle Bolts: Stainless-steel springhead type.
- 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

- 3.1 APPLICATION
 - A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 105.
 - B. Comply with requirements in Section 07 84 00 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
 - C. Comply with requirements for raceways and boxes specified in Section 26 05 33 "Raceways and Boxes for Electrical Systems."
 - D. EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
 - E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- 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 (90 kg).
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa], 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in "Cast-in-Place Concrete" and "Miscellaneous Cast-in-Place Concrete" portions of the specifications
- C. Anchor equipment to concrete base as follows:
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as 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 minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

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 conduits, tubing, and fittings.
 - 2. Nonmetal conduits, tubing, and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Surface raceways.
 - 5. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel, threaded conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.

- 2. HVAC, fire protection and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Certificates: For enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.
- C. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or comparable products approved equal:
 - 1. Allied Tube & Conduit.
 - 2. O-Z/Gedney.
 - 3. Thomas & Betts Corporation.
 - 4. Western Tube and Conduit Corporation.
 - 5. Wheatland Tube Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70 and New York City Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit and IMC.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- F. EMT: Comply with ANSI C80.3 and UL 797.
- G. FMC: Comply with UL 1; zinc-coated steel.
- H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

- I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew.
 - 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70 and New York City Electrical Code, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or comparable products approved equal:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.
 - 3. Condux International, Inc.
 - 4. Lamson & Sessions; Carlon Electrical Products.
 - 5. RACO; Hubbell.
 - 6. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70 and New York City Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. ENT: Comply with NEMA TC 13 and UL 1653.
- D. LFNC: Comply with UL 1660.
- E. RTRC: Comply with UL 1684A and NEMA TC 14.
- F. Fittings for ENT: Comply with NEMA TC 3; match to conduit or tubing type and material.
- G. Fittings for LFNC: Comply with UL 514B.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or comparable products approved equal:

- 1. Cooper B-Line, Inc.
- 2. Hoffman.
- 3. Mono-Systems, Inc.
- 4. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 and Type 3R, unless otherwise indicated, and sized according to NFPA 70 and New York City Electrical Code.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70 and New York City Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Flanged-and-gasketed type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or comparable products approved equal:
 - 1. Cooper Technologies Company; Cooper Crouse-Hinds.
 - 2. Hoffman.
 - 3. Milbank Manufacturing Co.
 - 4. O-Z/Gedney.
 - 5. Thomas & Betts Corporation.
 - 6. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular or as required by field conditions, subject to engineer's approval.

- 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70 and New York City Electrical Code, by a qualified testing agency, and marked for intended location and application.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- G. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb (32 kg).
 - 1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70 and New York City Electrical Code, by a qualified testing agency, and marked for intended location and application.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: As required by field conditions, subject to engineer's approval.
- K. Gangable boxes are allowed.
- L. Cabinets:
 - 1. NEMA 250, Type 1 and Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC; except where IMC or GRC, PVC coated is specified in the Contract Drawings.
 - 2. Concealed Conduit, Aboveground: IMC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R].
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:

- 1. Exposed, Not Subject to Physical Damage: EMT.
- 2. Exposed, Not Subject to Severe Physical Damage: EMT.
- 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Mechanical rooms.
- 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
- 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- 6. Damp or Wet Locations: GRC.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use setscrew cast-metal fittings except below design flood elevation (DFE). Comply with NEMA FB 2.10.
 - 4. EMT below design flood elevation (DFE): Rainproof compression connectors. Comply with NEMA FB 2.10.
 - 5. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 and New York City Electrical Code limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Comply with New York City Code.
- C. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.
- E. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- H. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- J. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to GRC or IMC before rising above floor.
- K. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or flexr raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end

of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

- R. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch (50-mm) radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and New York City Electrical Code and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70 and New York City Electrical Code.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70 and New York City Electrical Code.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC in damp or wet locations not subject to severe physical damage.
- W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- X. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Z. Locate boxes so that cover or plate will not span different building finishes.

- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.
- DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.5 **PROTECTION**

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260544

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

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. Sleeve-seal systems.
 - 2. Sleeve-seal fittings.
 - 3. Grout.
 - 4. Silicone sealants.
- B. Related Requirements:
 - 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fireresistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- B. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- C. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 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. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDMrubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel.
 - 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-firerated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.4 SILICONE SEALANTS

- A. Silicone Sealants: 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 that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they 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, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels. Refer to the drawings for equipment identifications for electrical equipment.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with New York City Electrical Code.
- D. Comply with New York City Building Code.

IDENTIFICATION FOR ELECTRICAL SYSTEM

- E. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- F. Comply with ANSI Z535.4 for safety signs and labels.
- G. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

- A. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- B. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

- B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.
- C. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve with diameter sized to suit diameter of conductor it identifies and to stay in place by gripping action.
- D. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.5 FLOOR MARKING TAPE

A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.

2.6 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Metal-Backed, Butyrate Warning Signs:
 - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
 - 2. 1/4-inch (6.4-mm) grommets in corners for mounting.
 - 3. Nominal size, 10 by 14 inches (250 by 360 mm).

IDENTIFICATION FOR ELECTRICAL SYSTEM

- C. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER ELECTRICAL SHOCK HAZARD EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING OSHA REGULATION AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
 - 3. Electrical room: "WARNING, ELECTRICAL EQUIPEMNT, NO STORGAE PERMITTED".

2.7 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
 - 1. Engraved legend with white letters on black face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

2.8 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.
- C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
- D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
- E. Stenciled Legend: In nonfading, waterproof, paint. Minimum letter height shall be 1 inch (25 mm.

2.9 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - 5. Color: Black.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- F. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- G. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl tape applied in bands. Install labels at 30-foot (10-m) maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 1. Power.
- C. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
 - 1. Limit use of underground-line warning tape to direct-buried cables.
 - 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless

otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

- G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metalbacked, butyrate warning signs.
 - 1. Comply with 29 CFR 1910.145.
 - 2. Identify system voltage with black letters on an orange background.
 - 3. Apply to exterior of door, cover, or other access.
 - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- H. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Switchboards.
 - d. Enclosed switches.
 - e. Enclosed circuit breakers.
 - f. Enclosed controllers.
 - g. Variable-speed controllers.

- h. Contactors.
- i. Remote-controlled switches, dimmer modules, and control devices.
- j. Monitoring and control equipment.

END OF SECTION 260553

SECTION 260572

OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

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 a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Short-circuit study input data, including completed computer program input data sheets.
 - 2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of

sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Field Adjusting Agency.
- B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Short-Circuit Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

- A. Software Developers:
 - 1. Eaton CYME International
 - 2. ESA Inc.
 - 3. Operation Technology, Inc.
 - 4. Power Analytics, Corporation
 - 5. SKM Systems Analysis, Inc

- B. Comply with IEEE 399 and IEEE 551.
- C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-currentcharacteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

- A. Executive summary.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
- D. Comments and recommendations for system improvements, where needed.
- E. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to short-circuit ratings.
 - 2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
 - 3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 - 4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
 - 5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 - a. Contractor is responsible to coordinate levels of over-current protection as per **electrical** code requirements and to size interrupting rating of boards, panels and over-current devices as per the study results at no additional cost to owner.
- F. Short-Circuit Study Input Data: As described in "Power System Data" Article.
- G. Short-Circuit Study Output:
 - 1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.

- b. Calculated fault-current magnitude and angle.
- c. Fault-point X/R ratio.
- d. Equivalent impedance.
- 2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Calculated asymmetrical fault currents:
 - 1) Based on fault-point X/R ratio.
 - 2) Based on calculated symmetrical value multiplied by 1.6.
 - 3) Based on calculated symmetrical value multiplied by 2.7.
- 3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Obtain all data necessary for the conduct of the study.
 - 1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Engineer.
 - 2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 - 3. For relocated equipment and that which is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.
- B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

- 1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
- 2. Obtain electrical power utility impedance at the service.
- 3. Power sources and ties.
- 4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
- 5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
- 6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
- 7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
- 8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
- 9. Motor horsepower and NEMA MG 1 code letter designation.
- 10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.2 SHORT-CIRCUIT STUDY

- A. Perform study following the general study procedures contained in IEEE 399.
- B. Calculate short-circuit currents according to IEEE 551.
- C. Base study on the device characteristics supplied by device manufacturer.
- D. The extent of the electrical power system to be studied is the complete electrical distribution system unless otherwise indicated on Drawings.
- E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 75 kVA and having impedance of 4.5% or greater.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

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- H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:
 - 1. Electric utility's supply termination point.
 - 2. Incoming switchgear and service switches.
 - 3. Unit substation primary and secondary terminals.
 - 4. Low-voltage switchgear.
 - 5. Motor-control centers.
 - 6. Control panels.
 - 7. Standby generators and automatic transfer switches.
 - 8. Distribution panelboards.
 - 9. Branch circuit panelboards.
 - 10. Switchboards
 - 11. Disconnect switches.
 - 12. All overcurrent protection of systems rated 1000 volts or greater.

3.3 ADJUSTING

A. Make minor modifications to equipment as required to accomplish compliance with short-circuit study.

END OF SECTION 260572

SECTION 262413

SWITCHBOARDS

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. Service and distribution switchboards rated 600 V and less.
 - 2. Disconnecting and overcurrent protective devices.
 - 3. Identification.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of switchboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
- B. Shop Drawings: For each switchboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
 - 5. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.
 - 6. Include schematic and wiring diagrams for power wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Field Quality-Control Reports:

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- 1. Test procedures used.
- 2. Test results that comply with requirements.
- 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals. In addition, include the following:
 - 1. Routine maintenance requirements for switchboards and all installed components.
 - 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 3. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards; include selectable ranges for each type of overcurrent protective device.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.
- B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. 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.
- E. Comply with NEMA PB 2.
- F. Comply with NFPA 70.
- G. Comply with New York City Electrical Code.
- H. Comply with UL 891.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.
- B. Handle and prepare switchboards for installation according to NECA 400 and NEMA PB 2.1 whichever is more stringent.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).
- B. Service Conditions: NEMA PB 2, usual service conditions, as follows:
 - 1. Ambient temperatures within limits specified.
 - 2. Altitude not exceeding 6600 feet (2000 m).
- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Construction Manager and Owner no fewer than 7 business days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Construction Manager's and Owner's written permission.
 - 4. Comply with NFPA 70E.

1.9 COORDINATION

- A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

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1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or compatible products approved equal:
 - 1. All City Switchboard Corp.
 - 2. Atlas Switch Co.
 - 3. Electrotech Inc.
 - 4. Eaton Electrical Inc.; Cutler-Hammer Business Unit
 - 5. General Electric
 - 6. Schneider Electric
 - 7. Siemens Energy & Automation, Inc.
- B. Front- and Rear-Accessible Switchboards:
 - 1. Main Devices: Fixed, individually mounted.
 - 2. Branch Devices: Panel and fixed, individually mounted.
 - 3. Sections front and rear aligned.
- C. Nominal System Voltage: 208Y/120 V, unless otherwise indicated.
- D. Main-Bus Continuous: As indicated on drawings.
- E. Indoor Enclosures: Steel, NEMA 250, Type 1.
- F. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
- G. Insulation and isolation for main and vertical buses of feeder sections.
- H. Hinged Front Panels: Allow access to circuit breaker, accessory, and blank compartments.
- I. Pull Box on Top of Switchboard:
 - 1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
 - 2. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
 - 3. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
 - 4. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.

- J. Buses and Connections: Three phase, four wire unless otherwise indicated.
 - 1. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity, silverplated.
 - 2. Ground Bus: 1/4-by-2-inch- (6-by-50-mm-) hard-drawn copper of 98 percent conductivity, equipped with compression connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
 - 3. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
 - 4. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with compression connectors for outgoing circuit neutral cables. Brace bus

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- B. Fuses are specified in Section 262813 "Fuses."

2.3 IDENTIFICATION

A. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store switchboards according to NECA 400 and NEMA PB 2.1, whichever is more stringent.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install switchboards and accessories according to NECA 400 and NEMA PB 2.1, whichever is more stringent.

- B. Equipment Mounting: Install switchboards on concrete base, 4-inch (100-mm) nominal thickness, unless otherwise noted.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to switchboards.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- D. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
- E. Install filler plates in unused spaces of panel-mounted sections.
- F. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.
- G. Provide & install spare-fuse cabinet.
- H. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- C. Device Nameplates: Label each disconnecting and overcurrent protective device and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Contractor shall field inspect components, assemblies, and equipment installations, including connections.

- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front and rear panels so joints and connections are accessible to portable scanner.
 - b. Instruments and Equipment:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- D. Switchboard will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

3.6 **PROTECTION**

A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories.

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END OF SECTION 262413

SECTION 262813

FUSES

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. Cartridge fuses rated 600-V ac and less for use in, control circuits, pullout, enclosed switches, panelboards, switchboards, etc.
 - 2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include material, dimensions, descriptions of individual components, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 2. Current-limitation curves for fuses with current-limiting characteristics.
 - 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.
 - 4. Coordination charts and tables and related data.

1.4 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. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than 3 of each size and type.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

- 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.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Comply with UL 248-11 for plug fuses.

1.6 **PROJECT CONDITIONS**

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.7 COORDINATION

A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or compatible products approved equal:
 - 1. Cooper Bussmann, Inc.
 - 2. Edison Fuse, Inc.
 - 3. Mersen, USA (Ferraz Shawmut, Inc.)
 - 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

2.3 PLUG FUSES

A. Characteristics: UL 248-11, nonrenewable plug fuses; 125-V ac.

2.4 PLUG-FUSE ADAPTERS

A. Characteristics: Adapters for using Type S, rejection-base plug fuses in Edison-base fuseholders or sockets; ampere ratings matching fuse ratings; irremovable once installed.

2.5 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Service Entrance: Class L, fast acting Class L, time delay, Class RK1, fast acting Class RK1, time delay Class J, fast acting Class J, time delay.
 - 2. Feeders: Class L, fast acting Class L, time delay Class RK1, fast acting Class RK1, time delay Class RK5, fast acting Class RK5, time delay Class J, fast acting Class J, time delay.
 - 3. Motor Branch Circuits: Class RK1 Class RK5, time delay.
 - 4. Other Branch Circuits: Class RK1, time delay Class RK5, time delay Class J, fast acting Class J, time delay.
 - 5. Control Circuits: Class CC, time delay.
 - 6. Or as indicated on drawings.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable from the front of the equipment, or with partially opened cabinet door, without removing fuse.
- B. Furnish & install spare-fuse cabinet(s). Provide at least one spare fuse cabinet in main electric service room, and at least one additional cabinet in each elevator machine room; and additional cabinets as indicated on drawings.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

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. Fusible switches.
 - 2. Molded-case circuit breakers (MCCBs).
 - 3. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with maximum dimensions.
- 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 NFPA 70.
- E. Comply with New York City Electrical Code.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 - 2. Altitude: Not exceeding 6600 feet (2010 m).
- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Construction Manager and Owner no fewer than 14 business days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Construction Manager's and Owner's written permission.
 - 4. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or compatible product approved equal:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 5. Lugs: Mechanical type, suitable for number, size, and conductor material.
 - 6. Service-Rated Switches: Labeled for use as service equipment.
 - 7. Accessory Control Power Voltage: Remote mounted and powered; 120-V ac/208-V ac.

2.2 MOLDED-CASE CIRCUIT BREAKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or compatible product approved equal:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

- D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads.

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with 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. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

3.4 FIELD QUALITY CONTROL

- A. Contractor shall field inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573 "Overcurrent Protective Device Coordination Study.

END OF SECTION 262816

SECTION 283113

FIRE ALARM AND SMOKE DETECTION SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions and Supplementary General Conditions of the work, wherever applicable to Mechanical and Electrical Work.
- B. Section 01 31 46 Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 26 05 00 General Provisions for Electrical Work shall apply.
- D. Drawings are diagrammatic and are a graphic representation of contract requirements to best available standards at the scale required.
- 1.02 DESCRIPTION OF WORK
 - A. This project is an upgrade of a fire pump and the installation of associated fire alarm modules to monitor tamper and water flow switches for the associated sprinkler system. All new points shall report to the existing FireWorks PC graphics computer. As part of this project, all programming of the existing system and/or graphics workstations shall be included as part of this contract.
 - B. This specification intends to describe a Protected Premises integrated "Class E" Fire Detection and Evacuation system. It shall provide evacuation alarm tone signaling using sounding devices to sound the alarm evacuation and/or alert signals, and strobe lights as visual notification devices, with two way firefighters communications capabilities and firemen's HVAC override control panel. The system shall be intelligent device addressable, analog detecting, low voltage and modular, with digital communication techniques, in full compliance with all applicable codes and standards. Generic terms such as "sub system", "the system", "a system", "the fire alarm system", etc. shall be deemed to apply to the complete intelligent analog addressable fire alarm system, unless specifically noted elsewhere.
 - C. The features and capacities described in this specification are a requirement for this project and shall be furnished by the successful Contractor. The system as described shall be installed, programmed, tested, and delivered to the Owner in fully operational condition. The system shall include all required hardware, software, raceways and interconnecting wiring to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein. The system shall consist of, but not be limited to, the following:
 - 1. Sprinkler supervisory switches and tamper switch supervision.
 - 2. ALL NYC Fire Alarm peripherals (listed as such but as required by the FDNY to meet the 2008 NYC code), placards, riser diagram, necessary switches, LED's, and FDNY approved locks shall be included in the system price.
 - D. Non-addressable alarm initiating, supervisory and status monitored devices shall be integrated into the fire alarm system, as applicable, via the addressable interface module:

- 1. Sprinkler water flow alarm (alarm initiating)
- 2. Sprinkler standpipe water flow (alarm initiating)
- 3. Sprinkler valve tamper switch (supervisory)
- E. Devices to be controlled by the FCS and/or RSP's panel programmable relays, remote system programmable addressable relays and/or intelligent addressable interface module relays:
 - 1. Connections to the appropriate Central Monitoring Point or as directed by the Owner for sprinkler alarm, supervisory and system trouble conditions.

1.03 RELATED DOCUMENTS / WORK AND EXISTING CONDITIONS

A. RELATED DOCUMENTS

- 1. Prior to the commencement of work, the Contractor shall obtain all permits necessary for installation of the work. All permit costs and inspections fees shall be included as part of the required work.
- 2. Local requirements shall be adhered to with regard to submitting specifications, wiring diagrams, shop drawings and plans. Responsibility for furnishing the quantities of copies on cloth and/or paper, as directed by such requirements, shall be included as part of the work of this Section.
- 3. Prior to commencement and after completion of work, the Contractor shall notify all authorities having jurisdiction.
- 4. The Contractor shall submit a letter of approval of the installation, from the local code authority, before requesting final acceptance of the system.

B. RELATED WORK

- 1. The Contractor shall coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the fire alarm system shall include, but not be limited to:
- 2. Sprinkler water flow alarm and valve tamper switches are existing. They shall be wired and connected to the fire alarm system by the Contractor.
- 3. Coordinate and furnish labor and assistance of other trades for the mounting of and/or interfacing with any and all other fire alarm system related devices.

1.04 REFERENCES - APPLICABLE LISTINGS, CODES, STANDARDS, DOCUMENTS

A. STANDARDS AND CODES

- 1. All equipment shall be installed and complied with the current adopted provisions of the following codes and standards.
- 2. All equipment shall be U.L. listed for its intended use, as a minimum, the following standards shall apply:
 - a. U.L. 346 Waterflow Indicators for Fire Protective Signaling Systems.
 - b. U.L. 864 Control Units for Fire Protective Signaling Systems.
 - c. U.L. 1481 Power Supplies for Fire Protective Signaling Systems.
- 3. National Fire Protection Association Standards.
 - a. NFPA No. 13 2002 Edition Sprinkler Alarm and Supervision.
 - b. New York City Electrical Code.
 - c. NFPA No. 72 2002 Edition National Fire Alarm Code.
 - d. NFPA No. 72, 4-5 Remote Supervising Station Fire Alarm Systems (If Required)
 - e. NFPA No. 72, 4-7 Auxiliary Fire Alarm Systems.
 - f. NFPA No. 101 2000 Edition Life Safety Code

- 4. All raceways and wiring shall be installed in compliance with NFPA Standard 70 (New York City Electrical Code Article 760). Codes shall be implicitly followed, in particular with regard to material type and quality, circuitry extensions from and connections to outlet and junction boxes, panel boards and similar appurtenances.
- 5. The fire alarm system and its installation shall comply with all applicable requirements of The Americans With Disabilities Act.
- 6. The fire alarm system and its installation shall comply with all other local codes and authorities having jurisdiction, including but not limited to, owner's engineering design guidelines.

1.05 DEFINITIONS

- A. <u>Initiating Device</u>: A system component that originates transmission of a change of state condition, such as a smoke detector, manual fire alarm box, supervisory switch, etc.
- B. <u>Initiating Device Circuit</u>: A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated. Typically known as a "Zone" for conventionally wired systems or circuits.
- C. <u>Notification Appliance</u>: A fire alarm system component such as a bell, horn, speaker, strobe, printer, etc., that provides an audible or visual output or both.
- D. <u>Notification Appliance Circuit</u>: A circuit or path directly connected to a notification appliance.
- E. <u>Signaling Line Circuit</u>: A circuit or path between any combination of circuit interfaces, control units, or transmitters over which multiple system input or output signals or both are carried. (When used with addressable analog initiating devices, these SLC circuits are also known as "Addressable Loops")
- F. Note: Both Signaling Line Circuits and Initiating Line Circuits operate initiating devices, however, they provide different communication capabilities. Code requirements differ greatly for performance and capacities. Refer to NFPA 72, Tables 3-5.1 & 3-6.1.

1.06 SYSTEM DESCRIPTION

- A. The system shall operate as an integrated multiplexed protected premises fire alarm/emergency communication monitoring and control system.
 - 1. Changes in the status of monitored points shall be detected by the microprocessor based fire command station utilizing distributed processing, peer-to-peer networking with remote system panel's located throughout the facility if required.
 - 2. Sensor "dirty" and "excessively dirty" trouble conditions shall report automatically.
 - 3. Devices shall be listed by U.L. for sensitivity testing by means of the portable programmer/tester or by readout from the control panel. Each addressable device address shall be set electronically, devices requiring dip switch settings, rotary switch settings, staples or jumper settings are not acceptable.
 - 4. As a minimum, RSP's shall consist of an enclosure, power supply, digital communications circuitry, mother boards, batteries and hardware, modules, audio hardware, and circuitry described for inclusion in the fire alarm control panel as required to function as specified. System control panels shall function in stand alone fail safe mode upon loss of the FCS processing, communications or communications wiring.

- 5. System individually identifies each addressable initiating device and other addressable monitor functions using multiplexing interfacing techniques.
- 6. System is capable of individually operating each alarm indicating appliance, and other control functions, using multiplexing techniques.
- B. Life safety alarm function programs shall perform automatically upon system alarm actuation. In addition, control points may be operated manually at any time by the attendant through appropriate keyboard commands.

1.07 QUALITY ASSURANCE

- A. It is the intent of these Specifications to provide a complete fire alarm system that complies in all respects with the requirements of all applicable codes and standards. Equipment, materials, software, installation practices, etc. that do not meet these requirements or do not meet the performance standards herein specified shall not be acceptable.
- B. Fire alarm system equipment furnished under this Specification shall be UL listed, under the appropriate category, as a product of a single manufacture. All central control equipment shall be listed under UL category UOJZ as a single control unit. The manufacture shall have been engaged in the production of this type of equipment for at least ten (10) years.
- C. The equipment furnished under this Specification shall be that of the specified manufacturer. Before commencing work the Contractor shall submit data showing that the manufacturer has successfully installed fire alarm systems of the same scope, type and design as specified. The Contractor shall also include the names and locations of at least three installations where such systems have performed satisfactorily for the preceding 18 months.
 - 1. The Contractor shall submit three copies of all required Licenses and Bonds as required in the State or Province having jurisdiction.
 - 2. The installing Contractor shall employ on staff a minimum of one NICET level 2 technician or a professional Engineer, registered in the State of the installation.
 - 3. The installing Contractor shall be qualified by Underwriter's Laboratories certifying the complete system meets UL upon completion of the installation. Ongoing maintenance and testing shall be provided to the Owner under a maintenance contract to maintain the certification.
 - 4. Installation contractors unable to comply with the provisions of 1.06 shall present proof of engaging the services of a subcontractor qualified to furnish the required services.
- D. Provide the services of a representative or technician from the manufacturer of the system. The representative or technician is to be certified and experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State, if required by law. The fire alarm Contractor shall supervise installation, software programming, software documentation, adjustments, preliminary testing, final testing and certification of the system. The fire alarm Contractor shall also be required to provide operational instruction to the Owner's personnel. Instruction shall include system operation, maintenance, programming and arm/disarm procedures.
- E. Acceptance of substitutions: Substitutions will not be permitted.
- F. Should conflicts arise between project drawings and/or these Specifications, regarding design, quantities of devices or circuits, the higher quantity or cost shall be considered as correct, unless directed by the Engineer to provide other appropriate measures.

- G. It is the Contractor's responsibility to submit acceptable equipment for review by the Engineer. The Contractor shall bear all liability for damages arising from his failure to submit equipment that meets these Specifications, including, but not limited to, any penalties for failure to meet construction deadline.
- H. Final determination of compliance with these Specifications shall rest with the Engineers, who, at their discretion, may require proof of performance at the cost of the Contractor. Required proof may include, but shall not be limited to, expense paid visits by representatives of the Owner and Engineer to sites where identical equipment is installed and providing beneficial use.

1.08 SUBMITTALS

- A. Prior to the start of work, the Contractor shall provide a complete and comprehensive submittal for review by the Engineer. These are to describe the proposed system and its equipment. Failure to provide a complete submittal shall be grounds for summary rejection of any incomplete submittal documentation. Contractor's who provide Resubmittal's, due to prior rejection, shall be subject to a review fee, should the Engineer elect to do so. The complete submittal shall include, but not be limited to, all of the following material:
 - 1. Complete manufacturer's catalog data including supervisory power usage, alarm power usage, physical dimensions, finish and mounting requirements.
 - 2. Complete drawings covering the following shall be submitted by the Contractor for the proposed system. Floor plans in a CAD compatible format showing all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
 - 3. A complete proposed system database including a description of all logic strings, control by event programming and point identification labels in electronic format and in a formatted printed form, as required for offsite editing, shall be submitted for evaluation by the Owner.
 - a. The program shall include all required interactive control functions between the local network systems and the methods for implementing these actions.
 - 4. Provide the address, telephone number, and contact person(s) of the manufacturer's local service facility for normal and off hour warranty issues.
 - 5. If the fire alarm system and its equipment is supplied by a manufacturer's distributor, as part of the submittal documentation, the manufacturer shall provide, on its corporate letterhead, a "letter of support". Said "letter of support" shall state that, when in the opinion of the Engineer, the distributor's efforts require backup and/or assistance, the manufacturer shall provide, at no cost to the Owner, all required technical support and manpower, in a timely manner, during the installation period and for a one (1) year guarantee period starting on the date of final acceptance by the Owner and the Authority Having Jurisdiction. If said "letter of support" is not submitted, the manufacturer's equipment will be deemed unacceptable and shall be grounds for summary rejection.
 - 6. Provide a fire alarm system function matrix. Matrix shall illustrate alarm output events in association with initiating devices input events. Matrix shall represent a summary of the installed system alarm, supervisory and trouble functions. Include any and all departures, exceptions, variances or substitutions from these Specifications and/or drawings at the time of bid. Failure to provide this requirement shall be cause for summary rejection of submittal documents where additional departures are discovered. (See Appendix-A "this document" for minimum matrix requirements and NFPA Appendix A-7-5.2.2(i) 1996).
 - 7. For each system control panel and/or transponder panel, provide panel ampere loading during both normal and alarm mode's, with time calculations to substantiate compliance

with battery backup power requirements (battery Ampere-Hour capacity), described elsewhere in these Specifications.

- 8. Provide manufacture's printed product data, catalog pages and descriptions of any special installation requirements and/or procedures. Drawings depicting any special physical installation requirements shall show physical plans, elevations, all dimensions, conduit entry, minimum access clearances and any other details required.
- 9. Provide a signed letter and notarized statement on the manufacture's letterhead, stating that each analog addressable data communications circuit shall support one hundred (100%) of the circuits and addressable devices in alarm or operated at the same time, during both primary (AC) and secondary (battery) power conditions.
- 10. Provide shop drawings as follows:
 - a. Coversheet with project name, address and drawing index.
 - b. General notes drawing with peripheral device backbox size information, part numbers, device mounting height information, and the names, addresses, point of contact, and telephone numbers of all contract project team members.
 - c. Device riser diagram that individually depicts all addressable devices. Shall include a specific, proposed point descriptor above each addressable device. Shall include a specific, discrete point address that shall correspond to addresses depicted on the device layout floor plans. Drawing shall provide wire specifications, and wire tags shown on all conductors depicted on the riser diagram. All circuits shall have designations that shall correspond with those require on the control panel and floor plan drawings. End-of-line resistors (and values) shall be depicted.
 - d. Control panel termination drawing(s). Shall depict internal component placement and all internal and field termination points. Drawing shall provide a detail indicating where conduit penetrations shall be made, so as to avoid conflicts with internally mounted batteries. For each additional data gathering panel, a separate control panel drawing shall be provided, which clearly indicated the designation, service and location of the control enclosure. End-of-line resistors (and values) shall be depicted.
 - e. See section <u>3.4 DOCUMENTATION AND TRAINING</u> for other documents relating to this section.
 - f. Device typical wiring diagram drawing(s) shall be provided which depict all system components, and their respective field wiring termination points. Wire type, gauge, and jacket shall also be indicated. When an addressable module is used in multiple configurations for monitoring or controlling various types of equipment, different device typical diagrams shall be provided. End-of-line resistors (and values) shall be depicted.
 - g. Device layout floor plans shall be created for every area served by the fire alarm system. CAD Files (AutoCAD latest edition) shall be requested from the consulting engineer for the fire alarm system equipment vendor in the preparation of the floor plans. Floor plans shall indicate accurate locations for all control and peripheral devices. Vendor drawings shall be NO LESS THAN 1/8 INCH SCALE. All addressable devices shall be depicted with a discrete address that corresponds with that indicated on the Riser Diagram. All notification appliances shall also be provided with a circuit address that corresponds to that depicted on the Riser Diagram. If individual floors need to be segmented to accommodate the 1/8" scale requirements, KEY PLANS and BREAK-LINES shall be provided on the plans in an orderly and professional manner. End-of-line resistors (and values) shall be depicted.
 - h. Contained in the title block of each drawing shall be symbol legends with device counts, wire tag legends, circuit schedules for all addressable and notification

appliance circuits, the project name/address, and a drawing description which corresponds to that indicated in the drawing index on the coversheet drawing. A section of each drawing title block shall be reserved for revision numbers and notes. The initial submission shall be Revision 0, with Revision A, B, or C as project modifications require.

- 11. Table of contents, product data sheets, sequences of operation, installation instructions, licenses, NICET certifications and B-Size (blackline) reduced shop drawings shall be provided by the fire alarm vendor as part of a single, spiral bound submittal book. The submittal book shall have laminated covers indicating the project address, project number, system type, and contractor. The book shall consist of labeled dividers, and shall not exceed 9 ¹/₂" in width, and 11 ¹/₂" in height. No less than three (3) sets of submittal booklets shall be provided to the consulting engineer for review and comment. Additional copies may be required at no additional cost to the project.
- 12. Scale drawing sets shall be submitted along with the submittal booklets. These drawings may be either D-Size or E-Size Blueline drawings and of a sufficient resolution to be completely read. Sets shall be bound and folded so as to not take up more than 100 square inches of space. No less than three (3) sets of scale drawing sets shall be provided to the consulting engineer for review and comment. Additional copies may be required at no additional cost to the project.
- 13. The fire alarm Contractor shall provide copies of certification for service technicians formal training by the system manufacture. As a minimum, certification documents shall indicate training dates, systems qualified, name of individual certified and current status.

1.09 SYSTEM OPERATION

A.	Description
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INI	TIATION	OPERATION
1.	Triggering of waterflow switch in sprinkler system	Sound audible signal and display "waterflow" and zone identification at fire command station and outlying annunciators. Sound evacuation and alert tone signals, followed by recorded announcement, through loudspeakers, and flash visual fire warning signals, as noted above for manual stations. Operate relay at fire command station to accommodate transmission of a "waterflow" signal through telephone company wires to a central station location. Operate outlying addressable modules to accommodate transmission of signals to elevators, fans, dampers and other equipment, as scheduled elsewhere or as described hereinafter. Display status of affected equipment at Fire Command Station.
2.	Operation of tamper switch on manual valve of sprinkler or fire standpipe system	Sound audible signal and display "manual valve tamper" and location identification at fire command station. Operate relay at fire command station to accommodate transmission of a "supervisory" signal through telephone company wires to a central station.

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- B. Reset of all alarm initiating device circuits, alarm notification circuits, and equipment control relays shall be accomplished from the fire command station. Manual fire alarm stations shall require local reset before central reset from the fire command station is possible. <u>In no case shall the above alarm reset procedure cause the resetting of equipment control relays</u> (for fans, dampers, etc.). Such devices shall require <u>separate</u> reset from the fire command station.
- C. It shall be possible to disconnect any floor, or any device or combination of devices on any floor, from the system to allow for maintenance, repairs, or the addition of system devices and wiring without disabling any other floor. Such disconnection shall cause a visual "disabled" annunciation at the fire command station identifying the floor and/or devices.
- D. System Configuration
 - 1. Each sprinkler/standpipe alarm or supervisory actuating device, and alarm or supervisory initiating device shall constitute a separate zone for reporting to the fire command station. For display at the fire command station (FCS), each reporting zone (i.e., device) shall be individually identified, except that multiple smoke detectors (or multiple heat detectors) located within a single space may be identified by a common display. It shall be possible to separately identify and display the address of the individual detector(s) in alarm within any such space by means of an appropriate command at the FCS keyboard or keypad.
 - 2. Reporting of all required alarms and supervisory signals to the Fire Command Station (FCS) from initiating devices of the non-addressable type, including (but not limited to) sprinkler and standpipe waterflow and supervisory devices, manual fire alarm stations, subsystem (e.g., halon, pre-action sprinkler, etc.) alarm and supervisory contacts, and the like shall be accomplished in conjunction with addressable monitoring modules of the initiating device type (i.e., AMM/ID). AMM/ID's shall be of a type intended for connection of NFPA 72, Style 6 "branch" signalling line circuits (SLC) as described hereinbefore and shall be connected to the appropriate SLC on the floor on which they are located. Except where incorporated as part of manual fire alarm stations (or in the outlet boxes on which they are mounted), AMM/ID's shall be mounted adjacent to the associated initiating devices in outlying addressable monitor module boxes and shall be complete with engraved red nameplate. Each AMM/ID shall be interconnected to its associated initiating device by means of an initiating device circuit (IDC) as described hereinbefore. Provide an end-ofline resistor at each initiating device so as to permit supervision of the interconnecting circuitry. Terminals shall be incorporated in each addressable module box for the accommodation of all entering conductors.
 - 3. Control (automatic and/or manual) and status reporting (monitoring) of equipment via the fire protective alarm system as specified hereinafter shall be accomplished by means of addressable control modules (ACM's) and addressable monitoring modules of the status reporting type (AMM/S's) located within 3'-0" of the controlled equipment in outlying addressable monitor boxes similar to those specified above for the AMM/ID's. Addressable modules (ACM's and AMM/S's) shall be provided in accordance with the following:
 - a. ACM's and AMM/S's shall be of a type intended for connection to NFPA 72, Style 6 "branch signalling circuits (SLC's) as described hereinbefore, and shall be connected to the appropriate SLC serving the floor on which they are located.
 - b. Each ACM shall provide (2) SPDT contacts suitable for use at voltages up to 250 VAC and capable of interrupting 10 amperes inductive, and shall derive its operating and supervisory current at 24VDC from the SLC. If necessary, these contact ratings shall be accommodated by means of auxiliary control relays mounted within or adjacent to the same addressable monitor boxes as the ACM's, and deriving their

operating power from the associated ACM's, or directly from the associated ECC via separate supervised power supply conductors.

- c. Each AMM/S shall function so as to provide a readily identifiable status indication at the FCS in response to a 120 or 208 VAC signal from the associated controlled equipment. Incorporate an auxiliary status (monitoring) relay for each AMM/S to convert a 120 or 208 VAC AC signal to a "dry" contact if the AMM/S requires a "dry" contact for proper status signal initiation. Auxiliary status relays, if required, shall be mounted in the same outlying addressable module boxes as their associated AMM/S's.
- d. At locations where multiple equipment controllers are installed, the addressable modules (and any associated auxiliary relays) may be grouped in common addressable module boxes.
- 4. Priority of Signals:
 - a. Accomplish automatic response functions by the first zone initiated. Alarm functions resulting from initiation by the first zone are not altered by subsequent alarms. The highest priority is an alarm signal. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even though the lower-priority condition occurred first. Annunciate all alarm signals regardless of priority or order received.
 - b. Noninterfering: Zone, power, wire, and supervise the system so a signal on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. Systems that require batteries or battery backup for the programming function are unacceptable.
 - c. Fire Alarm Control Panel (FACP) Response: The manual or automatic operation of an alarm-initiating or supervisory-operating device causes the FACP to transmit an appropriate signal including the following:
 - 1) General alarm.
 - 2) Smoke or heat detector alarm.
 - 3) Valve tamper supervisory.
 - 4) Elevator recall.
 - 5) Elevator shutdown.
 - 6) System trouble.
 - 7) Fan shutdown.
 - 8) Smoke-control initiation.
 - d. Transmission to Remote Central Station: Automatically route alarm, supervisory, and trouble signals to a remote central station in Engineer's office to Building "D" MER.
 - e. Silencing at the FCS: Switches provide capability for acknowledgment of alarm, supervisory, trouble, and other specified signals at the FACP; and capability to silence the local audible signal and light a light-emitting diode (LED). Subsequent zone alarms cause the audible signal to sound again until silenced by switch operation. Restoring alarm, supervisory, and trouble conditions to normal extinguishes the associated LED and causes the audible signal to sound again until restoration is acknowledged by switch operation.
- 5. Recording of Events:
 - a. Print a record all alarm, supervisory, and trouble events on the system printer. Printouts are by zone, device, and function. When the FACP receives a signal, the alarm, supervisory, and trouble conditions are printed. The printout includes the type of signal (alarm, supervisory, or trouble) the zone identification, date, and the time of the occurrence. The printout differentiates alarm signals from all other

printed indications. When the system is reset, this event is also printed, including the same information for device, location, date, and time. A command initiates the printout of a list of existing alarm, supervisory, and trouble conditions in the system.

- 1) Permissible Signal Time Elapse: The maximum permissible elapsed time between the actuation of any fire alarm or fire-detection system alarm-initiating device and its indication at the FACP is 2 seconds.
- 2) Independent System Monitoring: Supervise each independent smoke- or heat-detection system, duct detector, and elevator smoke-detection system for both normal operation and trouble.
- 3) Circuit Supervision: Indicate circuit faults by both a zone and a trouble signal at the FACP. Provide a distinctive indicating audible tone and LEDindicating light. The maximum permissible elapsed time between the occurrence of the trouble condition and its indication at the FACP is 200 seconds.
- E. System Supervisory Functions
 - 1. Activation of any supervisory circuit, (i.e.; supervised fire sprinkler valve closure, fire suppression system air pressure abnormal, low temperature, fire pump trouble, emergency fuel tank level alarm), shall cause the following actions and indications:
 - a. Activate "Supervisory Alarm" notification to the FCS computer terminal display indicating device address, device type, device location, time and date.
 - b. Activate "Supervisory Alarm" notification to the on-site location as specified herein.
 - c. Annunciate alarm notification on system remote alphanumeric annunciators.
 - d. Audible signals shall be silenceable from the control panel by an acknowledge switch.
 - e. Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
 - f. Record all events at the system alarm printer.
- F. System Trouble Functions

1.

- Receipt of a system trouble alarm, shall cause the following actions and indications:
 - a. Activate "Trouble Alarm" notification to the FCS computer terminal display indicating device address, device type, device location, time and date.
 - b. Activate "Trouble Alarm" notification on site location as shown on the drawings.
 - c. Audible signals shall be silenceable from the control panel by an acknowledge switch.
 - d. Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
- e. Record all events at the system alarm printer.
- 2. The fire alarm system wiring (except control wiring to fans, dampers, etc.) shall be electrically supervised to automatically detect and report trouble conditions to the FCS.
- 3. Any opens or grounds on Interface Addressable Module alarm initiating or supervisory circuit wiring and any opens, grounds or shorts across the addressable data communications, remote annunciator data communications, alarm speaker, or alarm strobe light circuit wiring shall initiate a system trouble condition.
- 4. System addressable devices shall be supervised for placement and normal operation. Removal of an addressable device or the failure of its internal electronic circuitry shall initiate a system trouble condition.
- 5. The following FCS and/or remote transponder control panels shall initiate a system trouble condition when the following occurs:
 - a. Primary 120/220 VAC power loss.

- b. Battery disconnect.
- c. Battery low voltage.
- d. FCS remote transponder or graphic LCD annunciator panel power loss.
- e. FCS primary alarm log printer power loss.
- 6. Operating a central station agency alarm disconnect switch (if equipped), or any manual control commands that alter the system from its normal programmed standby configuration shall initiate a trouble condition.
- 7. Trouble conditions shall automatically activate an audible signal and flash the general system trouble LED indicator at the FCS. Pressing the trouble acknowledge key on the FCS shall silence the audible signal and continuously light the LED indicator, until the trouble condition is repaired. Subsequent trouble conditions shall resound the audible signal and again flash the LED. Each trouble condition must be individually acknowledged.
- 8. Removal of or failure of internal electronic circuitry of any addressable device shall initiate a system trouble condition.

PART 2 - SYSTEM OPERATION

- 2.01 BASIC SYSTEM EQUIPMENT, CIRCUITING, ADDRESSING AND OPERATING CAPABILITIES
 - A. The catalog numbers used are those of Edwards EST by UTC Fire and Security. No equals.
 - B. All products used shall be of a single manufacturer. Submission of notification appliances, auxiliary relays, or documentation from other than a single manufacturer shall not be acceptable and will be grounds for immediate disapproval without comment.
 - C. All connected Field Appliances shall be designed and manufactured by the same company, and shall be tested and cross-listed as compatible to ensure that a fully functioning Life Safety System is designed and installed.
 - D. Circuiting Guidelines
 - 1. Each Signaling Line Circuit (SLC) shall be circuited so device loading is not to exceed 80% of loop capacity in order to leave for space for future devices. The loop shall have Class B operation. Each DGP shall include an SLC loop on a per floor basis. T-Tapping a selected loop to cover an alternate floor shall not be accepted.
 - 2. The network riser shall be wired NFPA Style 7 (Class A with isolation).
 - 3. Where it is necessary to interface conventional initiating devices provide intelligent input modules to supervise Class B zone wiring.
 - 4. Each of the following types of devices or equipment shall be provided with supervised circuits as shown on the drawings but shall be typically as follows:
 - a. Sprinkler Valve Supervisory Switches: Provide one (1) supervisory module circuit for each sprinkler valve supervisory switch.
 - b. When waterflow and tamper switches exist at the same location, provide one (1) dual input addressable module. When odd numbers of devices exist at a single location, provide additional single input addressable modules.
 - 5. Provide a dedicated 24VDC circuit to feed all auxiliary relays required for inductive loads. Circuits shall be supervised via an end-of-line relay and addressable input module. Auxiliary relays shall not derive their power from the starter or load being controlled.
 - 6. In no case shall any fire alarm circuit be sized beyond 80% of circuit capacity.

- E. System power supplies, including necessary transformers rectifiers, regulators, filters and surge protection required for system operation, with the capacity to power the system in a worst case condition with all devices in alarm and all local indicating appliances active without exceeding the listed ratings. All system devices shall display normal and alarm conditions consistently whether operating from normal power or reserve (standby) power.
 - 1. The intelligent interface module shall be listed by Underwriters' Laboratories, Inc. The unit shall incorporate a custom microprocessor based integrated circuit which shall provide communication with main fire control panel. The interface module shall supervise and monitor normally open or normally closed dry contacts. The interface module shall report the contact's status to the control panel. The intelligent interface module shall be dynamically supervised and uniquely identifiable by the control panel. The intelligent interface module shall be set by electronic means only, no mechanical means such as dipswitches, rotary dials or by inserting programmable pins shall be used. The intelligent interface module shall be used to uniquely identify field devices such as water flow switches, tamper switches, OS&Y valves or as directed by these specifications and project drawings.
 - 2. The intelligent interface module shall be used when remote relay functions are required for system functional requirements, such as but not limited to, fan shut downs. Relay dry contacts shall be rated at 2 amp. 120 VAC resistive or 30 VDC resistive and shall be Form "C".
 - 3. Each switch shall include space for labeling switch function. The label shall be protected behind a clear protective membrane cover. In addition, each switch shall have two LED's associated with it. One of the LED's shall be amber in color and shall indicate a fault condition on a zone or zone's associated with that switch. The second LED shall be dual color red/green, and be capable through software configuration, to clearly indicate zone status including which audio source is active (i.e. Evacuation, Alert, Page, etc.)
 - 4. Status only annunciation shall be provided by a set of modular visual Led indicators. Each module shall be capable, through system software mapping to include, but not limited to alarms and troubles. Each module shall include eight individual status indicators each containing one dual color LED for red and green status, and one amber color LED for zone integrity monitoring.
 - 5. Devices shall be listed by U.L. for sensitivity testing by means of the portable programmer/tester or by readout from the control panel. Device address and sensitivity assignments shall be predetermined electronically, devices requiring dip switch settings, rotary switch settings, staples or jumper settings are not acceptable.

2.02 UL LISTED AND APPROVED EQUIPMENT

A. All system devices shall be Edwards's type EST series. All under one label "<u>UL listed and</u> <u>approved</u>" for the use of fire alarm systems in this area of the United States of America. All modules shall be labeled, and all zone locations shall be identified.

2.03 COMPONENTS

A. Intelligent Devices — General: Each remote device shall have a microprocessor with non-volatile memory to support its functionality and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller. Each device shall be capable of electronic

addressing, either automatically or application programmed assigned, to support physical/electrical mapping and *supervision by location*. Setting a device's address by physical means shall not be necessary.

- B. Intelligent Modules General: It shall be possible to address each Intelligent Signature Series module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes shall not be acceptable. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment: Temperature: 32°F to 120°F (0°C to 49°C), Humidity: 0-93% RH, non-condensing.
- C. Single Input Module, SIGA-CT1 (Waterflow Detectors, Tamper Switches etc.): Provide intelligent single input modules SIGA-CT1. The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ¹/₂" (64mm) deep 1gang boxes and 1 ¹/₂" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).
- D. Dual Input Module, SIGA-CT2: Provide intelligent dual input modules SIGA-CT2. The Dual Input Module shall provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ¹/₂" deep 1-gang boxes and 1 ¹/₂" (38mm) deep 4" square boxes with 1-gang covers. The dual input module shall support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).
- E. Single Input Signal Module, SIGA-CC1: Provide intelligent single input signal modules SIGA-CC1. The Single Input (Single Riser Select) Signal Module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a telephone power selector, the module shall be capable of generating its own "ring tone". The module shall be suitable for mounting on North American 2 ¹/₂" (64mm) deep 2-gang boxes and 1 ¹/₂" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The single input signal module shall support the following operations: Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A).
- F. Control Relay Module, SIGA-CR: Provide intelligent control relay modules SIGA-CR. The Control Relay Module shall provide one form "R" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system

firmware. The control relay module shall be suitable for mounting on North American 2 $\frac{1}{2}$ " (64mm) deep 1-gang boxes and 1 $\frac{1}{2}$ " deep 4" square boxes with 1-gang covers.

PART 3 - EXECUTION

- 3.01 INSTALLATION, GENERAL
 - A. Install system according to NFPA standards referenced in Parts 1 and 2 of this Section.
- 3.02 EQUIPMENT INSTALLATION
 - A. Waterflow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.
 - B. Addressable Modules: In dedicated control box within 3'-0" of the equipment.
 - 1. Outlying addressable module boxes, each complete as indicated, shall be provided for equipment requiring automatic or manual control by the FPA system on the basis of the following:
- 3.03 WIRING INSTALLATION
 - A. Wiring Method: For exposed runs install wiring in metal raceway according to Section 26 05 33 "Raceways and Boxes for Electrical Systems."
 - B. No raceways are required for fire alarm cables installation in hollow partitions and hung ceilings.
 - C. Wiring within Enclosures: Install conductors parallel with or at right angles to the sides and back of the enclosure. Bundle, lace, and train the conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
 - D. Cable Taps: Use numbered terminal strips in 3unction, pull or outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
 - E. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and a different color code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visual alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
 - F. Risers: Install at least 2 vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.
 - G. Minimum temperature rating of the cables shall be 150 Deg. Celsius.

3.04 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Basic Electrical Materials and Methods."

3.05 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- C. Install grounding equipment conductor and terminate it at water main. Refer to Section 26 05 26 for detailed requirements.
- D. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.
- 3.06 FIELD QUALITY CONTROL
 - A. Manufacturer's Field Service: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
 - B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.
 - C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
 - D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
 - E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72. Minimum required tests are as follows:
 - 1. Verify the absence of unwanted voltages between circuit conductors and ground.
 - 2. Test all conductors for short circuits using an insulation-testing device.
 - 3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
 - 4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.

- 5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. one connection each should be opened at not less than 10 percent of the initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
- 6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
- 7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.
- 8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.
- H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.
- 3.07 CLEANING AND ADJUSTING
 - A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.
- 3.08 DEMONSTRATION
 - A. Startup Services: Engage a factory-authorized service representative to provide startup service and to demonstrate and train owner's maintenance personnel as specified below.
 - 1. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, adjusting, and preventive maintenance. Provide a minimum of 8 hours' training.
 - 2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
 - 3. Schedule training with Owner with at least 7 days' advance notice.

3.09 ON-SITE ASSISTANCE

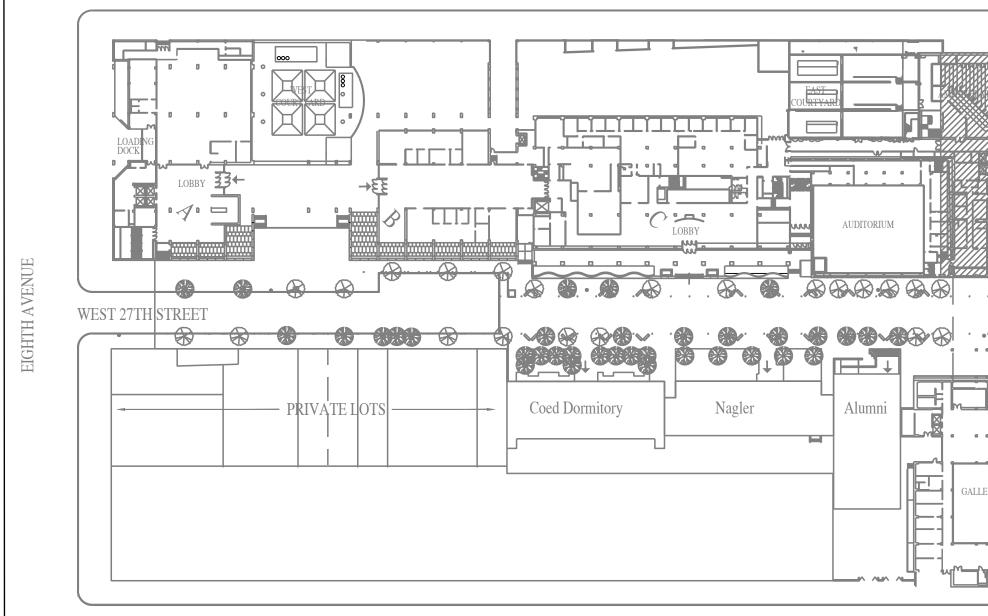
A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to 3 requested adjustment visits to the site for this purpose.

END OF SECTION 283113

EXHIBIT D: DRAWINGS

FASHION INSTITUTE of TECHNOLOGY State University of New York 227 WEST 27TH STREET, NEW YORK, NY 10001 FRED P. POMERANTS ART & DESIGN CENTER (FIRE PUMP UPGRADE)

ROJECT DATA LOCATION 00 7TH AVENUE NEW YORK, NY 1000' PROPERTY IS NOT LOCATE IN SPECIAL FLOOD HAZAR



SITE PLAN NOT TO SCALE



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LIST OF DRAWINGS		
DRAWING NAME	DRAWING TITLE	
T-001.00	COVER SHEET	
ELECTRICAL		
E-001.00	ELECTRICAL SYMBOL LIST, MATRIX AND ABBREVIATIONS	
E-002.00	ELECTRICAL CONSTRUCTION MATRIX	
E-010.00	ELECTRICAL SUB-CELLAR DEMOLITION PART PLANS	
E-100.00	ELECTRICAL SUB-CELLAR POWER PLAN	
E-500.00	ELECTRICAL DETAILS I	
E-501.00	ELECTRICAL DETAILS II	
E-600.00	ELECTRICAL EXISTING & NEW WORK SINGLE LINE DIAGRAM & D	
FIRE ALARM		
FA-001.00	FIRE ALARM NOTES, SYMBOL LIST, MATRIX AND ABBREVIATION	
FA-100.00	FIRE ALARM SUB-CELLAR AND FIRST FLOOR PART PLANS	
FA-101.00	FIRE ALARM PART PLANS - 3RD, 4TH, 5TH AND 6TH FLOORS	
FIRE PROTECTION		
FP-001.00	FIRE PROTECTION NOTES, SYMBOL LIST AND SCHEDULES	
FP-010.00	FIRE PROTECTION CELLAR LEVEL - PARTIAL PLAN - DEMOLITION	
FP-011.00	FIRE PROTECTION 1ST FLOOR PARTIAL PLAN - DEMOLITION	
FP-100.00	FIRE PROTECTION CELLAR LEVEL PARTIAL PLAN	
FP-101.00	FIRE PROTECTION PARTIAL FLOOR PLAN - TYPICAL FOR 3RD, 4	
FP-501.00	FIRE PROTECTION DETAILS	
FP-601.00	FIRE PROTECTION RISER DIAGRAM	
PLUMBING		
P-001.00	PLUMBING NOTES, SYMBOL LIST, ABBREVIATIONS AND DRAWING LIS	
P-010.00	PLUMBING SUB-CELLAR LEVEL - DEMOLITION	
P-100.00	PLUMBING PARTIAL PLANS	

NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT. THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

ISSUED FOR BID 02/28/2024

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M 116	6 West 32	NEERING D.P.C.
E 98	PM, Inc 83 Marcus	ental Consultants :. s Ave. Suite 109 s, NY 11042 / (516) 328–1 [.]
NO.	01-18-2024 DATE	ISSUED FOR BID REVISION
PRO		ed P. Pomerantz Art Design Center
		re Pump Upgrade 300 7th Avenue, NY, NY 10002

AREA OF

DRAWING TITLE:

COVER SHEET

SEAL & SIGNATURE:

DATE:	02.15.2024
PROJECT No:	8969.76
DRAWING BY:	DG
CHK BY:	DN
SCALE:	NTS
DWG No:	
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GENERAL NOTES

- 1. THE GENERAL NOTES APPLY TO ALL DRAWINGS UNDER THIS CONTRACT. REFER TO INDIVIDUAL DRAWINGS FOR ADDITIONAL NOTES.
- 2. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE CONDITIONS CONSISTENT WITH PROJECT CRITERIA.
- 3. EXACT LOCATION OF ALL EQUIPMENT AND DEVICES SHALL BE FIELD VERIFIED AND COORDINATED WITH BUILDING MANAGEMENT AND ARCHITECT.
- 4. EXACT ROUTING OF ALL FEEDERS SHALL BE FIELD VERIFIED AND COORDINATED WITH BUILDING MANAGEMENT AND ARCHITECT. FURNISHING OF LIGHTING FIXTURES, SPEAKERS, SMOKE DETECTORS,
- 5. ALL PENETRATIONS THROUGH WALLS AND SLABS SHALL BE PROPERLY SEALED TO MATCH OR EXCEED ORIGINAL CONSTRUCTION RATING.
- 6. LOCATION OF ALL EQUIPMENT, DEVICES AND OUTLETS SHALL BE FIELD VERIFIED. LOCATION OF NEW COMPONENTS SHALL BE COORDINATED ALSO FOR EXACT POSITIONING. CORRECT ANY INACCURACY RESULTING FROMFAILURE TO DO SO WITHOUT ANY ADDITIONAL EXPENSE TO THE OWNER.
- 7. JUNCTION AND PULL BOXES SHALL GENERALLY BE LOCATED FOR FLUSH MOUNTING IN FINISHED SPACES. WHERE NECESSARY, CONDUIT SHALL BE REROUTED OR OTHER ARRANGEMENTS SHALL BE MADE FOR CONCEALMENT. PULL BOXES SHALL BE PROVIDED AS INDICATED AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE AND COORDINATE LOCATION WITH OTHER TRADES. COVERS OF JUNCTION AND PULL BOXES SHALL BE ACCESSIBLE. FOR EMPTY RACEWAY RUNS PULL BOXES SHALL BE PROVIDED EVERY 100 FEET AND AS INDICATED OR NECESSARY.
- 8. SEPARATE BOXES OR WIREWAYS SHALL BE PROVIDED FOR EMERGENCY AND NORMAL WIRING.
- 9. BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. WALL OUTLET BOXES SHALL BE ERECTED IN ADVANCE OF FURRING AND FIREPROOFING. BOXES SHALL BE SECURED TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRONS.
- 10. ALL SUPPORTS TO BUILDING STRUCTURE SHALL BE SECURED AS NOTED IN THE SPECIFICATIONS. HORIZONTAL RUNS OF METALLIC CONDUIT SHALL BE SUPPORTED AT INTERVALS OF NOT MORE THAN 10 FEET APART. RACEWAY RISERS SHALL BE ALSO SUPPORTED AT EACH FLOOR LEVEL. EXPOSED RACEWAYS SHALL RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
- 11. CONDUIT AND CABLE ROUTING SHALL BE FIELD VERIFIED AND COORDINATED WITH ARCHITECT, OWNER AND EXISTING CONDITIONS. PROPER ADJUSTMENTS SHALL BE MADE FOR ACTUAL ROUTING TO AVOID OR MINIMIZE RELOCATION OF EXISTING SYSTEMS COMPONENTS.
- 12. PROVIDE ALL NECESSARY PROPER SUPPORT FOR MI CABLE AS PER MANUFACTURER RECOMMENDATIONS. MI CABLE SHALL BE SUPPORTED INDEPENDANTLY FROM BUILDING STRUCTURE, NOT RELYING ON ANY OTHER SYSTEMS COMPONENTS SUPPORT.
- 13. ELECTRICAL EQUIPMENT, DEVICES AND OUTLETS/BOXES SHALL BE SUPPORTED INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON CONDUIT. CONDUITS SHALL BE SUPPORTED INDEPENDANTLY FROM BUILDING STRUCTURE, NOT RELYING ON ANY OTHER SYSTEMS COMPONENTS SUPPORT.
- 14. ALL REQUIRED ACCESS DOORS SHALL BE FURNISHED UNDER THE ELECTRICAL SECTION AND INSTALLED UNDER GENERAL CONSTRUCTION. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY THE ARCHITECT PRIOR TO INSTALLATION.
- 15. NO ELECTRICAL RACEWAYS OR MI CABLES SHALL BE INSTALLED WITHIN 3 INCHES OF STEAM OR HOT WATER PIPES, OR APPLIANCES, EXCEPT FOR CROSSINGS WHERE RACEWAYS OR MI CABLES SHALL BE AT LEAST 1 INCH FROM PIPE COVER.
- 16. HORIZONTAL OR CROSS RUNS IN PARTITIONS OR WALLS ARE NOT PERMITTED. CONDUIT AND MI CABLES SHALL NOT RUN IN PRECAST ROOF SLABS OR IN 2 INCHES SLABS.
- 17. COORDINATE WITH ARCHITECT AND OWNER FOR ALL NECESSARY CONDUIT AND MI CABLE PRNRTRATIONS THROUGH WALLS AND SLAB. ALL PENETRATIONS SHALL BE PROPERLY FIRE SEALED AS REQUIRED. COORDINATE ALSO WITH MI CABLE MANUFACTURER FOR PROPER SEALS.
- 18. CONDUIT ENDS SHALL BE CUT SQUARE AND REAM SMOOTH. MALE THREADS OF FIELD THREADED CONDUIT SHALL BE PAINTED WITH GRAPHITE BASED PIPE COMPOUND AND DRAWN UP TIGHT WITH CONDUIT COUPLINGS.
- 19. CONDUIT TO MOTOR TERMINAL BOXES SHALL BE CONNECTED WITH "SEALTITE" FLEXIBLE CONDUIT; MINIMUM 18 INCHES IN LENGTHS WITH 50 PERCENT SLACK. RACEWAYS SHALL NOT BE TERMINATED IN, OR FASTENED TO MOTOR FOUNDATION.

- 20. SUFFICIENTLY LONG WIRE SLACK SHALL BE LEFT IN RUNS MAKING PROPER FINAL CONNECTIONS. ALL EMPTY CONDUI PROVIDED WITH # 12 AWG STEEL DRAG WIRE.
- 21. WIRE COLOR CODING SHALL CONFORM TO CODE REQUIREMENT COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITI REQUEST PERMISSION FOR OVERLAP COLOR TAPING OF COM (MINIMUM LENGTH 6") IN ACCESSIBLE LOCATIONS. COLOR ESTABLISHED, MUST BE USED CONSISTENTLY FOR THE ENTI
- 22. WIRING FOR ALL LOW VOLTAGE SYSTEMS SHALL BE RUN IN CEILING. CABLE SHALL BE ADEQUATELY HARNESSED, BUNE AT 4 FOOT INTERVALS BY INDIVIDUAL SYSTEMS AND MARKE IDENTIFICATION TAGS. ALL LOW VOLTAGE SYSTEM WALL OU HAVE 3/4" CONDUIT EXTENDED INTO HUNG CEILING. WHER TO BE EXPOSED, IT SHALL BE INSTALLED IN EMT CONDUIT. TERMINATION OF WIRING FIRM HUNG CEILING TO CENTRAL CABINETS SHALL ALSO BE INSTALLED IN EMT CONDUIT. I WIRING IN CEILINGS USED AS AIR PLENUM SHALL BE TEFLO IN NON-AIR PLENUM CEILINGS IT SHALL BE INSTALLED IN
- 23. NO THERMOPLASTIC WIRES SHALL BE PULLED AT TEMPERAT 32 DEG. F.
- 24. PROVIDE GROUND BONDING JUMPERS FOR ALL MECHANICAL ENCLOSURES AND METAL PIPING SYSTEM THAT MAY BECOM THE BONDING JUMPERS SHALL BE INSTALLED IN ACCORDAN REQUIREMENTS.
- 25. CONTRACTOR SHALL SCAN CONCRETE SLABS PRIOR TO PEN THE SLAB FOR CONDUIT ROUTING. VERIFY LOCATIONS AND OBSTRUCTIONS. COORDINATE WORK WITH FIT AND SHARE FIN
- 25. CONTRACTOR SHALL PROVIDE PERSONNEL CERTIFIED TO WOR REQUIRED TASKS WITHIN THE SCOPE OF THIS WORK.

EXISTING CONDITIONS AND RELOCATION NOTES

- REFER TO SPECIFICATION SECTION 02070 SELECTIVE DEMOLITION, FOR ADDITIONAL DEMOLITION CRITERIA.
- GENERALLY, IN AREAS SCHEDULED FOR DEMOLITION AND REMODELING, REMOVE ALL ELECTRICAL DEVICES SUCH AS LIGHTING FIXTURES, WIRING DEVICES, TELEPHONE BOXES, SPEAKERS, FIRE ALARM DEVICES, TELEVISION OUTLETS DISCONNECT. MOTORS. ETC., THAT ARE LOCATED ON EXISTING WALLS/PARTITIONS OR CEILING WHICH ARE TO BE DEMOLISHED OR ARE ON THE WAY OF NEW CONSTRUCTION. REMOVE EXPOSED PORTIONS OF THE BRANCH AND SIGNAL CIRCUIT WIRING AND CONDUITS AND BE RESPONSIBLE FOR MAINTAINING THE CONTINUITY OF EXISTING CIRCUITS FEEDING DEVICES THAT ARE TO REMAIN. MAINTAIN THE CONTINUITY OF EXISTING CIRCUITS SERVING OTHER SPACES BUT PASSING THROUGH THE AREA OF RENOVATION.
- 3. CONDUITS OR SLEEVES, THAT ARE NO LONGER REQUIRED, WHICH ARE PROTRUDING THROUGH THE FLOOR SLAB, SHALL BE CUT BACK AND CAPPED. ALL FEEDERS TO BE REMOVED BACK TO PANEL BOARD.
- 4. ELECTRICAL EQUIPMENT REMOVED SHALL BE RETURNED TO OWNER OR DISCARDED PER OWNER DIRECTIVE.
- 5. REMOVE TELEPHONE AND DATA CABLES BACK TO CLOSET OF ORIGINATION. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE HOSPITAL'S TELECOMMUNICATION DEPARTMENTS FOR THE DISCONNECTION AND REMOVAL OF LOW TENSION DEVICES.
- ELECTRICAL CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SYSTEM 6. CIRCUITS FOR FIRE ALARM, POWER AND TELE COMMUNICATIONS, ETC., DURING DEMOLITION.
- 7. THE ELECTRICAL CONTRACTOR SHALL REMOVE ALL ABANDONED WIRING/CABLING NO LONGER IN USE FROM RACEWAYS.
- 8. THE ELECTRICAL DEMOLITION SCOPE IDENTIFIED AND AS SHOWN INDICATE GENERAL INTENT. IT IS NOT INTEND TO SHOW ALL COMPONENTS AND ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMISSION OF THEIR BID TO BECOME FAMILIAR WITH THE ACTUAL WORKING CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON THE WALLS AND OR CEILINGS DESIGNATED TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATION AND ARCHITECT OF ANY UNANTICIPATED OR HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.
- 9. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH AND FEEDERS WITHIN OR ASSOCIATED WITH DEMOLITION SCOPE PRIOR TO DE-ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS, LOAD CENTERS, MOTOR CONTROL CENTERS AND SWITCHBOARDS, IDENTIFIED FOR REMOVAL SHALL BE TRACED AND FIELD LABELED TO ENSURE THAT NO AREA OUTSIDE THE SCOPE LIMIT IS AFFECTED.

ABBREVIATIONS

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DUIT SHALL BE		DESCRIPTION		DESCRIPTION	SYMBOL	
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RITING AND CONDUCTORS	AC AFF AFG	ABOVE COUNTER TOP ABOVE FINISHED FLOOR ABOVE FINISHED GRADE	KWH LTG MCC	LIGHTING MOTOR CONTROL CENTER	$\overline{\mathcal{A}}$	MOTOR
OR CODING, ONCE NTIRE PROJECT.	ATS AWG	AUTOMATIC TRANSFER SWITCH AMERICAN WIRE GAUGE	MCM MECH MH	THOUSAND CIRCULAR MILS MECHANICAL MANHOLE		CONDUIT & WIRE
IN SPACES ABOVE JNDLED AND TIED	BLDG CAT C	BUILDING CATALOG CONDUIT	MISC MTD MTR	MISCELLANEOUS MOUNTED MOTOR	 — P— P—	CONDUIT & WIRE
RKED WITH DUTLETS SHALL IERE WIRING HAS	CB CCTV CKT	CIRCUIT BREAKER CLOSED CIRCUIT TELEVISION CIRCUIT	N NIC NL	NEUTRAL NOT-IN-CONTRACT NIGHT LIGHT	 - X - X -	CONDUIT & WIRE
IT. OR MAIN	CLG CT CU	CEILING CURRENT TRANSFORMER COPPER	NTS PB	NOT TO SCALE PULL BOX		
LOW VOLTAGE TLON COATED,	DISC DN DP	DISCONNECT DOWN DISTRIBUTION PANELBOARD	PH PNL PWR	PHASE PANEL POWER		SPECIALTY
N CONDUIT. RATURE LOWER THAN	DWG E EC	DRAWING EXISTING EMPTY CONDUIT	PT R RCS	POTENTIAL TRANSFORMER RELOCATED REMOTE CONTROL SWITCH	XX	HEXAGON WITH I PLAN REFERENCI A REFERENCE S
AL EQUIPMENT METAL OME ENERGIZED.	ELEC ELEV EM	ELECTRICAL ELEVATOR EMERGENCY	RM RMS SN	ROOM ROOT MEAN SQUARE SOLID NEUTRAL	XX	DIAMOND WITH IN PLAN REFERENCE
ANCE WITH NEC	EMR EWC ER E/R	ELEVATOR MACHINE ROOM ELECTRIC WATER COOLER EXISTING TO REMAIN EXISTING TO RELOCATE	SP SPECS STD	SINGLE POLE SPECIFICATIONS STANDARD	~	A REFERENCE S
PENERTRATING OR TRENCHING D ROUTING ARE FREE OF	FA FBO FCO	FIRE ALARM FURNISHED BY OTHERS FUSED CUTOUT	SW SWBD SWGR SYM	SWITCH SWITCHBOARD SWITCHGEAR SYMMETRICAL	SYMBOL	
FINDINGS WITH FIT AND ENGINEER. WORK AROUND ACM FOR	FDR FIXT FT	FEEDER FIXTURE FEET	TB TEL TV	TERMINAL BLOCK TELEPHONE TELEVISION	2,4	CONDUIT AND WIRE F HASHMARKS DENOTE ARROWS DENOTE HO
	G GD GEN GFI	WITH WIRE GUARD GROUND GENERATOR GROUND FAULT INTERRUPTER	TYP UC UF	TYPICAL UNDER COUNTER UNFUSED	2,4	1P-20A CIRCUITS. M CONDUIT WITH WIRE HASHMARKS DENOTE ARROWS DENOTE HO
	HP HZ IC	HORSEPOWER HERTZ INTERRUPTING CAPACITY	UG UON V	UNDERGROUND UNLESS OTHERWISE NOTED VOLT OR VOLTAGE		1P-20A CIRCUITS. M CEILING MOUNTED JU INDICATES FLOOR MC
	JB KVA KW	JUNCTION BOX KILOVOLT AMPERE KILOWATT	VA VM W	VOLT AMPERE VOLTMETER WATT	<u> </u>	JUNCTION BOX/FLEX AND GROUND WIRES.
			WP XFMR	WEATHER-PROOF TRANSFORMER	н	WALL MOUNTED JUNG

ISSUED FOR BID

02/28/2024



CONTRACTOR SHALL MAINTAIN THE CONTINUITY OF FIRE ALARM DEVICES IN THE SPACE. FIRE ALARM DEVICES SHALL BE PROTECTED DURING THE DEMOLITION & CONSTRUCTION PHASES OF PROJECT. THIS INCLUDES THE COVERING OR THE DISABLING OF SMOKE DETECTORS IN AREA OF WORK. CONTRACTOR SHALL NOTIFY FIRE ALARM VENDOR FOR ANY REQUIRED SHUT DOWN OF MONITORING OF THE FIRE ALARM DEVICES DUE TO WORK IN THE AREA.

NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE
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SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED
UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE
WITH APPLICABLE CODES.

NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

MBOL LIST

DESCRIPTION
ELECTRICAL EQUIPMENT/DEVICE/CONTROLLER AS INDICATED
MOTOR
CONDUIT & WIRE/CABLING AS INDICATED
CONDUIT & WIRE/CABLING AS INDICATED
CONDUIT & WIRE/CABLING AS INDICATED TO BE REMOVED
SPECIALTY AND MISCELLANEOUS
HEXAGON WITH INSCRIBED UPPER CASE LETTERS IS A LEGEND OF PLAN REFERENCE SYMBOL AND WITH INSCRIBED NUMERAL IS A REFERENCE SYMBOL TO A RISER DIAGRAM NOTE
DIAMOND WITH INSCRIBED UPPER CASE LETTERS IS A LEGEND OF PLAN REFERENCE SYMBOL AND WITH INSCRIBED NUMERAL IS A REFERENCE SYMBOL TO A PLAN NOTE
LIGHTING AND POWER
DESCRIPTION
CONDUIT AND WIRE RUN CONCEALED IN FLOOR, CEILING OR WALL. HASHMARKS DENOTE NUMBER OF WIRES IF MORE THAN TWO ARE REQUIRED. ARROWS DENOTE HOMERUNS OF PARTICULAR CIRCUITS AND QUANTITY OF 1P-20A CIRCUITS. MINIMUM 2#12 THHN / THWN IN 3/4" CONDUIT U.O.N.
CONDUIT WITH WIRE RUN EXPOSED IN CEILING OR WALL. HASHMARKS DENOTE NUMBER OF WIRES IF MORE THAN TWO ARE REQUIRED. ARROWS DENOTE HOMERUNS OF PARTICULAR CIRCUITS AND QUANTITY OF 1P-20A CIRCUITS. MINIMUM 2#12 THHN / THWN IN 3/4" CONDUIT U.O.N.
CEILING MOUNTED JUNCTION/SPLICE BOX, SIZE AS REQUIRED. SUBSCRIPT 'F' INDICATES FLOOR MOUNTED.
JUNCTION BOX/FLEXIBLE CONDUIT FOR EQUIPMENT CONNECTION WITH POWER AND GROUND WIRES. 'SEALTITE' AS REQUIRED.
WALL MOUNTED JUNCTION BOX
WIRE TROUGH/SPLICE BOX. SIZE AS REQUIRED.
LIGHTING AND POWER PANELBOARD, FLUSH MOUNTED IN WALL WITH COVER INDICATED.
LIGHTING AND POWER PANELBOARD, SURFACE MOUNTED ON WALL.
SINGLE POLE TOGGLE SWITCH. SUBSCRIPT DENOTES FIXTURES CONTROLLED. 'K' INDICATES KEY OPERATED. '3' INDICATES THREE-WAY SWITCH. 'TK' INDICATES KEY OPERATED TEST SWITCH FOR CENTRAL BATTERY INVERTER SYSTEM. 't' INDICATES THERMAL OVERLOAD SWITCH RATED AS A MOTOR DISCONNECT
DUPLEX THREE WIRE GROUNDED RECEPTACLE, 20A, 125V. MOUNTED AT 18" AFF SUBSCRIPT 'S' INDICATES WITH SURGE SUPPRESSION. 'K' INDICATES SAFETY TYPE. 'IG' INDICATES WITH ISOLATED GROUND. "GFI" INDICATES GROUND FAULT INTERRUPTER NUMERAL INDICATES CIRCUIT NUMBER
QUADRUPLEX THREE WIRE GROUNDED RECEPTACLE, 20A, 125V. MOUNTED AT 18" AFF SUBSCRIPT 'S' INDICATES WITH SURGE SUPPRESSION. 'K' INDICATES SAFETY TYPE. 'IG' INDICATES WITH ISOLATED GROUND. 'GFI' INDICATES GROUND FAULT INTERRUPTER. NUMERAL INDICATES CIRCUIT NUMBER
SINGLE THREE WIRE GROUNDED RECEPTACLE, 20A, 125V. MOUNTED AT 18" AFF NUMERAL INDICATES CIRCUIT NUMBER
SPECIAL PURPOSE RECEPTACLE. TYPE AND RATING NOTED ON PLAN. MOUNTED AT 18" AFFNUMERAL INDICATES CIRCUIT NUMBER
DISCONNECT SWITCH, RATING AND FUSING NOTED. HORSEPOWER RATING AS REQUIRED BY MOTOR LOAD. 'WP' INDICATES WEATHERPROOF ENCLOSURE, OTHERWISE NEMA-1. INSCRIBED '/' INDICATES FUSIBLE TYPE.

NOTE TO THE CONTRACTOR

WEST 28TH STREET
AREA OF WORK
WEST 26TH STREET
LOCATION PLAN BLOCK: 777 NOT TO SCALE LOT: 37
Fashion Institute of Technology 227 WEST 27TH STREET
NEW YORK, NY 10001 C1591
MEP Consultant MG ENGINEERING D.P.C.
116 West 32nd Street
New York, NY 10001 / (212) 643-9055 #8969.76
Environmental Consultants EPM, Inc.
983 Marcus Ave. Suite 109
Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID
NO. DATE REVISION
FIT Fred P. Pomerantz Art &
Design Center
Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
DRAWING TITLE: ELECTRICAL
SYMBOL LIST, MATRIX AND
ABBREVIATIONS
SEAL & SIGNATURE: DATE: 02.15.2024
PROJECT No: 8969.76 DRAWING BY: CTD CHK BY: DN
SCALE: NTS

E-001.00

DOB page:

1 OF 7



ASSOC NOTES	.STEP	
		CONTRACTOR IS TASK IDENTIFYING OF A DISCONNECT AND THE DISMANTLING INSTALLING NEW F INSTALLING AN ITEM) RELOCATING E NEWLY INSTAL
(1) E-010	1	CONTRACTOR SHALL TRACE AND IDE INDICATED PANELBOARDS. AFTER INFORMATION IS OBTAINED CO PERSONNEL AS WELL AS THE ENGIN
② E-010	2	CONTRACTOR SHALL PROVIDE A LOC CONTRACTOR SHALL DISCONNECT AN CONTROLLER AND FIRE MOTOR. PR LOCAL SERVICE SWITCH SHUT
3^{4} 5^{6} 7^{7} E = 100 2^{4} E = 600	3	CONTRACTOR SHALL INSTALL THE FO 600A SERVICE SWITCH AND PROVIDE NEW 3P CIRCUIT ROOM FOR JOCKEY PUMP. TERMINATIONS AT FIRE PUMP AND J BEEN INSTALLED BY OTHERS. TERMINATIONS AT THE SERVICE SHAL
 (1) (2) (2) (3) (4) (5) (6) (7) (8) (7) (8) (7) (8) (8) (7) (8) (8) (9) (9)	4	CONTRACTOR SHALL PROVIDE BY ME CONTRACTOR SHALL UTILIZE THIS SH REMOVAL OF INTERNAL COM FINAL TERMINATIONS FOR F WORK INDICATED IN AL CONTRACTOR SHALL REQUIRED FOR INDI FIT WILL PROVIDE FIRE WATCH FO IMPAIRMENT OF THE FIRE PROTECTION FIRE WATCH AS REQUIRED BY 2022 UTILITY SHUT DOWN REQUIRED

CONSTRUCTION MATRIX NORMAL BUSINESS HOURS MONDAY – FRIDAY 7AM – 4PM 12:01AM TO TASK 5:59AM ON SATURDAY KED WITH THE FOLLOWING: ALL ACTIVE LOADS OF MSD-1. REMOVING CIRCUIT PROTECTING EXISTING FIRE PUMP. OF EXISTING SECTION OF ELECTRICAL DISTRIBUTION BOARD MSD-1. I FIRE PUMP SERVICE SWITCH AND ENERGIZING NEW FIRE PUMP. AND THE ENERGIZING OF SWITCHBOARD SECTION 1-1 OF MSD-1. (ALTERNATE PRICE EXISTING ACTIVE BRANCH CIRCUIT FEEDERS FROM REMOVED SWITCHBOARD SECTIONS TO ALLED SWITCHBOARD SECTION.(ALTERNATE PRICE ITEM) DENTIFY LOADS (TAG), WIRE SIZES OF BRANCH CIRCUIT WIRING FOR CONTRACTOR SHALL PROVIDE THIS INFORMATION TO FIT FACILITIES Х SINEER. AMPROBING OF EXISTING ACTIVE LOADS. OCAL SHUTDOWN OF via FIRE PUMP SERVICE SWITCH (AT MSD-1). EQUIPMENT AFFECTED: FIRE AND REMOVE BRANCH CIRCUIT WIRING ENERGIZING EXISTING FIRE PUMP Х PRIOR COORDINATION WITH SPRINKLER CONTRACTOR IS REQUIRED. PUMP DOWN REQUIRED FOLLOWING ELECTRICAL EQUIPMENT: ID LOAD SIDE MI CABLING TO FIRE PUMP ROOM. BREAKER IN DP-DSCA-3A AND BRANCH CIRCUITING WIRING TO FIRE PUMP Х JOCKEY PUMP CONTROLLERS SHALL BE PERFORMED AFTER EQUIPMENT HAS HALL BE PERFORMED DURING UTILITY SHUTDOWN. METER #812540 (FEEDS SERVICE SWITCHES FOR MSD-1 & MSD-2). SHUT DOWN TO PERFORM THE FOLLOWING: EQUIPMENT AFFECTED – MSD–1 & MSD–2 LOADS: Cellar, 2nd Fl, 4th Fl, 5th Fl, 6th Fl, OMPONENTS OF THE EXISTING FIRE PUMP CIRCUIT BREAKER. FIRE PUMP SERVICE SWITCH FOR UTILITY CONNECTIONS. Х ALTERNATE #1 L COORDINATE WITH THE FIT & UTILITY COMPANY FOR ANY ADDITIONAL TIME E. Court Yard Temp IDICATED WORK TO BE PERFORMED. & Unknown Branch Circuit OR 2 WEEKS WHILE FIRE PROTECTION SYSTEM IS OUT OF SERVICE. IF THE TION SYSTEM EXTENDS BEYOND TWO WEEKS, THE CONTRACTOR SHALL PROVIDE 22 NYC FC AT NO EXTRA COST FOR THE CLIENT. QUIRED

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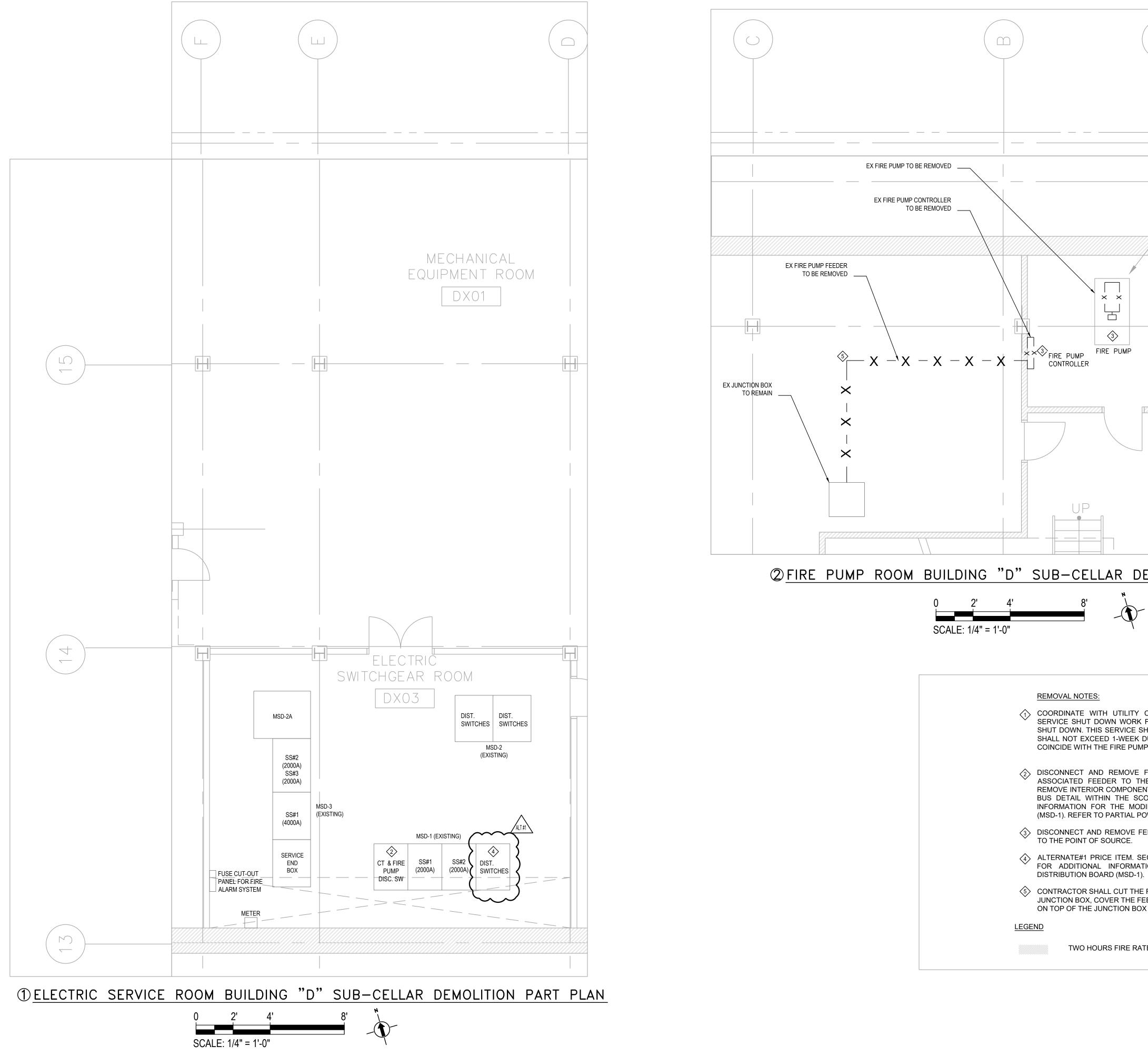
NEW YORK CITY ENERGY CONSERVATION CODE YORK CITY ENERGY CONSERVATION CODE.

ISSUED FOR BID 02/28/2024

WEST 27TH STREET								
WEST 26TH STREET								
LOCATION PLAN BLOCK: 777 NOT TO SCALE LOT: 37								
NOT TO SCALE LOT: 37								
Fashion Institute of Technology 227 WEST 27TH STREET NEW YORK, NY 10001								
C1591 MEP Consultant								
MG ENGINEERING D.P.C. 116 West 32nd Street								
New York, NY 10001 / (212) 643-9055 #8969.76 Environmental Consultants								
EPM, Inc. 983 Marcus Ave. Suite 109								
Lake Success, NY 11042 / (516) 328–1194								
01-18-2024 ISSUED FOR BID NO. DATE REVISION								
FIT Fred P. Pomerantz Art &								
Design Center								
Fire Pump Upgrade 300 7th Avenue, NY, NY 10002								
DRAWING TITLE: ELECTRICAL								
CONSTRUCTION MATRIX								
SEAL & SIGNATURE: DATE: 02.15.2024								
PROJECT No: 8969.76 DRAWING BY: DG CHK BY: KB SCALE: NTS								
DWG No:								
E-002.00								

DOB page: 2 OF 7





FI-FIRE PUMP ROOM DX02		EICHTH AVENUE
DEMOLITION PART PLAN		Fash 227 V NEW C159 MEP MG 116 V New Env EPN 983 Lake
TY COMPANY AND FIT FACILITY ENGINEERS RK FOR APPROVED SCHEDULING OF SERVICE E SHUTDOWN WILL REQUIRE FIRE WATCH AND EK DURATION. THE SERVICE SHUTDOWN MUST UMP SHUTDOWN. YE FIRE PUMP 300A CIRCUIT BREAKER AND THE POINT OF LOAD. CONTRACTOR SHALL NENTS TO MAKE PROVIDE SPACE FOR FUTURE SCOPE OF THIS PROJECT. FOR ADDITIONAL MODIFICATION OF THIS DISTRIBUTION BOARD POWER RISER DIAGRAMS ON E-600.		
E FEEDERS FROM EXISTING EQUIPMENT BACK . SECTION 1-1 OF MSD-1 SHALL BE REMOVED. MATION FOR THE MODIFICATION OF THIS 0-1). THE FIRE PUMP FEEDER AT THE INDICATED E FEEDER WIRES, AND ABANDON THE FEEDER BOX IN A TERMINATION BOX		PROJEC
	<u>Anc</u>	ELE DEI PAF

	AREA OF WORK
- Private Lots	
WEST 26T	H STREET
LOCATION PLAN NOT TO SCALE	ВLOCK: 777
NOT TO SCALE	LOT: 37
Fashion Institute of Te	echnology
227 WEST 27TH STF NEW YORK, NY 1000	REET
C1591	
MEP Consultant MG ENGINEERIN	NG D.P.C.
116 West 32nd Street	
New York, NY 10001 Environmental C	#8969.76
EPM, Inc.	onsultants
983 Marcus Ave. Su	
Lake Success, NY 110	42 / (516) 328-1194
01-18-2024FOR FIT REVISIONNO.DATEREVISION	VIEW
PROJECT:	
FIT Fred P. F	omerantz Art &
•	n Center
	np Upgrade
DRAWING TITLE:	
ELECTRICAL S	UBCELLAR
DEMOLITION	
PART PLANS	
SEAL & SIGNATURE:	DATE: 02.15.2024
	PROJECT No: 8969.76 DRAWING BY: DG CHK BY: CTD

NTS

DOB page: 3 OF 7

SCALE: DWG No:

CADD FILE:

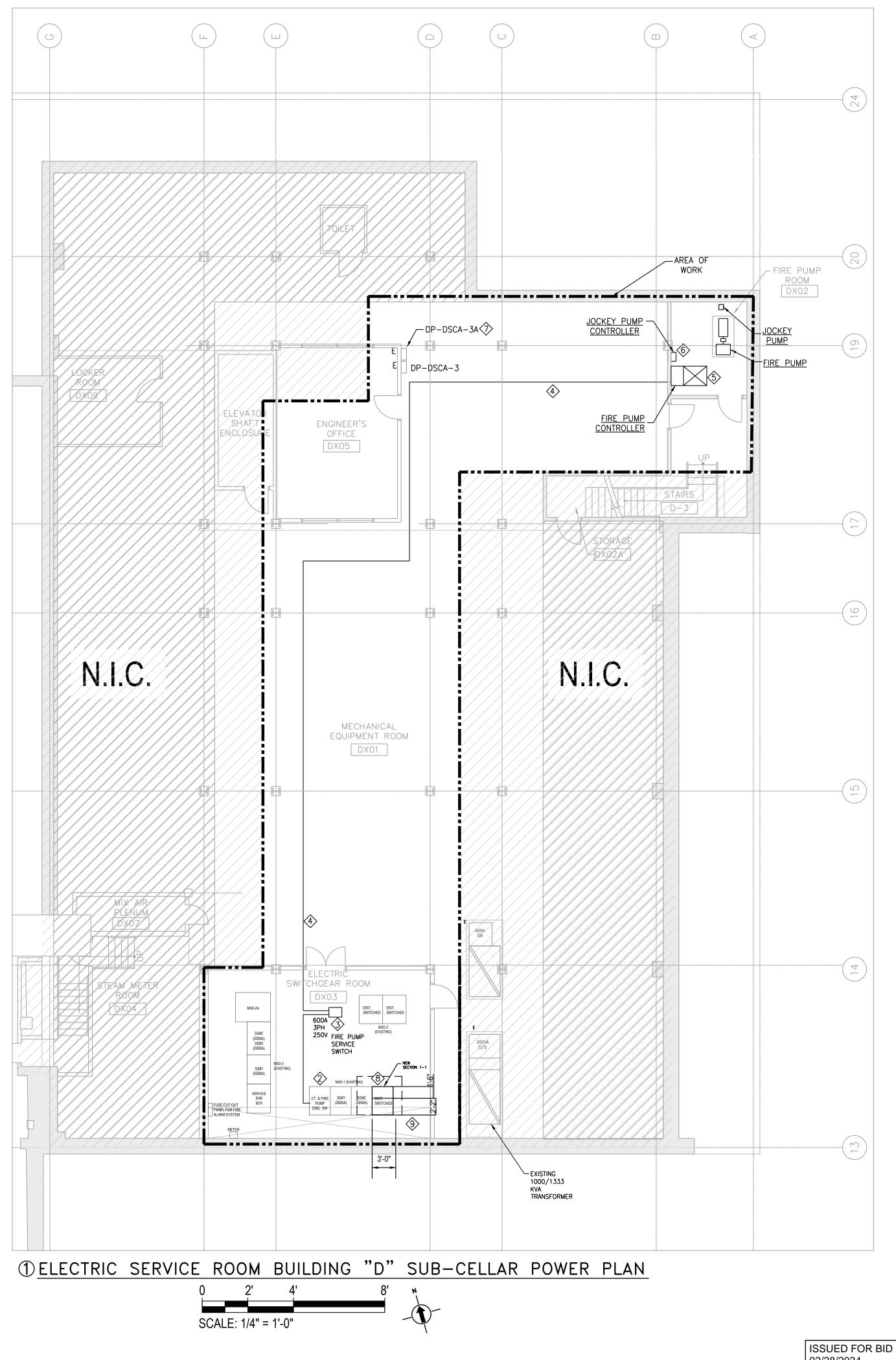
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<u> <u>ann</u></u> MG Engineering D.P.C. / we engineer success 116 West 32nd Street, 12th Floor, New York, N.Y. 10001 P 212.643.9055

www.mgedpc.net

NEW YORK CITY ENERGY CONSERVATION CODE

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW



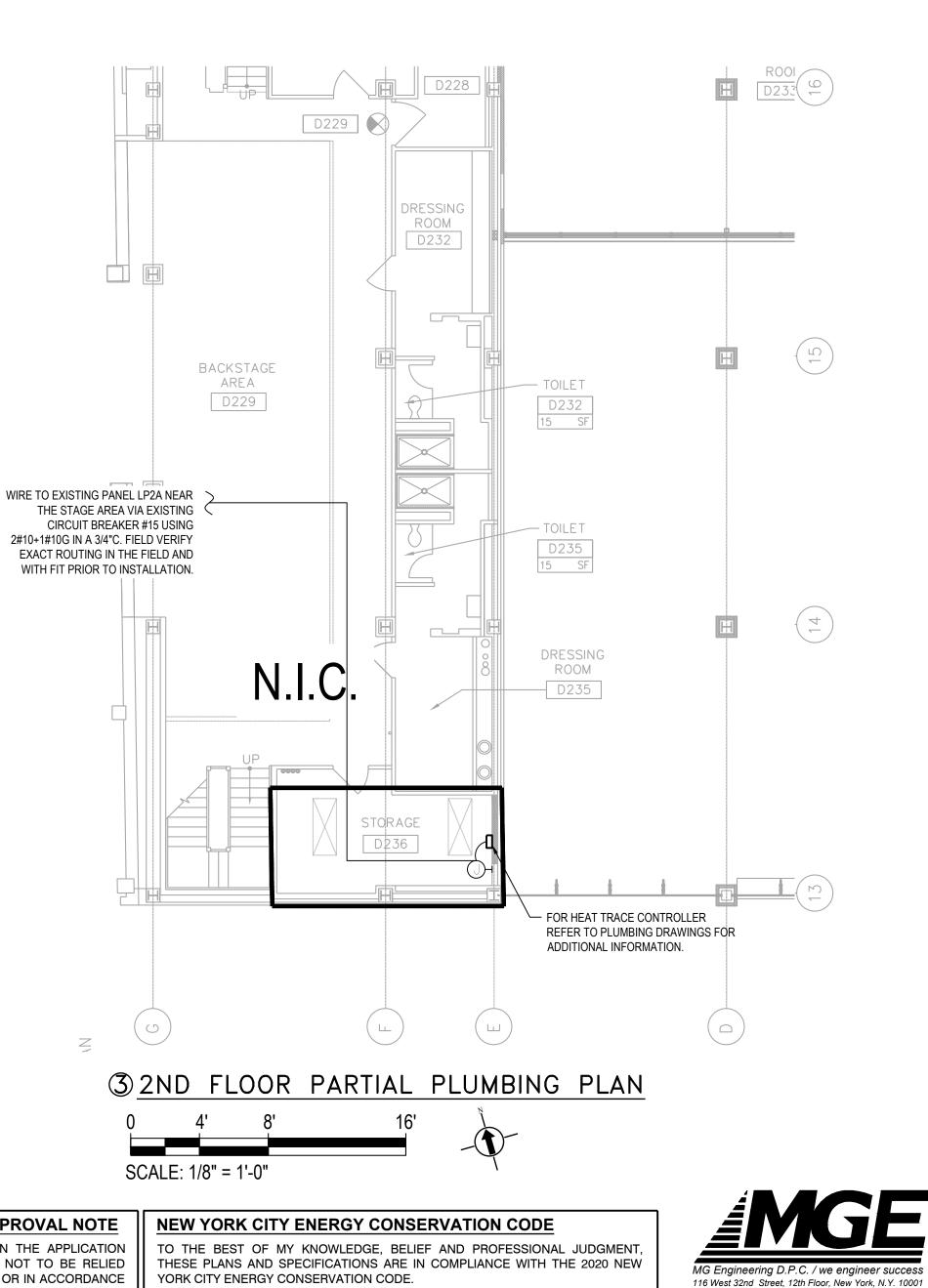
2/27/2024 4:23 PM M:\8969-76\DRAWINGS

PLAN NOTES:

- CONTRACTOR SHALL COORDINATE ALL WORK THAT CONTRIBUTES TO SERVICE SHUTDOWN WITH BUILDING. ADVICE F.I.T. FACILITIES MANAGEMENT IN, (2 WEEKS IN ADVANCE), TO OBTAIN PERMISSION FOR SHUTDOWN OF ELECTRICAL SERVICE.
- FABRICATE AND INSTALL A COPPER DETAIL THAT WILL ACCEPT A FIRE PUMP TAP CONNECTION AS INDICATED.
- (3) CONTRACTOR SHALL EXTEND NEW FEEDERS 2 SETS (3#300kcmil & 2/0G-3"C.) FROM NEW BUS DETAIL TO LINE SIDE OF NEW 600A FIRE PUMP SERVICE SWITCH.
- $\langle 4 \rangle$ Contractor shall extend new feeders 2 sets (3#2 & 6G-MI cable. (MI cable should be rated FOR AT LEAST 150A WITH LESS 2% VOLT DROP FROM SOURCE TO LOAD.) FEEDER ROUTING SHALL BE AS CLOSE TO CEILING SLAB AS POSSIBLE. THE EXISTING CONDITIONS AT CEILING SLAB HEIGHT HAS MANY OBSTRUCTIONS. CONTRACTOR SHALL SUBMIT TO ENGINEER AND FIT THE PROPOSED ROUTING PLAN FOR APPROVAL PRIOR TO INSTALLATION.
- 5 CONTRACTOR SHALL TERMINATE FEEDERS AT LINE OF SIDE OF FIRE PUMP CONTROLLER AND FIRE PUMP. PROVIDE REQUIRED ACCESSORIES TO MAKE INDICATED CONNECTIONS. COORDINATE WITH PUMP INSTALLER FOR EXACT LOCATIONS AND TO VERIFY TYPE OF ELECTRICAL CONNECTION.
- ⟨6⟩ NEW JOCKEY PUMP. PROVIDE ELECTRICAL CONNECTIONS (3#12 & 1#12G-3/4"C.) FROM DP-DSCA-3A TO CONTROLLER AND JOCKEY PUMP.
- ⟨𝔅⟩ ALTERNATE #1 NEW 2000A SWITCHBOARD SECTION. REFER TO PARTIAL RISER DIAGRAMS ON E-600 FOR ADDITIONAL INFORMATION. MATERIAL PRE-PURCHASED BY FIT
- \odot ALTERNATE #1 AREA OPEN TO WIRING TROUGH BELOW. CONTRACTOR SHALL FABRICATE A METAL STRUCTURE TO SUPPORT NEW SWITCHBOARD SECTION THAT DOES NOT SPAN THE DEPTH OF THE EXISTING WIRING TROUGH. METAL SUPPORT STRUCTURE SHALL ALSO SPAN THE ENTIRE OPENING OF THE TROUGH AND SHALL HAVE FUNCTIONALITY TO PROVIDE ACCESS TO THE TROUGH BELOW.

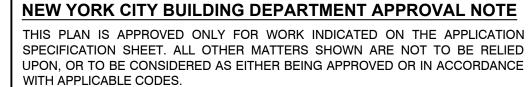
TWO HOURS FIRE RATED WALL

LEGEND



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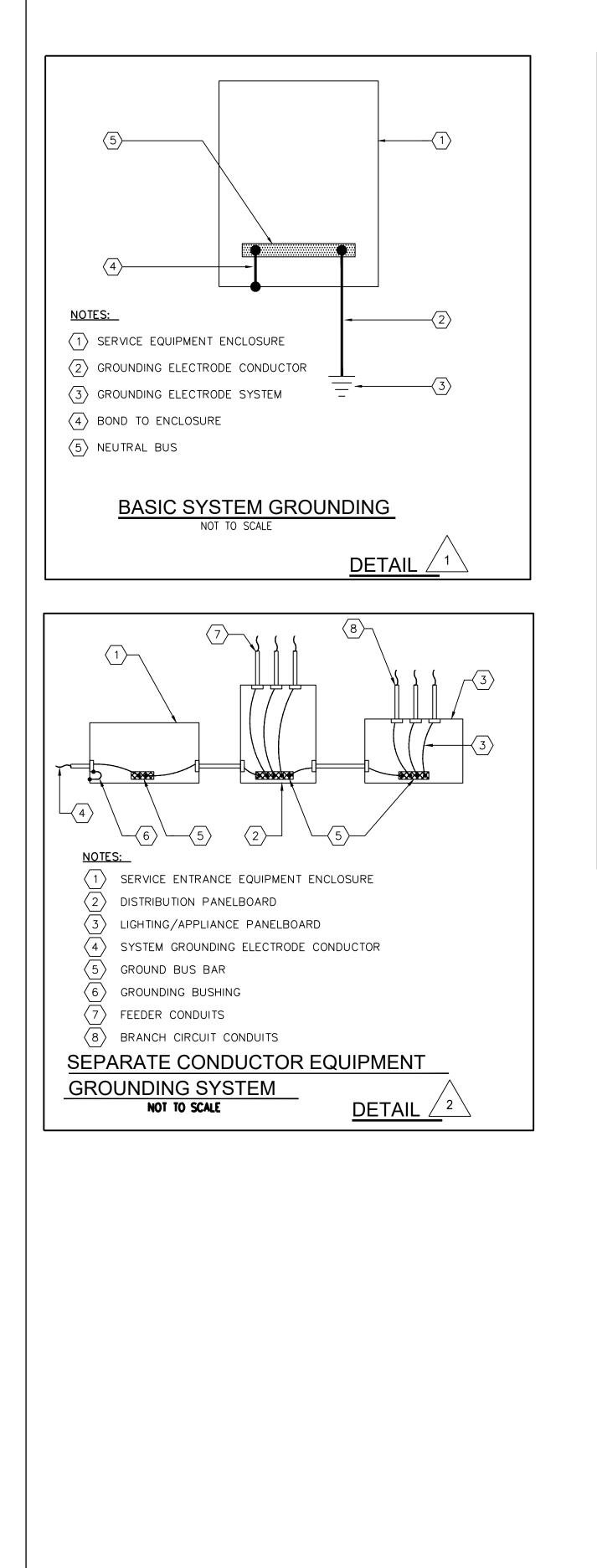
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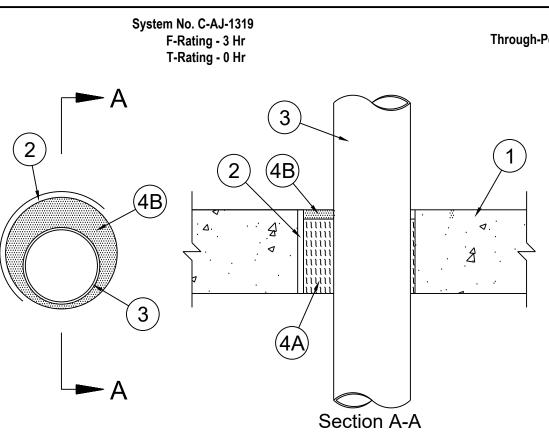
 $\langle 2 \rangle$ contractor to engage the services of a switchboard manufacturer to modify bussing, and to

DP-DSCA-3A. CONTRACTOR SHALL PROVIDE A 15A/3P CIRCUIT BREAKER IN PANEL TO PROTECT NEW FEED TO JOCKEY PUMP CONTROLLER AND JOCKEY PUMP. PROVIDE WIRE AND CONDUIT AS INDICATED.

AREA OF WORK
Privole Lots
WEST 26TH STREET
LOCATION PLAN BLOCK: 777
Fashion Institute of Technology
NEW YORK, NY 10001 C1591
MEP Consultant MG ENGINEERING D.P.C.
116 West 32nd Street New York, NY 10001 / (212) 643-9055 #8969.76
Environmental Consultants EPM, Inc.
983 Marcus Ave. Suite 109 Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID NO. DATE REVISION
FIT Fred P. Pomerantz Art &
Design Center Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
DRAWING TITLE: ELECTRICAL
SUBCELLAR POWER PLAN
SEAL & SIGNATURE: DATE: 02.15.2024
PROJECT No: 8969.76 DRAWING BY: DG CHK BY: CTD
SCALE: 1/8"=1'-0" DWG No:
E-100.00

DOB page: 4 OF 7





1. Floor or wall assembly -- min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. floor may also be constructed of any ul classified hollow core precast concrete units*. wall may also be constructed of any ul classified concrete blocks*. max diam of opening is 6 in. see concrete blocks (cazt) and precast concrete units (cftv) categories in the fire resistance directory for names of manufacturers. 2. Nonmetallic sleeve -- (optional) -- nom 6 in. diam (or smaller) schedule 40 polyvinyl chloride pipe sleeve cast or grouted into concrete flush with both surfaces of floor or wall.

3. Through penetrant -- one metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. the annular space between the pipe, conduit or tubing and the periphery of the opening shall be min 1/4 in. to max 1-3/4 in. pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. the following types and sizes of metallic pipes, conduits or tubing may be used: A. Steel pipe -- nom 4 in. diam (or smaller) schedule 10 (or heavier) steel pipe.

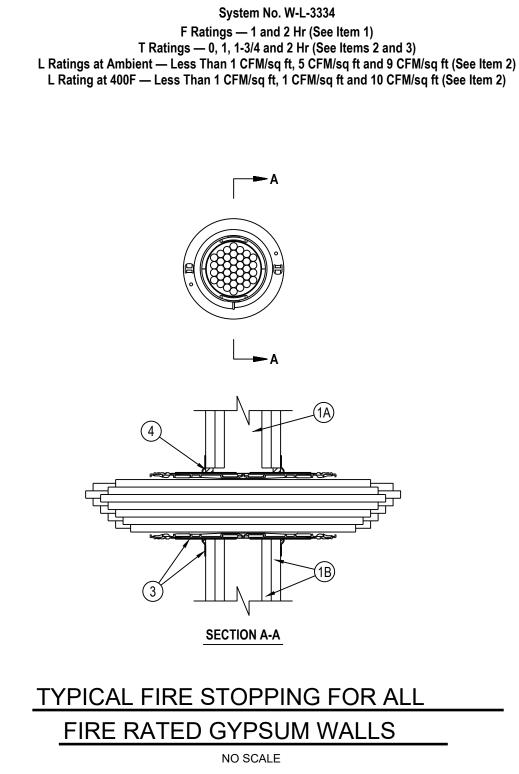
B. Iron pipe -- nom 4 in. diam (or smaller) cast or ductile iron pipe. C. Conduit -- nom 4 in. diam (or smaller) rigid steel conduit, nom 4 in. diam (or smaller) steel electrical metallic tubing or nom 1 in. diam (or smaller) flexible steel conduit.

D. Copper tubing -- nom 4 in. diam (or smaller) type I (or heavier copper tubing. E. Copper pipe -- nom 4 in. diam (or smaller) regular (or heavier

copper pipe. 4. Firestop system -- the firestop system shall consist of the following: A. Packing material -- min 4 in. thickness of 4 pcf mineral wool batt insulation compressed and firmly packed into opening as permanent form. packing material to be recessed from top surface of floor or from both surfaces of wall as

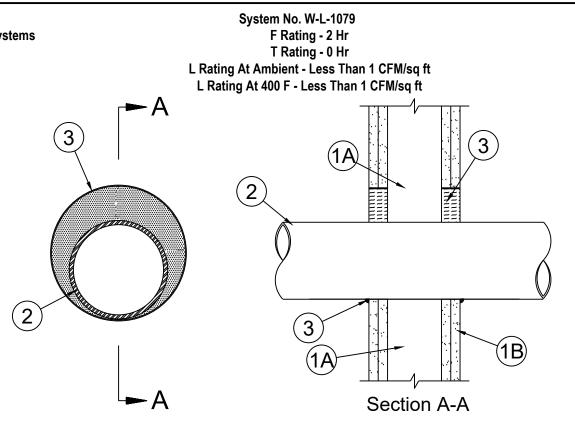
required to accommodate the required thickness of fill material. in floors constructed of hollow-core precast concrete units, mineral wool packing material to extend below exposed cores in precast concrete units. B. Fill, void or cavity material*--sealant -- min 1/2 in thickness of fill material applied within the annulus flush with top surface of floor or with both surfaces of wall.

Specified technologies inc —— specseal series sss sealant or specseal lci sealant *Bearing the ul classification mark



Guide XHEZ Through-Penetration Firestop Systems

DETAIL



1. Wall assembly -- the 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual u300 or u400 series wall or partition design in the ul fire resistance directory and shall include the following construction features:

A. Studs -- wall framing may consist of either wood studs or steel channel studs. wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. oc. steel studs to be min 3-5/8 3-1/2 in. wide and spaced max 24 in. oc. when steel studes are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel stude at each end. the framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.

B. Gypsum board * - 5/8 in. thick, 4 ft wide with square or tapered edges. the gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual u300 or u400 series design in the ul fire resistance directory. max diam of opening is 26 in. for steel stud walls. max diam of opening is 14-1/2 in. for wood stud walls.

the hourly f rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. 2. Through penetrant -- one metallic pipe, conduit or tubing to be installed either

concentrically or eccentrically within the firestop system. pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. the annular space between pipe, conduit or tubing and periphery of opening shall be min 0 in. (point contact) to max 2 in. pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. the following types and sizes of metallic pipes, conduits or tubing may be used: A. Steel pipe —— nom 24 in. diam (or smaller) schedule 10 (or heavier) steel pipe

B. Iron pipe -- nom 24 in. diam (or smaller) cast or ductile iron pipe. C. Conduit -- nom 4 in. diam (or smaller) steel electrical metallic tubing, nom 6 in. diam (or smaller) steel conduit or nom 1 in. diam (or smaller) flexible steel conduit. D. Copper tubing -- nom 6 in. diam (or smaller) type I (or heavier) copper tubing.

E. Copper pipe -- nom 6 in. diam (or smaller) regular (or heavier) copper pipe. 3. Fill, void or cavity material* -- sealant -- min 5/8 in. thickness of fill material applied within annulus, flush with both surfaces of wall, at the point contact location between through penetrant and gypsum board, a min 3/8 in. diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall. Specified technologies inc -- specseal series sss sealant or specseal lci sealant *Bearing the ul classification mark

Wall Assembly -- The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described within the individual U300, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features: A. Studs -- Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced max 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced max 24 in. OC.

B. Gypsum Board^{*} -- Nom 5/8 in. thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be max 2-1/2 in. diam for 2" device and max 4-1/2 in. diam for 4" device. The hourly F Rating of the firestop system is dependent upon the hourly rating of the wall in which it is installed. 2. Cables -- Within the loading area for each firestop device, the cables may represent a 0 to 100

percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types of cables may be used: A. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.

B. Max 7/C No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation. C. Max 4/0 AWG Type RHH ground cable. D. Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.

E. Max RG 6/U coaxial cable with fluorinated ethylene insulation and jacketing. F. Fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 inches.

G. Max 20/C No. 22 AWG shielded printer cable with PVC jacket. H. Through-Penetrating Product* - Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.

AFC CABLE SYSTEMS INC I. Max. 1/4 in. diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket J. Max 3/C No 12 AWG MC Cable.

K. Through Penetrating Product* -- Any cables, Armored Cable+ or Metal Clad Cable+ currently Classified under the Through Penetrating Product category. See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers. For openings with cables, when the hourly rating of the wall assembly is 1 hr, the T Rating is 0 hr. For openings with cables, when the hourly rating of the wall ossembly is 2 hr, the T Rating is 1-3/4 hr except that when Item 2C, 2G, 2I 2J or 2K is used, the T Rating is 1 hr for 2C, 2 OR 2I and the T Rating is 1/2 hr for 2J or 2 K (see Item 3 also). L Ratings apply only when device flanges and CP 606 or FS-One Sealant is used. For blank (no cables) openings, the L Rating at Ambient and 400F is Less Than 1 CFM/sq ft (or Less Than 1 CFM/Unit). For openings with cables, the L Rating is 9 CFM/sq ft (or 1 CFM/Unit) at Ambient and 10 CFM/sq ft (or 1 CMF/Unit) at 400F. For openings with Cat 5 or 6 cables only (Item 2D), the L Rating is 5 CFM/sq ft (or Less T an 1 CFM/Unit) at Ambient and 1 CFM/sq ft (or Less Than 1 CFM/Unit) at 400F.

3. Firestop Device* -- Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings and twisted inner fabric smoke seal. Firestop device to be installed in accordance with the accompanying installation instructions. As an option, the inner fabric seal may remain open except that, to attain the L Rating, the inner fabric seal shall be twisted to completely close off the opening within device. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, butting tightly to both sides of wall. Device flanges are optional. When the device flanges are not used, the T Rating for the firestop system is 0 hr. For blank openings (no cables), the T Rating for the firestop system equals the F Rating only when the device flanges are used. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve

4. Fill, Void or Cavity Material* - Sealant -- Min 1/2 in. thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall, and an additional 1/4 in. bead applied around periphery of device. When device flanges are used, gypsum drywall compound may be used in place of the fill material.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE or CP 606 Sealant DETAIL *Bearing the UL Classification Mark

NOTES:

1. EACH MI CABLE SET SHALL BE BUNDLED INDIVIDUALLY.

FOR "FREE AIR" RATINGS, THE TRANSITION FROM BUNDLED CABLES MUST COMMENCE 24" MINIMUM FROM THE ENCLOSURE -

> BRASS PLATE 1/4" THICK (SIZE AS REQUIRED)

SECURELY FASTEN BRASS PLATE TO STEEL ENCLOSURE WITH SET OF SCREWS AS REQUIRED.(TYPICAL) -

THE BRASS PLATE MUST BE BONDED TO THE ENCLOSURE. DRILL AND TAP THE BRASS PLATE TO ACCEPT THE BONDING CONNECTOR -

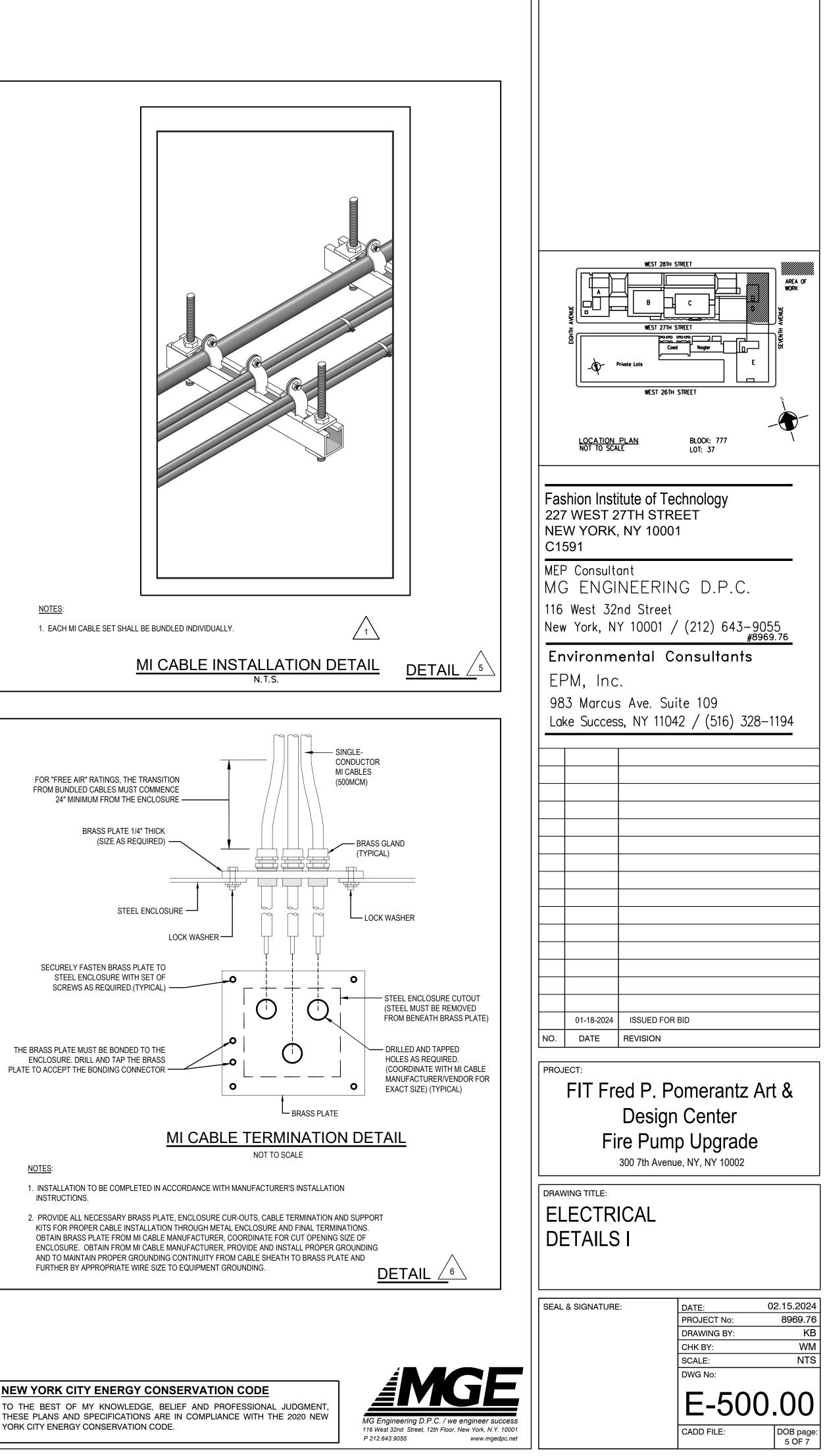
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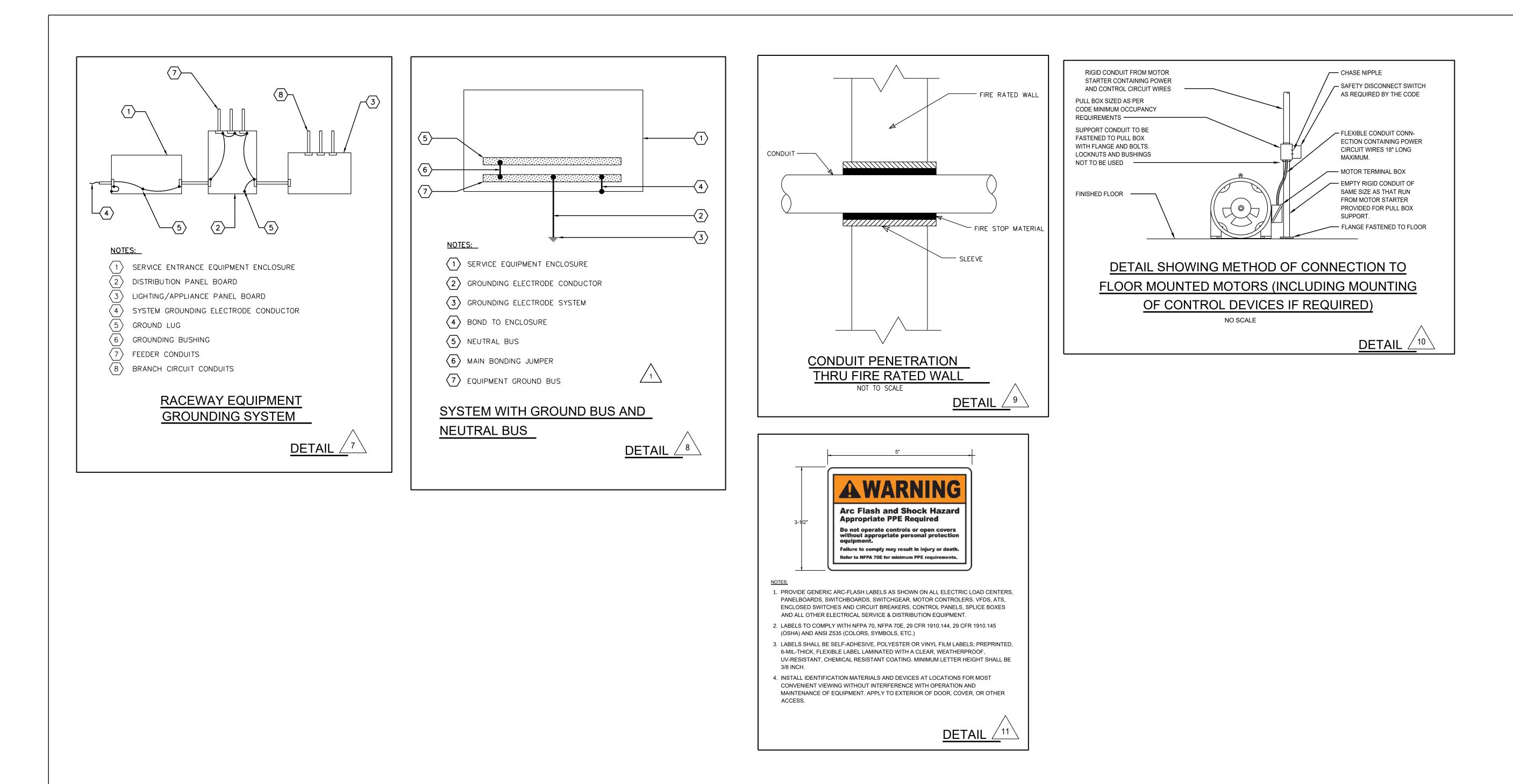
INSTRUCTIONS.

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NEW YORK CITY ENERGY CONSERVATION CODE YORK CITY ENERGY CONSERVATION CODE.

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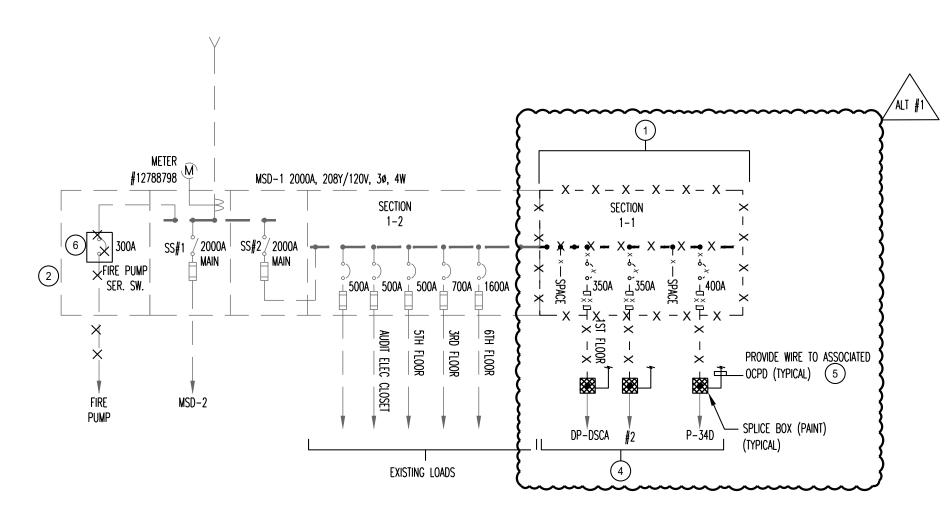


	NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE
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NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

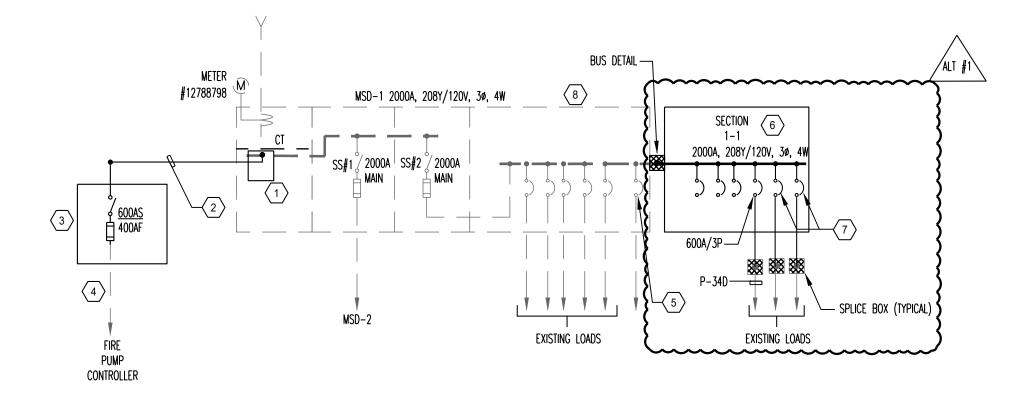
				AREA OF WORK							
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				echnology							
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	MEF	^D Consult									
	116	West 32	nd Street								
				/ (212) 643-9055 #8969.76 Consultants							
		^D M, Inc									
		33 Marcus ke Succes		42 / (516) 328–1194							
		01-18-2024	ISSUED FOR	RBID							
	PROJ		REVISION								
	PROL		ed P. P	omerantz Art &							
	Design Center Fire Pump Upgrade										
	300 7th Avenue, NY, NY 10002										
	EL	LECTR									
	SEAL	& SIGNATURE	 E:	DATE: 02.15.2024							
				PROJECT No: 8969.76 DRAWING BY: KB CHK BY: WM							
L				SCALE: NTS DWG No:							
				E-501.00							
				CADD FILE: DOB page: 6 OF 7							





REMOVAL NOTES:

- (1) CONTRACTOR SHALL TRACE AND IDENTIFY ALL ACTIVE BRANCH CIRCUITS FROM MSD-1.
- (2) DISCONNECT AND REMOVE ASSOCIATED BRANCH CIRCUIT WIRING AND CONDUIT FROM THE LOAD SIZE OF 300A CIRCUIT BREAKER PROTECTING THE FIRE PUMP. COORDINATE WITH SPRINKLER CONTRACTOR PRIOR TO COMMENCING THIS WORK.
- 3 NOT USED.
- (4) ALTERNATE #1: CONTRACTOR SHALL REPLACE EXISTING SECTION WITH 2000A/3P SECTION (PROVIDED BY FIT). IDENTIFY RATINGS OF ALL ACTIVE OCPD'S. LABEL AND SAFE OFF EXISTING ASSOCIATED BRANCH CIRCUIT WIRING OF ALL BRANCH CIRCUIT WIRING FOR FUTURE USE WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR SHALL NOTE EXISTING REMOVAL OF SWITCHGEAR SECTION INVOLVES THRU BUS REMOVAL. THE INDICATED SECTION IS FED FROM A THRU BUS. SAFELY REMOVE FEED TO SWITCHGEAR SECTION DESIGNATED FOR REMOVAL. PROVIDE SHEET METAL TO CLOSE EXISTING PENETRATIONS IN FEEDING SECTIONS TO PROVIDE PROPERLY GROUNDED AND SECURED ENCLOSURE.
- 5 ALTERNATE #1: INTERCEPT AND RE-ENERGIZE FROM NEW MSD-1 SECTION. BRANCH CIRCUITS WIRING SHALL BE MOVED TO NEW SWITCHBOARD INDIVIDUALLY IN ORDER TO MINIMIZE RESPECTIVE LOAD OUTTAGE TIME.
- (6) CONTRACTOR SHALL REMOVE INTERIOR COMPONENTS 300A CIRCUIT BREAKER TO MAKE PROVIDE SPACE FOR FUTURE BUS DETAIL WITHIN THE SCOPE OF THIS PROJECT.



NEW WORK NOTES:

- 1 PROVIDE BUSING DETAIL TO TAP AND EXISTING BUS WITH INDICATED CONDUCTORS TO FEED NEW FIRE PUMP SERVICE SWITCH.
- $\langle 2 \rangle$ EXTEND NEW SERVICE FEEDER TAP (2 SETS OF(3-300kcmil &1#2G-2"C.)) TO THE LINE SIDE OF NEW 600A FIRE PUMP SERVICE RATED SWITCH (WITH TYPE J FUSES).
- (3) NEW 600A FIRE PUMP SERVICE SWITCH FUSED AT 600A AS MANUFACTURED BY EATON. CONTRACTOR SHALL INSTALL SERVICE SWITCH AND PROVIDE LOAD SIDE MI CABLING TO
- 4 3#2 &1#6G MI CABLE. (CABLE SHALL BE RATED FOR A MINIMUM OF 150A WITH A WITH A MAXIMUM OF 2% VOLTAGE DROP AT LOAD. ROUTED VIA CHILLER PLAN CEILING.
- 5 NOT USED.
- $\langle 6 \rangle$ ALTERNATE #1: BUS DETAIL. NEW COPPER DETAIL EXTENDING TAPPED SERVICE FEEDERS TO NEW 2000A SERVICE EQUIPMENT. COORDINATE WITH KEN SWANSON OF EATON (KENJSWANSON@EATON.COM)
- $\langle 7 \rangle$ ALTERNATE #1: CONTRACTOR SHALL INSTALL SWITCHBOARD SECTION. REFER TO REMOVAL INFORMATION ON E-010 AND REMOVAL PART RISER DIAGRAM ON THIS PLAN FOR ADDITIONAL DIRECTION.
- (8) ALTERNATE #1: CONTRACTOR SHALL PROVIDE A CIRCUIT BREAKER WITH THE RATING THAT MATCHES THE TRIP RATING OF OCPD PRESENTLY PROTECT BRANCH CIRCUIT WIRING. REFER TO REMOVAL INFORMATION ON E-010 AND THE REMOVAL PART RISER DIAGRAM ON THIS PLAN.

SERVICE NOTE:

COORDINATE WITH UTILITY COMPANY AND FIT FACILITY ENGINEERS SERVICE SHUT DOWN WORK FOR APPROVED SCHEDULING OF SERVICE SHUT DOWN. REFER TO PHASING MATRIX WHEN DEVELOPING WORK SCHEDULE.

PARTIAL POWER DIAGRAMS

ſ	NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE
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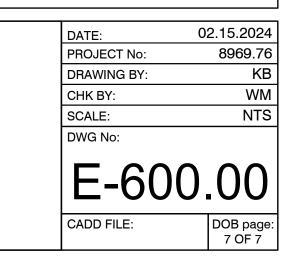
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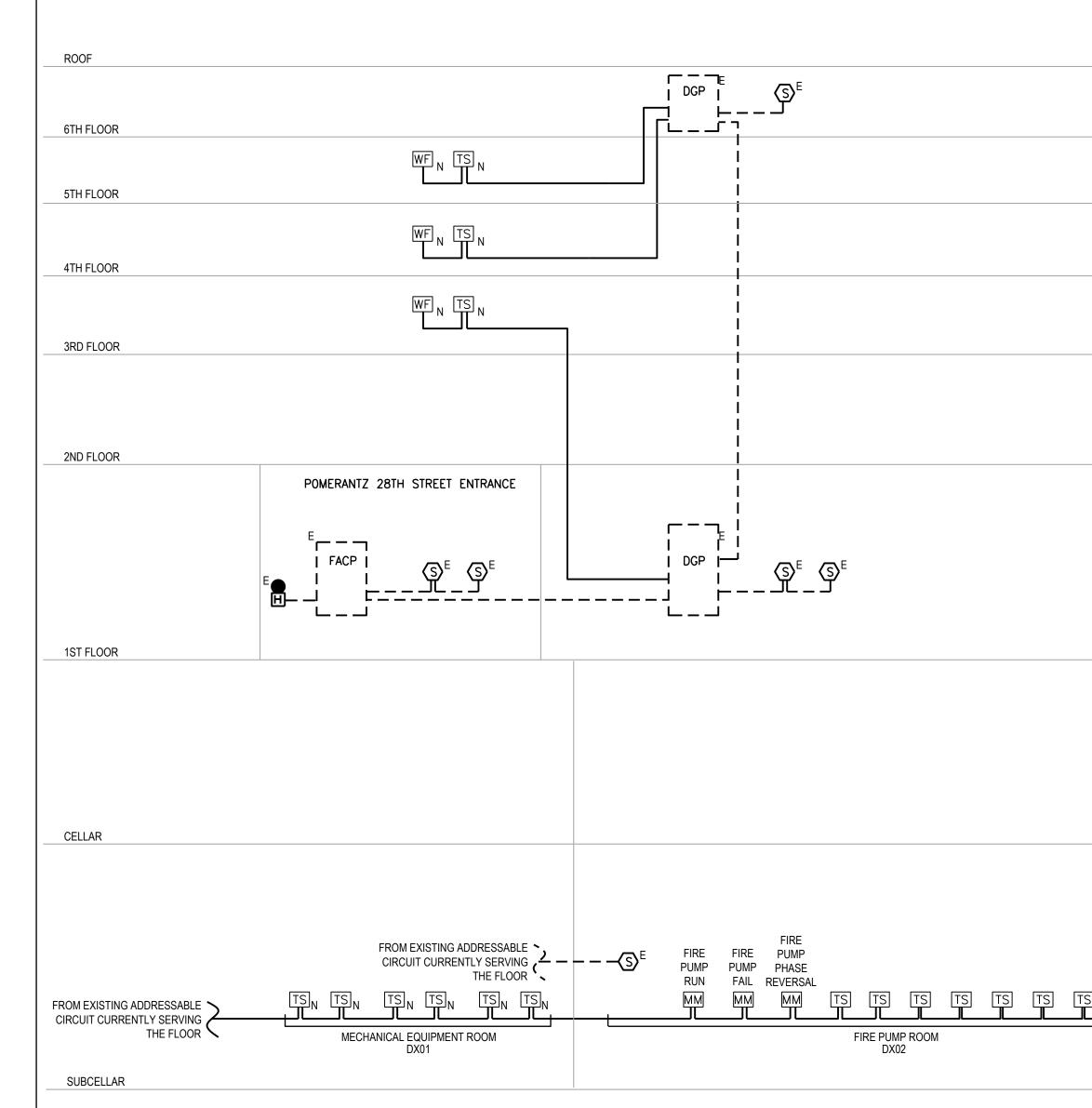
- REFER TO SYMBOLS LIST ON DRAWING E-001. REFER TO DRAWING E-003 FOR EQUIPMENT LIST.
- REFER TO DRAWINGS E-101 & E-302 FOR LOCATIONS OF EQUIPMENT.
- 4. REFER TO THE E-400 SERIES DRAWINGS FOR ELEVATIONS. 5. REFER TO E-700 SERIES DRAWINGS FOR PANEL SCHEDULES.
- 6. PROVIDE NEW WIRING IN EXISTING CONDUIT IF EXISTING IS NOT A MINIMUM OF FEEDER SIZE #26 PER FEEDER SCHEDULE ON SHEET E-002.

WEST 28TH STREET AREA OF WEST 27TH STREE Privale Lol WEST 26TH STREET LOCATION PLAN NOT TO SCALE BLOCK: 777 LOT: 37 Fashion Institute of Technology 227 WEST 27TH STREET NEW YORK, NY 10001 C1591 MEP Consultant MG ENGINEERING D.P.C. 116 West 32nd Street New York, NY 10001 / (212) 643-9055 #8969.76 Environmental Consultants EPM, Inc. 983 Marcus Ave. Suite 109 Lake Success, NY 11042 / (516) 328-1194 01-18-2024 ISSUED FOR BID NO. DATE REVISION PROJECT: FIT Fred P. Pomerantz Art & Design Center Fire Pump Upgrade 300 7th Avenue, NY, NY 10002 DRAWING TITLE: ELECTRICAL EXISTING & NEW WORK SINGLE LINE DIAGRAM & DETAILS

SEAL & SIGNATURE:







PARTIAL FIRE ALARM RISER

<u>RISER NOTES:</u>

1. ALL FIRE ALARM CABLING SHALL BE SUPPORTED FROM BUILDING STRUCTURE AND NOT DEPEND ON CEILING MEDIA, PIPES, DUCTS, CONDUITS OR EQUIPMENT FOR SUPPORT. CABLING SHALL BE SECURED IN PLACE AT INTERVALS NOT EXCEEDING 5 FEET ON CENTERS AND WITHIN 12" EVERY ASSOCIATED CABINET BOX OR FITTING.

2. MODIFY STROBE POWER SUPPLY AS REQUIRED BY FIRE ALARM VENDOR. SUPPLY ALL MODULES, HARDWARE AND SOFTWARE AS NECESSARY.

3. STROBES SHALL BE SYNCHRONIZED WHEN FLASHING SO THAT NO TWO OR MORE STROBES IN ANY FIELD OF VIEW SHALL FLASH AT DIFFERENT TIMES OR RATES.

4. INSTALL NEW STROBE BOOSTER PANEL IN THE CELLAR TO ACHIEVE SYNCHRONIZATION. ALL NEW STROBES ON THE CELLAR AND 1ST FLOORS TO BE CONNECTED FROM THE NEW BOOSTER PANEL. PROVIDE LINE VOLTAGE POWER FOR NEW BOOSTER PANEL FROM DEDICATED FIRE ALARM LINE VOLTAGE POWER RISER VIA 2P-30A DISCONNECT SWITCH.

MAINTAIN CONTINUITY OF EXISTING FA CIRCUITS WHEN FA DEVICES ARE MODIFIED.

FIRE ALARM DRAWING LIST

DWG No. DRAWING TITLE FA-001.00 FIRE ALARM NOTES, SYMBOL LIST, MATRIX & ABBREVIATIONS FA-100.00 FIRE ALARM SUBCELLAR & FIRST FLOOR PART PLANS FA-101.00 FIRE ALARM PART PLANS - 3RD, 4TH, 5TH, AND 6TH FLOORS

	SYMBOL LEGEND							
FACP	FIRE ALARM CONTROL PANEL							
DGP	DATA GATHERING PANEL							
SPS	STROBE POWER SUPPLY							
F	MANUAL PULL STATION, MOUNTED NOT LESS THAN 42" AND NOT MORE THAN 4 ABOVE FINISH FLOOR.							
S	AREA SMOKE DETECTOR ELV - DENOTES ELEVATOR RELATED DEVICE							
H	HORN/STROBE NOTIFICATION DEVICE							
СМ	CONTROL MODULE							
MM	MONITORING MODULE							
TS	TAMPER SWITCH							
WF	WATER FLOW SWITCH							
E ER ERL ERP ERPL	EXISTING TO REMAIN EXISTING REMOVED EXISTING RELOCATED EXISTING IN RELOCATED POSITION EXISTING REPLACED WITH NEW							

		F							ï	i	1	NOTIF	ICATIO	N	1	1			, ,		E SAF ONTRO		
	SYSTEM OUTPUTS	ACTUATE COMMON ALARM SIGNAL INDICATOR, DISPLAY ON LCD AND REMOTE ANNUNCIATOR WHERE APPLICABLE	ACTUATE LOCAL AUDIBLE ALARM SIGNAL AND REMOTE ANNUNCIATOR WHERE APPLICABLE		UATE LOC REMOTE	ACTUATE COMMON TROUBLE SIGNAL INDICATOR, DISPLAY ON LCD AND REMOTE ANNUNCIATOR WHERE APPLICABLE	ACTUATE LOCAL AUDIBLE TROUBLE SIGNAL AND REMOTE ANNUNCIATOR WHERE APPLICABLE	ACTUATE ALL VISUAL DEVICES	ACTUATE ALL AUDIBLE DEVICES TO SOUND A 3-3-3 CODE	TRANSMIT SMOKE ALARM SIGNAL TO CENTRAL STATION	TRANSMIT WATERFLOW ALARM SIGNAL TO CENTRAL STATION	TRANSMIT MANUAL PULL STATION ALARM SIGNAL TO CENTRAL STATION	IT SUPERVIS	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION	TRANSMIT FIRE PUMP RUNNING SIGNAL TO CENTRAL STATION	FIRE PUMF CENTRAL	IT FIRE PUMF TO CENTRAL	ELEVATORS DESIGNATED	SHUTDOWN ALL AIR HANDLING UNITS 2000 CFM AND LARGER SERVING THE FLOOR IN ALARM	CLOSE ALL REQUIRED FIRE/SMOKE DAMPERS	OPERATE ALL DOOR STRIKE RELEASE RELAYS TO OPEN LOCKED DOORS ON ALARM FLOOR	OPERATE ALL DOOR HOLDER RELEASE RELAYS TO ALLOW DOOR TO CLOSE ON ALARM FLOOR	CAUSE THE SHAFT VENT TO OPEN IN THE RESPECTIVE ELEVATOR SHAFT
STEM INPUTS NUAL PULL STATION EA SMOKE DETECTOR EVATOR LOBBY OR E.M.R. SMOKE DETECTOR EVATOR HOISTWAY SMOKE DETECTOR OUCT SMOKE DETECTOR AT DETECTOR TERFLOW SWITCH MPER SWITCH E PUMP RUNNING	2	A 0 0	B 0 0	<u> </u>			F										P						•
IRE PUMP POWER FAILURE IRE PUMP PHASE REVERSAL IRE ALARM AC POWER FAILURE IRE ALARM LOW BATTERY OPEN CIRCUIT ROUND FAULT IOTIFICATION APPLIANCE CIRCUIT FAULT						0																	
S APPLY TO ALL DRAWINGS UNDER THIS NDIVIDUAL DRAWINGS FOR ADDITIONAL GRAMMATIC AND INDICATE GENERAL MS AND WORK. FOLLOW DRAWINGS IN NTAIN HEADROOM AND SPACE CONDITIONS CT CRITERIA. L BOXES SHALL GENERALLY BE LOCATED FINISHED SPACES. WHERE NECESSARY, DUTED OR OTHER ARRANGEMENTS SHALL		Y IS I L WIF HE N G CO L FIR A APF L FIR	EDWA RING, YC EI RK S DE A PROVE E AL	RDS POWE LECTR HALL ND N ARM ID). ARM	ER, C RICAL BE I FPA EQUIF CIRCL	PRODU ONDU CODE N AC 72.	UCTS. CTOR - CORD T SH4	S, C Ance all E	ONDUI E WITH BE AP	h the Prov	ED (N	S MEA,	BSA	S A 3 O 3 SI D IN	TROBE DDRES 0. A PENS, 1. SH HALL OCUM I A S	E OR SSABI SHC HIELD BE A ENTA EPAR	SPEA LE CIF RING DRTS ED C(S INS TION. ATE F	AKER) RCUIT SHAL OR E ONDU STRUC ALL RACE	L BE ARTH CTOR CTED NON- WAY.	INSF GRO S OR BY T -POW	NG S PECTE UNDS RUN HE F /ER LI	HALL D TC NING IRE A IMITEI	ATION NOT) ASSU IN SE ALARM D WIRI
MENT. PULL BOXES SHALL BE PROVIDED REVER TE PULLING OF WIRE AND COORDINATE RADES. COVERS OF JUNCTION AND PULL SIBLE. BUILDING STRUCTURE SHALL BE SECURED FICATIONS.HORIZONTAL RUNS OF METALLIC PORTED AT INTERVALS OF NOT MORE RACEWAY RISERS SHALL BE SUPPORTED EXPOSED RACEWAYS SHALL RUN RIGHT ANGLES TO WALLS.	20. AL 4/Y/B WHICH DUAL C APPRON Y/CLAS WIRED S ALTERN 21. CC	 19. ALL FIRE ALARM CIRCUITS SHALL BE SIZED TO A MAXIMUM OF 80% OF CAPACITY. 20. ALL FIRE ALARM CIRCUITS SHALL BE WIRED NFPA STYLE 4/Y/B (CLASS B) WITH THE EXCEPTION OF THE NETWORK CIRCUIT WHICH SHALL BE NFPA STYLE 7 (CLASS A WITH ISOLATION). DUAL CLASS B NETWORKING IS NOT STYLE 7 AND WILL NOT BE APPROVED. ALL AUDIBLE AND VISUAL CIRCUITS SHALL BE STYLE Y/CLASS B AND SPLIT A/B. SPLIT A/B CIRCUITS SHALL BE STYLE Y/CLASS B AND SPLIT A/B. SPLIT A/B CIRCUITS SHALL BE MIRED ON AN ALTERNATE CIRCUIT. 21. CONDUITS MAY NOT ENTER THE TOP OF ANY FIRE ALARM 																					
ND PULL BOXES SHALL BE SUPPORTED DING STRUCTURE WITH NO WEIGHT ESS DOORS SHALL BE FURNISHED UNDER ALL BE INSTALLED WITHIN 3 INCHES OF	EQUIPM 22. AL AESTHE AND CA 23. AL PAINTEL	_L FIF :TICS \BLE _L FIF	RE AL IN MI TRAY RE AL	.ARM ND. (S SH .ARM	CABIN ALL E CABII	ETS BE HI NETS	SHALI DDEN AND	JUN	SEMI CTION	FLUS	SH MO	DUNTE HALL	BE	T(3) F(3) TI	D BUI 6. D DR M 7. D HE DU	LDINC EVICE AINTE UCT JCTW(G CON LOC NANC MOUN DRK I	ISTRU ATION E AN ITED N ST	ICTION NS ML ID REI SMOK RICT J	IST E PAIR. E DE ACCC	BE RE	ADIL ORS 1	BE SEG Y ACC SHALL WITH T
ALL BE INSTALLED WITHIN 3 INCHES OF PIPES, OR APPLIANCES, EXCEPT FOR EWAYS SHALL BE AT LEAST 1 INCH FROM ALL BE CUT SQUARE AND REAM SMOOTH. D THREADED CONDUIT SHALL BE PAINTED PIPE COMPOUND AND DRAWN UP TIGHT GS.	BE CLE LABEL. 24. AL JUNCTIO NUMBEF SOLDER LOCKS.	LL FIF DN BO RED A	RE AL DXES	ARM AND ABEL	WIRE CABII ED.	SHA NETS. ALL	LL BE ALL CONN	CLE TERI ECTI(ARLY MINAL	LABI S SH SHALL	ELED All e Be i	IN 3E EITHE		P Lt 3	ROVID ED ST 8. FIR ND C(ED W ATION E WA	NTH A NTO NTCH RUCTI	A REM BE L IS TO	ADTE ABEL D BE	LED PER PRON A TE	IN AN UNIT /IDED	N OB: ANE BY F	CT DE SERVA) DEVI F.I.T D E NEW
G SHALL CONFORM TO CODE TIONS OF THE BUILDING, SUCH AS BOILER E SPACES, ETC., LOCATIONS OF CONDUIT SHALL CLEAR PIPING AND ALL OTHER ITS IN THESE PORTIONS OF THE BUILDING D. DM, CONDUITS SHALL NOT BE RUN OVER	STEEL F	TED BOVE SSION ECTRI NICAL AREA 8 FT. SHAL) ON RACE	BY EI THE CAL DAM S AP ALL L BE WALL WAY.	THER FINIS D EXT ROOM AGE PROV WIRII AS F _S -	BUIL IHED TINGUI IS AN SHALI (ED W NG IN FOLLC IN SI	DING FLOO ISHIN ID OT _ BE IRE M STAL WS: NGLE	CONS R. L G SYS THER IN FL JAY E LATIC PIEC	STRU OADII STEM LOCA JLL F BE RI N EX E 1/	CTION NG DO WIRIN TIONS RIGID JN WI POSE (2" SU	OR OCKS, NG, M S SUE COND THOU D IN JRFA(COND GAR ECHA JECT UIT. T CO FINIS CE MC	UIT 1 AGES NICAI TO IN A NDUI ⁻ HED	S, L ALL T ED										
CONTRACTOR SHALL COORDINATE ALL D DETERMINE CEILING TYPE PRIOR TO DETECTORS, OR ANY OTHER CEILING ELEMENTS. ELECTRICAL WORK SHALL ALSO LOCATION OF DIFFUSERS, SPRINKLERS AND ORK.	B SURFAC 26. FII ALARM BE MIXE	É MC RE AL CABL ED OF	DUNTE _ARM .ING. R WIR	D ST CABI LOW ED N	LES S VOLTA EAR A	RACEN SHALL AGE I ANY	NAY. NOT FIRE AC C	BE ALAR RCUI	MIXED M CA T.) WITH BLING	H NOI SHA	n fir Ill N	RE IOT										
	27. AL			. —		1 A	••••	_															

1. THE GENERAL I CONTRACT. REFER NOTES.

2. DRAWINGS ARE ARRANGEMENT OF LAYING OUT WORK. CONSISTENT WITH PR

JUNCTION AND FOR FLUSH MOUNTIN CONDUIT SHALL BE BE MADE FOR CONC AS INDICATED AND NECESSARY TO FACI

LOCATION WITH OTH BOXES SHALL BE AG

4. ALL SUPPORTS AS NOTED IN THE CONDUIT SHALL BE THAN 10 FEET APA AT EACH FLOOR LE PARALLEL WITH OR

5. JUNCTION BOXE INDEPENDENTLY TO BEARING ON CONDU

6. ALL REQUIRED THIS CONTRACT.

7. NO RACEWAYS STEAM OR HOT WAT CROSSINGS WHERE PIPE COVER.

8. CONDUIT ENDS MALE THREADS OF WITH GRAPHITE BAS WITH CONDUIT COUP

9. WIRE COLOR CO REQUIREMENTS.

10. IN UNFINISHED ROOM, FAN ROOMS, ARE APPROXIMATE CONSTRUCTION. CO SHALL BE RUN EXPO

11. IN THE BOILER BOILERS.

12. THE ELECTRICA CEILING WORK WITH FURNISHING OF SMO MOUNTED ELECTRICA BE COORDINATED WI OTHER MECHANICAL WORK.

13. ALL OUTLET BOXES RECEIVING 1-1/4" CONDUIT SHALL BE A MINIMUM OF 2-1/2"DEEP.

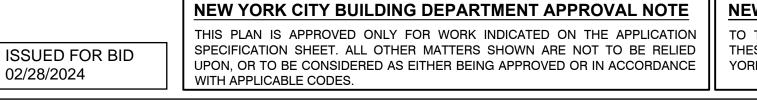
14. SUFFICIENTLY LONG WIRE SLACK SHALL BE LEFT IN RUNS TO PERMIT MAKING PROPER FINAL CONNECTIONS. ALL EMPTY CONDUIT SHALL BE PROVIDED WITH #12 AWG STEEL DRAG WIRE.

15. THE FIRE ALARM MANUFACTURER BASIS OF DESIGN FOR THIS 29. POLARITY SHALL BE OBSERVED ON ALL CIRCUITS. T-TAPPING

02/28/2024

27. ALL LOW VOLTAGE WIRING SHALL BE FPLP 150 DEGREE C. ALL NOTIFICATION CIRCUITS SHALL BE A MINIMUM OF 14 AWG AND ALL OTHER LOW VOLTAGE FIRE ALARM CIRCUITS SHALL BE 16 AWG MINIMUM.

28. VERTICAL RISER CABLE FOR ALL SYSTEMS SHALL BE INSTALLED IN A 2 HOUR RATED SHAFT.



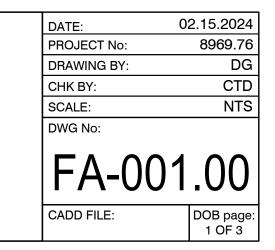
NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

WEST 28TH STREET								
Privole Lots WEST 26TH STREET <u>LOCATION PLAN</u> NOT TO SCALE LOT: 37								
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PROJECT: FIT Fred P. Pomerantz Art & Design Center Fire Pump Upgrade 300 7th Avenue, NY, NY 10002 DRAWING TITLE:								
FIRE ALARM NOTES,								

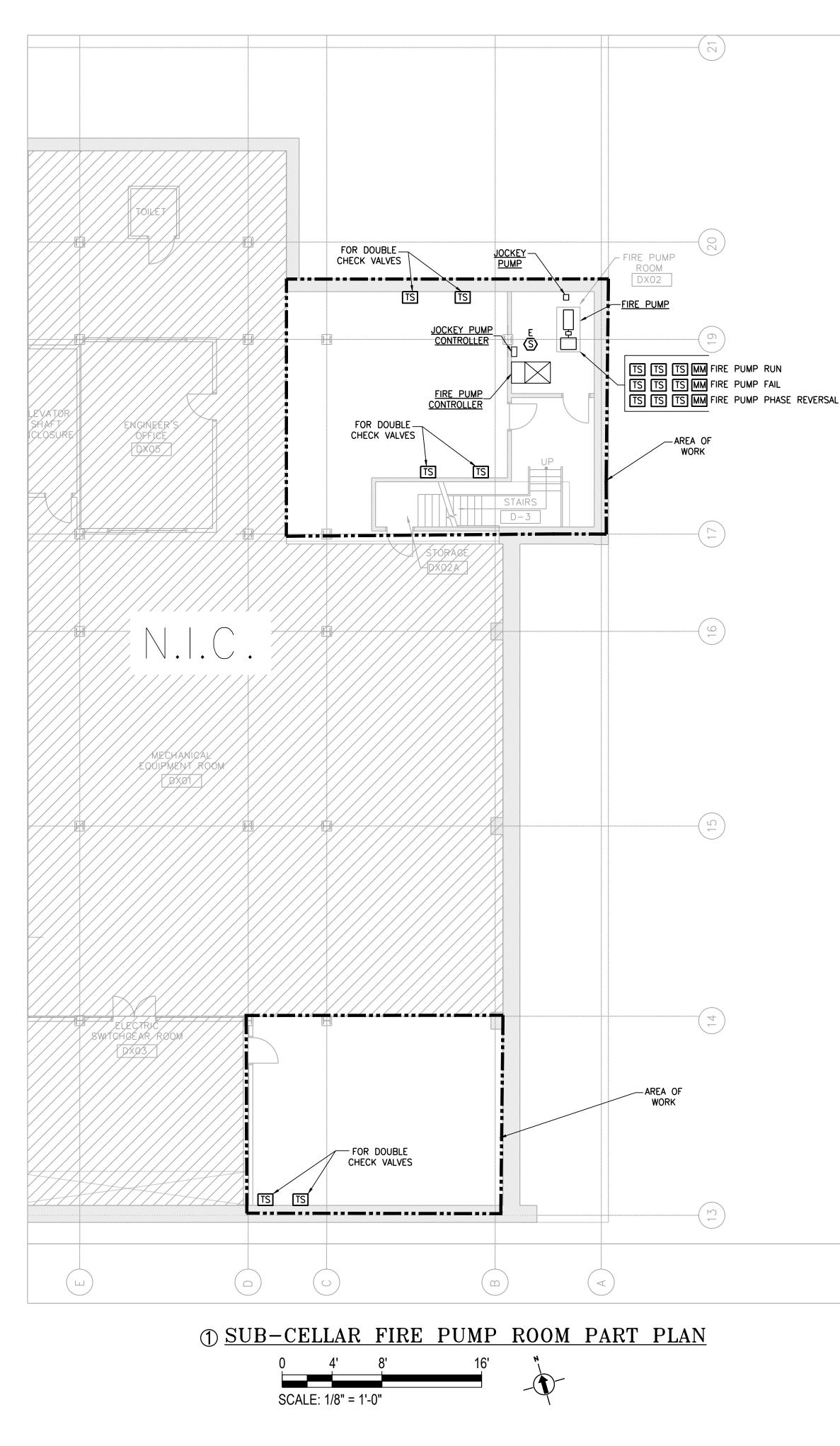
ABBREVIATIONS

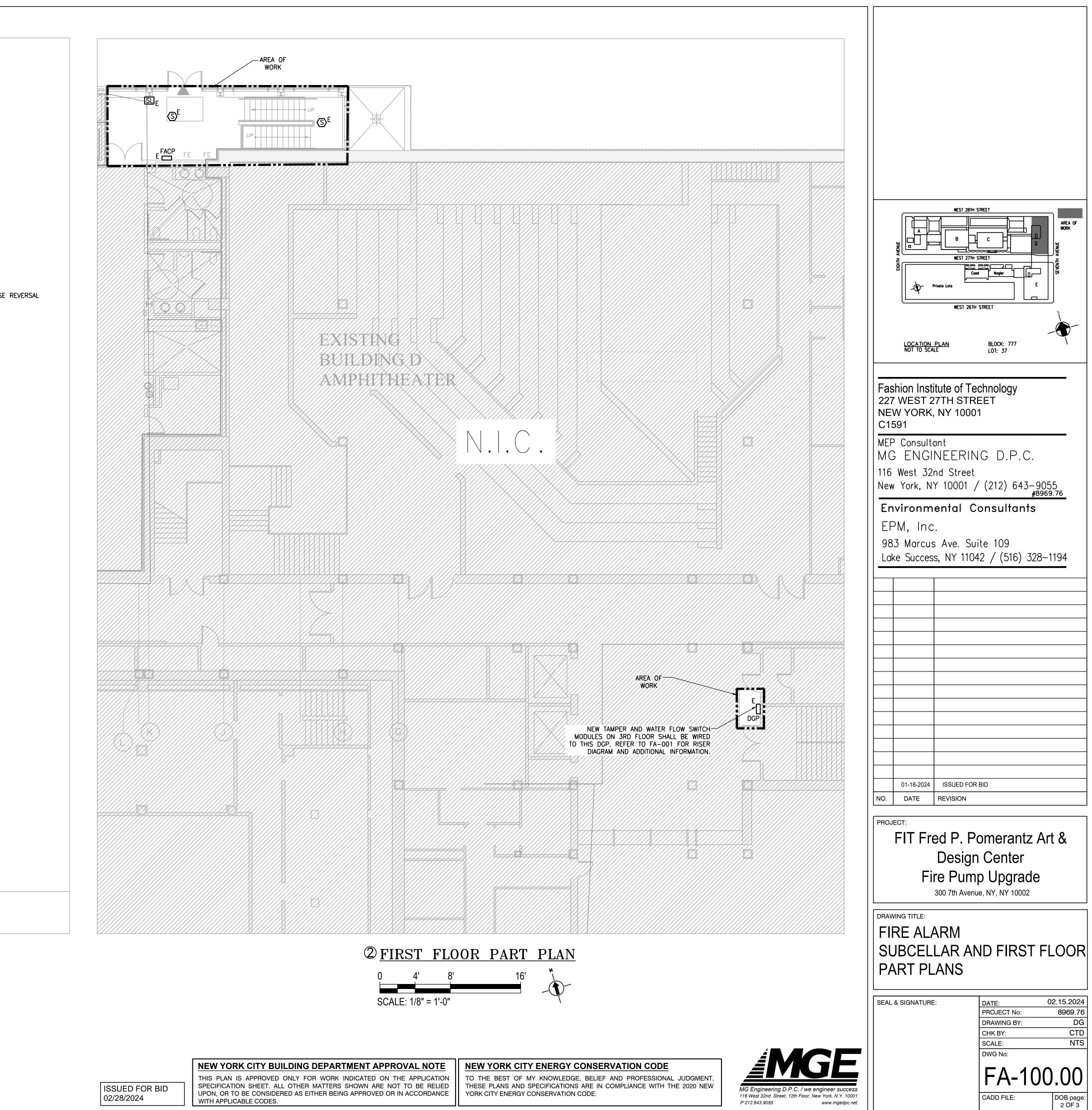
SYMBOL LIST, MATRIX AND

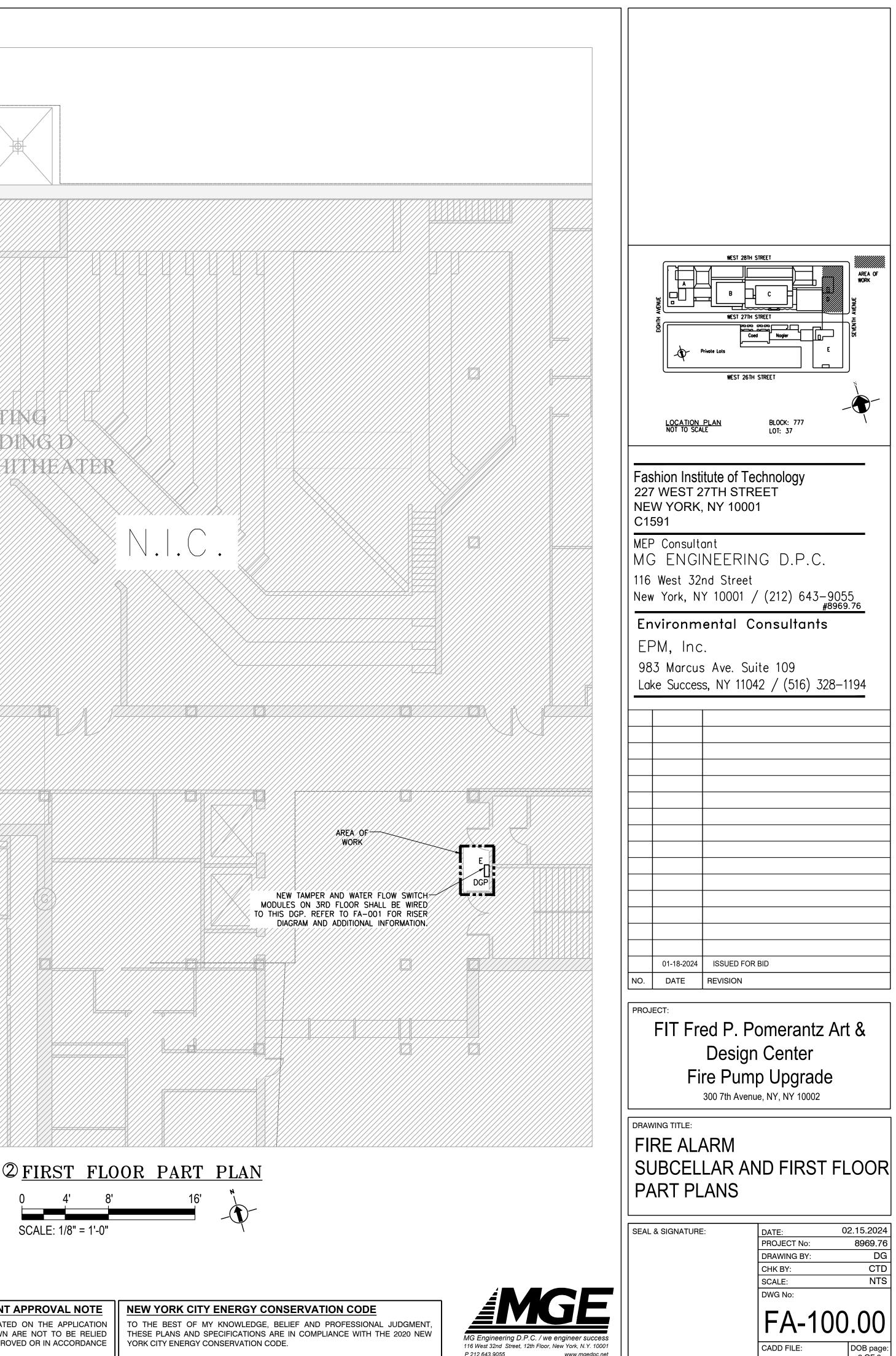
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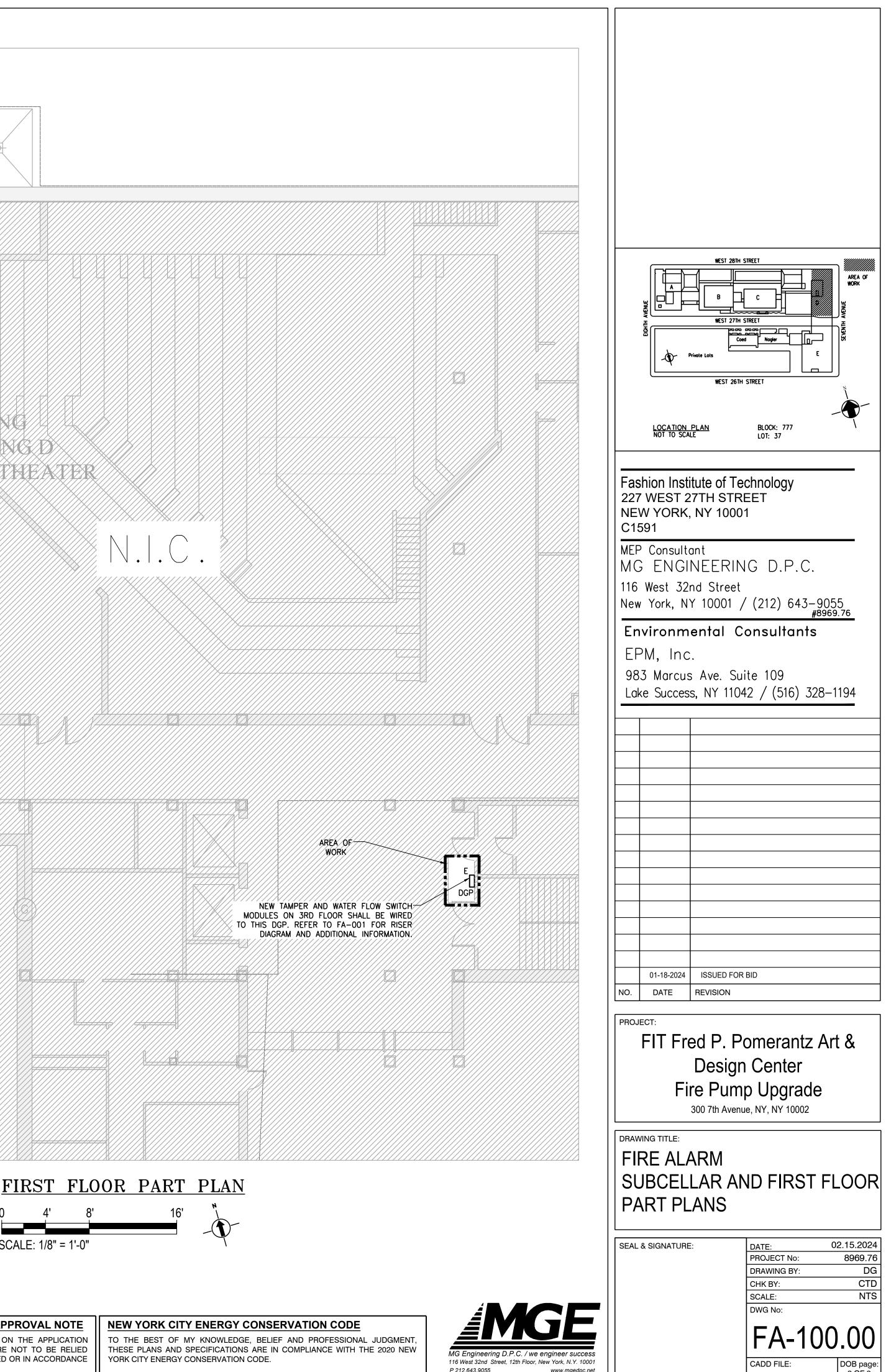


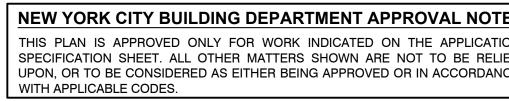


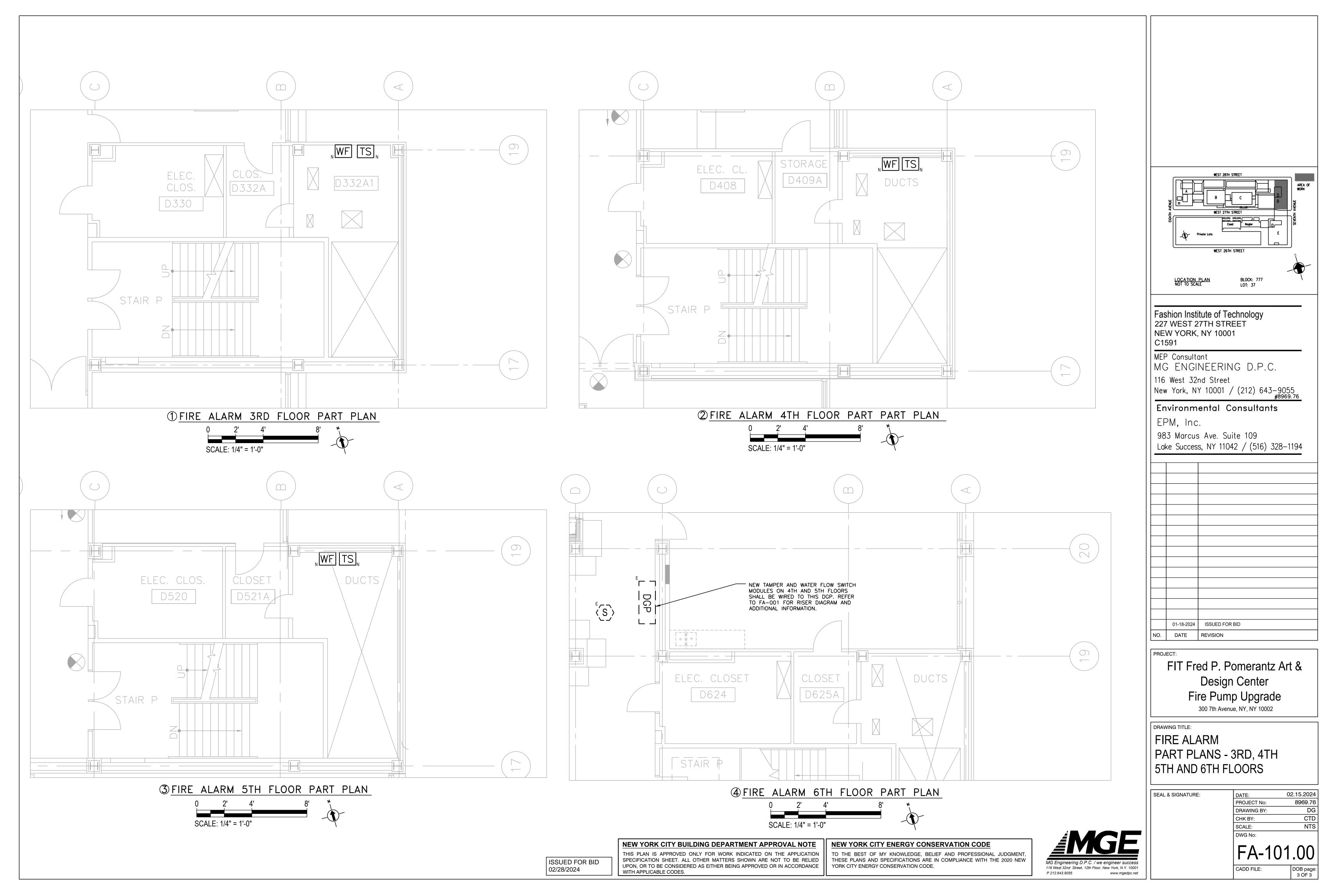








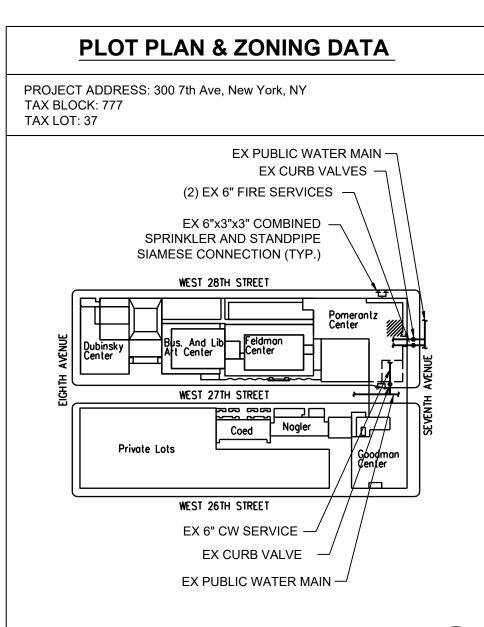




FIRE PROTECTION ABBREVIATIONS

FIRE PROTECTION SYMBOLS									
⊱ F(S) −−−− 2	FIRE PROTECTION INCOMING SERVICE/STREET PRESSURE PIPING								
⊱────₣────₹	FIRE STANDPIPE PIPING								
<u>۲</u>	EXISTING PIPING (REFER TO LETTER DESIGNATION ABOVE)								
► x - x - x →	EXISTING PIPING TO BE REMOVED								
≥ → ₹	ARROW INDICATES DIRECTION OF FLOW								
	PIPE SLEEVE								
<u>ک</u>	UNION								
C	CAPPED OUTLET								
<u>ن</u>	VALVE ON VERTICAL								
<u>ک</u> ے	AUTOMATIC AIR VENT VALVE								
T T	PRESSURE GAUGE AND COCK								
¹	FIRE DEPT. CONNECTION (WALL MOUNTED)								
\bullet	CONNECT NEW WORK TO EXISTING								
	DISCONNECT EXISTING WORK & CAP								
1//,	2 HOURS FIRE RATED WALL								

FP-001	FIRE PROTECTION NOTES, SYMBOLS, ABBREVIATIONS & DRAWING
FP-010	FIRE PROTECTION SUB-CELLAR LEVEL PARTIAL PLAN - DEMOLITION
FP-011	FIRE PROTECTION 1ST FLOOR PARTIAL PLAN - DEMOLITION
FP-100	FIRE PROTECTION SUB-CELLAR LEVEL PARTIAL PLAN
FP-101	FIRE PROTECTION PARTIAL FLOOR PLAN - TYPICAL FOR 3RD,4TH, AND 5TH
FP-501	FIRE PROTECTION DETAILS
FP-601	FIRE PROTECTION RISERS DIAGRAM



RENOVATION SPACE

LOCATION PLAN NOT TO SCALE

SPRINKLERS DURING CONSTRUCTION

Ch J

AS PER FIRE CODE SECTION 901.7.2 PROVIDE FIRE WATCH UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. THE BUILDING SHALL BE EVACUATED OR A FIRE WATCH MAINTAINED IN ACCORDANCE WITH THIS SECTION WHEN A STANDPIPE SYSTEM, SPRINKLER SYSTEM OR FIRE ALARM SYSTEM IS OUT OF SERVICE. SUCH FIRE WATCH SHALL BE CONDUCTED IN COMPLIANCE WITH THE REQUIREMENTS OF FC 901.7.2.1 THROUGH 901.7.2.3.

FIT WILL PROVIDE FIRE WATCH FOR A TWO WEEKS PERIOD. CONTRACTOR SHALL NOT PRICE THE FIRE WATCH IN THE SCOPE OF WORK

SCOPE OF WORK

REPLACE EXISTING SPECIAL SERVICE FIRE PUMP WITH NEW FIRE PUMP. EXTEND EXISTING SPRINKLER AND DRAIN RISER AND PROVIDE NEW FCA AT THE 3RD, 4TH, AND 5TH FLOORS FOR FUTURE

		///////	
ABD	AUTOMATIC BALL DRIP	MAX	MAXIMUM
AFF	ABOVE FINISHED FLOOR	MECH	MECHANICAL
AFP	AUTOMATIC FIRE PUMP	MFR	MANUFACTURER
ARCH	ARCHITECTURAL	MIN	MINIMUM
BLDG	BUILDING	MISC	MISCELLANEOUS
BOP	BOTTOM OF PIPE	N.I.C.	NOT IN CONTRACT
CONN	CONNECTION	No.	NUMBER
CONST	CONSTRUCTION	NTS	NOT TO SCALE
CONT	CONTINUATION	OS&Y	OUTSIDE SCREW AND YOKE GATE VALVE
CV	CHECK VALVE	PO	PLUGGED OUTLET
DIM	DIMENSION	PSIG	POUNDS PER SQUARE INCH (GAUGE)
DN	DOWN (THRU FLOOR SLAB)	REV	REVISED / REVISION
DR	DRAIN	RPM	REVOLUTIONS PER MINUTE
DWG	DRAWING	RV	RELIEF VALVE
EA	EACH	SCHED	SCHEDULE
EL	ELEVATION	SECT	SECTION
ELEC	ELECTRICAL	SLV	SLEEVE
EMER	EMERGENCY	SP	SPRINKLER
ENCL	ENCLOSURE	SS	STAINLESS STEEL
EQUIP	EQUIPMENT	SQ.FT.	SQUARE FOOT (中)
EXIST	EXISTING	STD	STANDARD
FD	FLOOR DRAIN	STL	STEEL
FDC	FIRE DEPARTMENT CONNECTION	TCSP	TEMPORARY CORE SPRINKLER PROTECTION
FF	FINISH(ED) FLOOR	TDH	TOTAL DYNAMIC HEAD
FL	FLOOR	TEMP	TEMPORARY
FS	FIRE SERVICE PIPING	THRU	THROUGH
FSP	FIRE STANDPIPE	TOP	TOP OF PIPE
FT	FEET	TOS	TOP OF SLAB
GC	GENERAL CONTRACTOR	TYP	TYPICAL
GAL	GALLONS	UON	UNLESS OTHERWISE NOTED
GPM	GALLONS PER MINUTE	UP	UP (THRU FLOOR SLAB)
GV	GATE VALVE	VCO	VALVED & CAPPED OUTLET
HP	HORSEPOWER/HIGH POINT	VERT	VERTICAL
HR	HOUR	VIF	VERIFY IN FIELD
ID	INSIDE DIAMETER	VLV	VALVE
IE	INVERT ELEVATION	VO	VALVED OUTLET
IN	INCH	W/	WITH
JP	JOCKEY PUMP	WF	WIDE FLANGE
LP	LOW POINT	WFS	WATER FLOW SWITCH
LZ	LOW ZONE	WP	WATER PROOFING / WATER PROOFED

SPRINKLER BOOSTER PLIMP SCHEDULE

PUMP #	LOCATION	QUANT.	SERVICE	GPM	HEAD			мото	R DATA		MANUFACT.	REMARKS
					TDH	RPM	HP	PH	CYCLE	VOLTS	& MODEL	
FIRE PUMP	FIRE PUMP ROOM (CELLAR)	1	COMBINED	500	89.98 PSI	3550	40	3	60	208	PEERLESS MODEL 4AEF10B	INCLUDE FIRE PUMP CONTROLLER SIMILAR TO FIRETROL FTA1000 WITH ACROSS THE LINE STARTING
JOCKEY PUMP	FIRE PUMP ROOM (CELLAR)	1	COMBINED	10	96 PSI	3500	1.5	3	60	208	GRUNDFOS MODEL CR 3-8	INCLUDE JOCKEY PUMP CONTROLLER SIMILAR TO FIRETROL FTA560I MULTI-STAGE CENTRIF. PUMP

NYC DOB SPECIAL INSPECTION NOTES

AN INDEPENDENT SPECIAL INSPECTOR SHALL BE RETAINED TO PERFORM SPECIAL INSPECTIONS AS WELL AS FILE FORM TR-1 FOR FIRE PROTECTION SYSTEMS DESIGN AS DOCUMENTED ON THESE

- PLANS IN ACCORDANCE WITH THE NYC BUILDING CODE.
- SPECIAL INSPECTION REQUIRED FOR FIRE-RESISTANT
- PENETRATIONS AND JOINTS PER 2022 NYCBC 1705.17.
- SPECIAL INSPECTION REQUIRED FOR POST-INSTALLED ANCHORS PER 2022 NYCBC 1705.37. FINAL INSPECTION REQUIRED PER 2022 NYCBC 28-116.2.4.2,
- BC110.5, DIRECTIVE 14 OF 1975, & 1 RCNY 101-10.

NYC PROFESSIONAL'S STATEMENT

- PER 1RCNY: 5000-01(E)(2)(III) STANDPIPE AND SPRINKLER WORK IS EXEMPT FROM THE ENERGY CODE. I HEREBY CERTIFY THAT THE SYSTEM'S NEWLY CALCULATED
- HYDRAULIC DEMAND AS PER 2022 NYC BUILDING CODE DUE TO WORK FILED UNDER THIS APPLICATION IS EQUAL TO OR LESS THAN THE HYDRAULIC DEMAND OF THE EXISTING SYSTEM PRIOR TO CURRENT OR PROPOSED MODIFICATION.

NYC DOB FILING NOTE

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

FIRE PROTECTION GENERAL NOTES

- 1. THE SPRINKLER CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPLETE SHOP DRAWINGS INCLUDING LOCATIONS AND PIPE SIZING.
- 2. THE SPRINKLER CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS, INSPECTIONS & SIGN-OFF REQUIRED BY THE BUILDING DEPT. OFFICIALS.
- 3. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL PENETRATIONS FOR APPROVAL TO STRUCTURAL & MEP ENGINEER PRIOR INSTALLATION OF WORK.
- 4. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
- 5. EXISTING PIPING WHERE SHOWN FOR VARIOUS SYSTEMS IS DIAGRAMMATIC ONLY.
- 6. BECOME THOROUGHLY FAMILIAR WITH ACTUAL EXISTING CONDITIONS AT THE BUILDING OF THE PRESENT INSTALLATIONS, INCLUDING LOCATIONS, SIZES, AND ELEVATIONS OF PIPING, TO WHICH CONNECTIONS MUST BE MADE OR WHICH MUST BE CHANGED OR ALTERED. THE INTENT OF THE WORK IS SHOWN ON THE DRAWINGS AND DESCRIBED HEREINAFTER, AND NO CONSIDERATION WILL BE GRANTED BY REASON OF LACK OF FAMILIARITY ON THE PART OF THE CONTRACTOR WITH ACTUAL PHYSICAL CONDITIONS AT THE SITE.
- INSTALL ALL WORK IN FULL ACCORDANCE WITH THE REQUIREMENTS OF ALL LOCAL AND GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION OVER THESE MATTERS, AS WELL AS WITH ANY REQUIREMENTS OF THE NFPA, UL, AND OTHER APPLICABLE CODES. SECURE AND PAY FOR NECESSARY APPROVALS, PERMITS, INSPECTIONS, ETC., AND DELIVER THE OFFICIAL RECORDS OF THE GRANTING OF PERMITS TO THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.
- 8. PREPARE AND SUBMIT FOR APPROVAL MANUFACTURER'S SHOP DRAWINGS AND DATA FOR EQUIPMENT, AND DETAILED DRAWINGS OF ALL PIPING WORK.
- 9. KEEP AN ACCURATE RECORD ON ALL DEVIATIONS BETWEEN WORK SHOWN ON DRAWINGS AND THAT WHICH IS ACTUALLY PERFORMED.
- 10. ALL FIRE PROTECTION VALVES SHALL HAVE TAMPER SWITCHES.
- 11. ALL FIRE PROTECTION OS&Y VALVES SIZE 4" & LARGER & PRESSURE DIFFERENTIAL OF 200 PSI & GREATER SHALL BE PROVIDED WITH A VALVED BYPASS.
- 12. ALL FIRESTOPPING MUST BE APPROVED PRODUCTS THAT ARE UL RATED.

DEMOLITION NOTES

- ARRANGEMENT.
- THE PIPING AND EQUIPMENT TO BE REMOVED.
- OF.
- REMAIN.
- UPON COMPLETION OF ALL NEW WORK.
- SITE.
- THE BUILDING OWNER.
- NEW PROPOSED SPRINKLER HEAD LAYOUT.
- WORK.
- DURING CONSTRUCTION.
- SHALL GOVERN.

SPRINKLER AND STANDPIPE PAINTING

IN ACCORDANCE WITH 2022 NYCBC CHAPTER 9 SECTION 903.6. ALL STANDPIPE AND SPRINKLER PIPING INCLUDING MAINS, LOOP MAINS AND VALVE HANDLES MUST BE PAINTED, AS OUTLINED IN THE LAW. THIS LAW IS RETROACTIVE AND IS REQUIRED FOR ALL PROJECTS. SPRINKLER BRANCH LINES FROM MAIN TEE'S ARE EXCLUDED FROM THIS REQUIREMENT. SAMPLES OF THE THREE PRIMARY COLORS USED, RED, GREEN AND YELLOW SHALL BE SUBMITTED FOR APPROVAL BY ENGINEER. PAINTING OF ALL PIPING SHALL REQUIRE A SPECIAL INSPECTION AND CERTIFICATION. NO PIPING SHALL BE ENCLOSED PRIOR TO PAINT INSPECTION BY SPECIAL INSPECTOR.

NYC FLOOD HAZARD AREA NOTES

FEMA FLOOD MAPS OBTAINED FROM FEMA FLOOD MAP SERVICE CENTER WEBSITE. DESIGN APPLICANT MAKES NO CLAIM AS TO THEIR ACCURACY. PROPERTY IS NOT IN SPECIAL FLOOD HAZARD AREA PER EFFECTIVE 2007 FIRM.

> **ISSUED FOR BID** 02/28/2024

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NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL

. VERIFY ALL GOVERNING DIMENSIONS, PIPE SIZES AND LOCATION OF

. NOTIFY BUILDING MANAGER AT LEAST 48 HOURS BEFORE DEMOLITION WORK OR BEFORE SHUT DOWN OF EXISTING SERVICES. RISER SHUT DOWNS SHALL BE PERFORMED AT DESIGNATED TIMES UNDER BUILDING MANAGER'S SUPERVISION AND ONLY WITH HIS APPROVAL.

4. ALL EQUIPMENT, PIPING, ETC. TO BE REMOVED, SHALL BE DISPOSED

5. UPON COMPLETION OF ALL NEW WORK NO ABANDONED PIPING SHALL

6. THE EXISTING SYSTEMS SHALL BE LEFT IN PERFECT WORKING ORDER

. LOCATIONS AND SIZES OF EXISTING PIPING ARE APPROXIMATE. FIELD VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING PIPING AT THE

3. NO REMOVED EXISTING PIPING FITTINGS, VALVES, FIXTURES, ETC. SHALL BE REUSED UNLESS OTHERWISE APPROVED BY THE ENGINEER.

9. THE CONTRACTOR SHALL NOT INTERRUPT ANY OF THE SERVICES OF THE EXISTING BUILDING NOR INTERFERE WITH THE SERVICES IN ANY WAY WITHOUT THE EXPRESS PERMISSION IN WRITING BY THE BUILDING OWNER. SUCH INTERRUPTIONS AND INTERFERENCES SHALL BE MADE AS BRIEF AS POSSIBLE AND ONLY AT THE TIME STATED BY

10. CONTRACTOR & THEIR SUBCONTRACTOR'S SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING SPRINKLERS AND RELATED PIPING AND REMOVING SPRINKLERS AND RELATED PIPING AS REQUIRED TO MEET

1. CONTRACTOR SHALL EXERCISE EXTREME CARE IN PROTECTING AREAS ADJACENT TO CONSTRUCTION AREAS, SHALL FULLY PROTECT THEM FROM ANY DAMAGE RESULTING FROM CONTRACTOR'S WORKMEN, SUBCONTRACTORS OR AGENTS, SHALL BE RESPONSIBLE FOR REPAINTING, CLEANING OR REPLACING ANY SUCH DAMAGE.

12. THE CONTRACTOR SHALL VISIT THE JOB SITE AND THOROUGHLY FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS AND FIRE PROTECTION SYSTEMS PRIOR TO THE BEGINNING OF DEMOLITION

13. SPRINKLER COVERAGE OF THE EXISTING SPRINKLER SYSTEM OUTSIDE THE AREA OF WORK SHALL BE MAINTAINED AT ALL TIMES

14.IN THE EVENT OF ANY DISCREPANCY BETWEEN THE DEMOLITION PLAN AND THE CONSTRUCTION PLANS, CONSTRUCTION PLANS AND INTENT

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DWG No:

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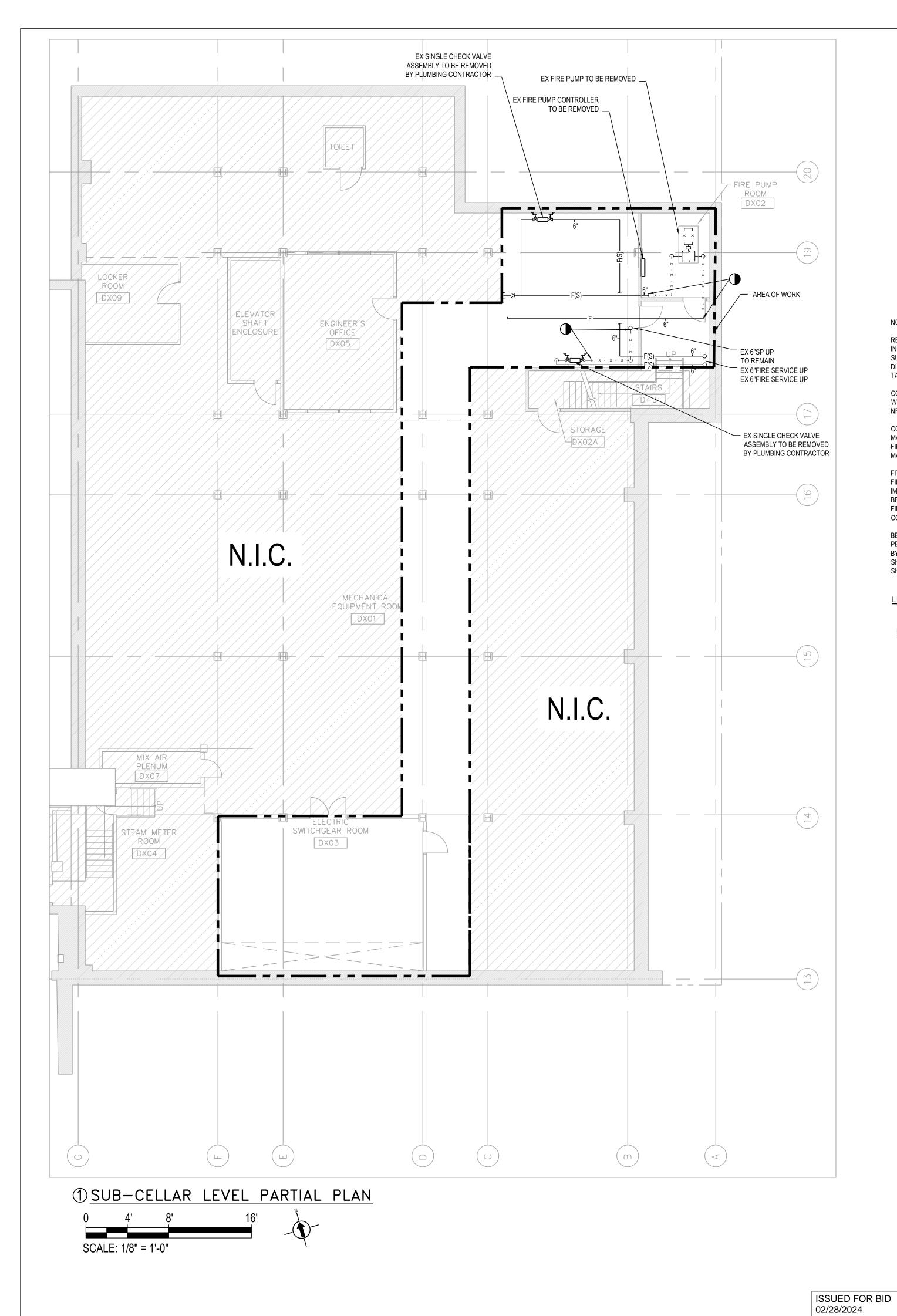
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1 OF 7





NOTE:

REMOVE THE FIRE PUMP AND ALL ASSOCIATED PIPING,

INCLUDING VALVES, CHECK VALVES, RELIEF VALVES AND SUCH. DISCONNECT ELECTRICAL CONNECTION OF EXISTING TAMPER SWITCHES

CONTRACTOR SHALL SUBMIT FIRE PUMP ROOM LAYOUT WITH CLEARANCE AROUND FIRE PUMP REQUIRED BY NFPA13 AND NYC BC

CONTRACTOR SHALL SCHEDULE AND PROVIDE NECESSARY MANPOWER, INCLUDING OVERTIME HOURS TO LIMIT THE FIRE PROTECTION SYSTEM OUT OF SERVICE PERIOD TO MAXIMUM TWO WEEKS

FIT WILL PROVIDE FIRE WATCH FOR TWO WEEKS WHILE FIRE PROTECTION SYSTEM IS OUT OF SERVICE. IF THE IMPAIRMENT OF THE FIRE PROTECTION SYSTEM EXTENDS BEYOND TWO WEEKS, THE CONTRACTOR SHALL PROVIDE FIRE WATCH AS REQUIRED BY 2022 NYC FC AT NO EXTRA COST FOR THE CLIENT.

BEFORE STARTING ANY WORK, THE CONTRACTOR SHALL PERFORM A STANDPIPE SYSTEM FLOW TEST AS REQUIRED BY NYC DOB AND FDNY. PRESSURE AND FLOW READS SHALL BE TAKEN AT THE ROOF MANIFOLD. TEST REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

<u>LEGEND</u>

TWO HOURS FIRE RATED WALL

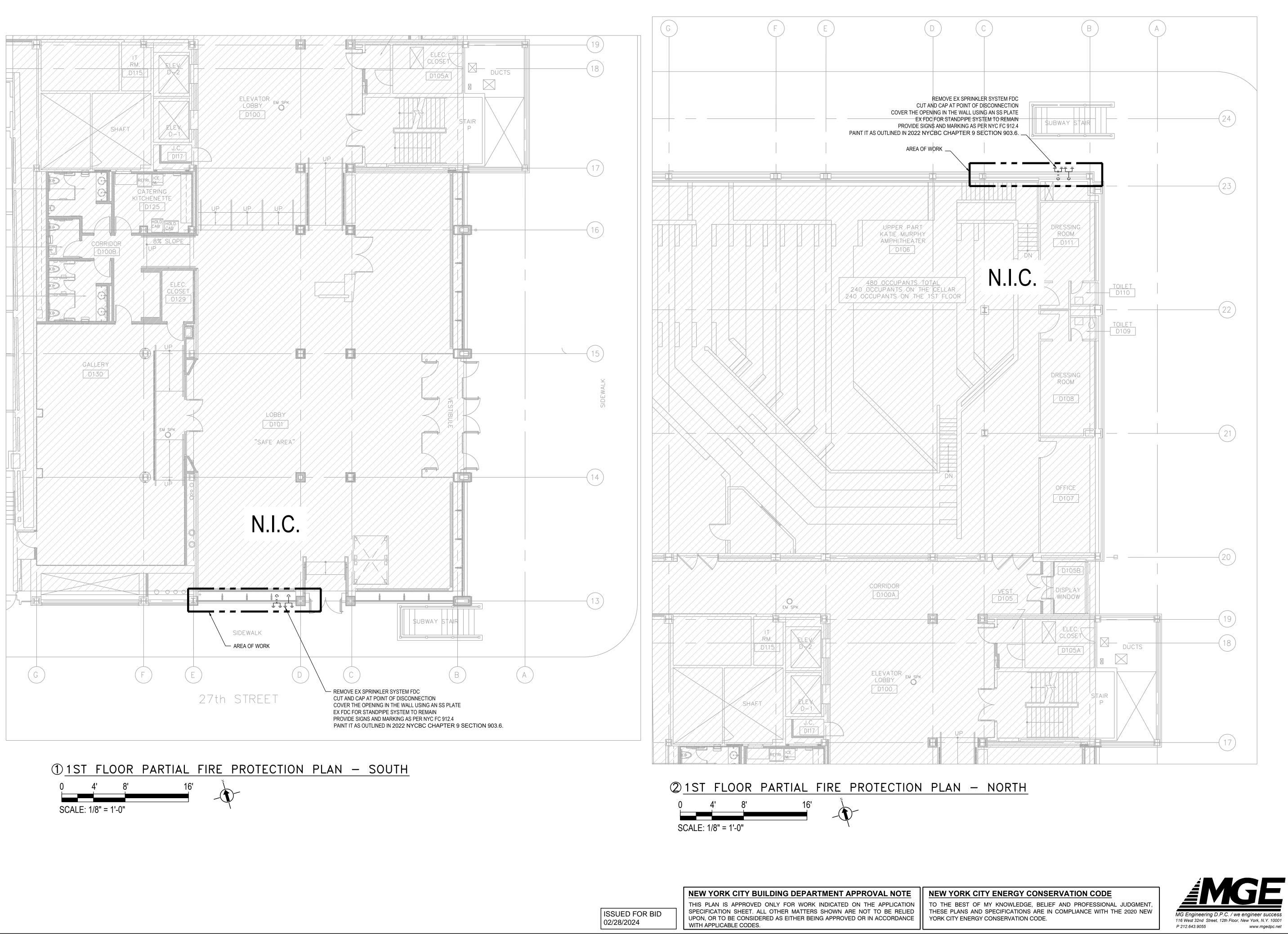
NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE
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WEST 28TH STREET
LOCATION PLAN NOT TO SCALE LOT: 37
Fashion Institute of Technology 227 WEST 27TH STREET
NEW YORK, NY 10001 C1591
MEP Consultant
MG ENGINEERING D.P.C. 116 West 32nd Street
New York, NY 10001 / (212) 643-9055 #8969.76
Environmental Consultants
EPM, Inc.
983 Marcus Ave. Suite 109 Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID NO. DATE REVISION
PROJECT:
FIT Fred P. Pomerantz Art &
Design Center
Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
DRAWING TITLE: FIRE PROTECTION
SUB-CELLAR LEVEL
PARTIAL PLAN - DEMOLITION
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SEAL & SIGNATURE: DATE: 02.15.2024 PROJECT No: 8969.76 DRAWING BY: SAN
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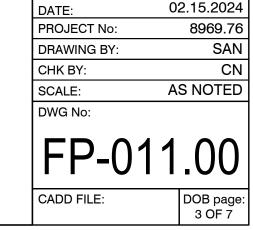
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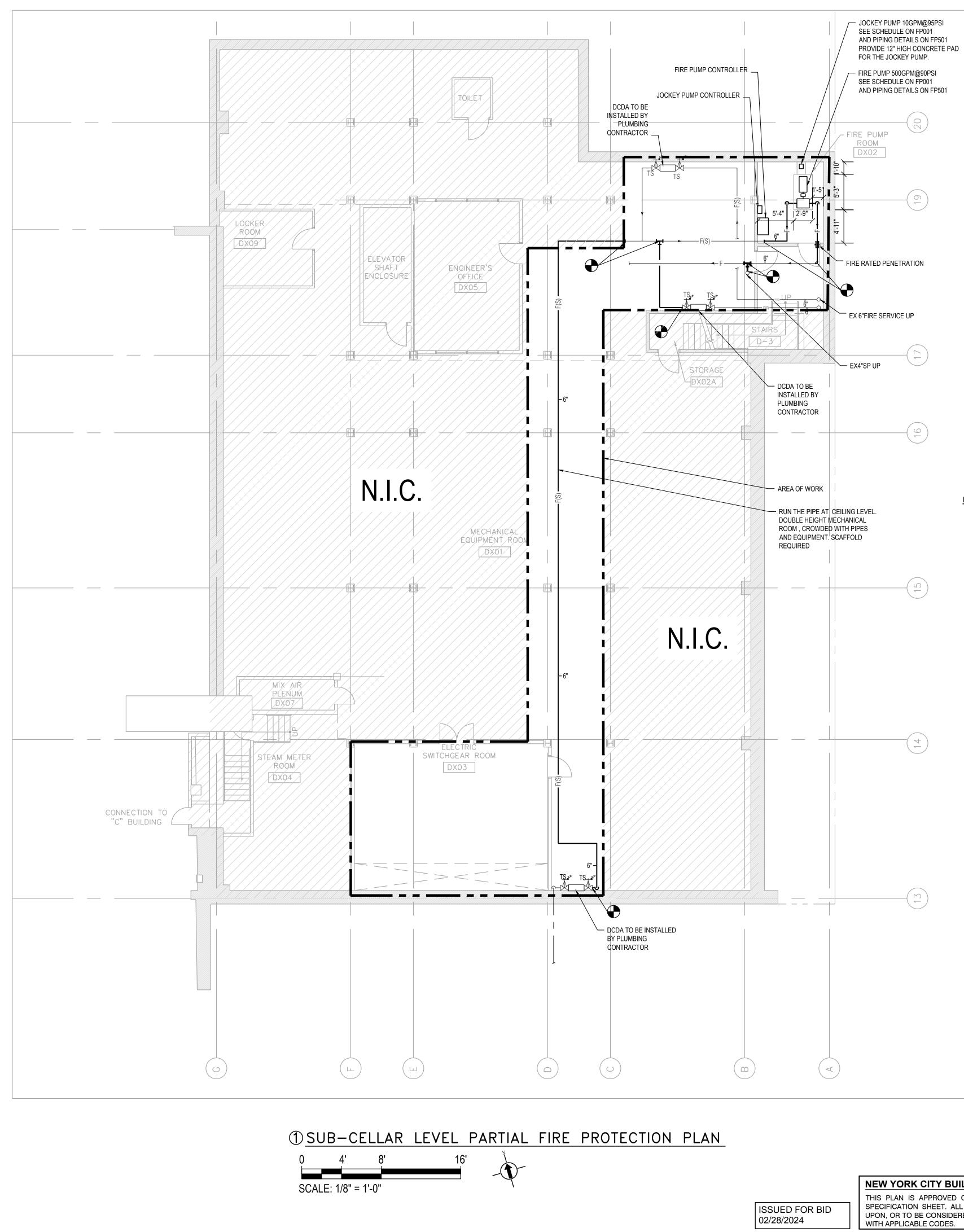




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YORK CITY ENERGY CONSERVATION CODE.

NOTE:

CONTRACTOR SHALL SUBMIT FIRE PUMP ROOM LAYOUT WITH CLEARANCE AROUND FIRE PUMP REQUIRED BY NFPA13 AND NYC BC

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CCONTRACTOR SHALL SCHEDULE AND PROVIDE NECESSARY MANPOWER, INCLUDING OVERTIME HOURS TO LIMIT THE FIRE PROTECTION SYSTEM OUT OF SERVICE PERIOD TO MAXIMUM TWO WEEKS

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AFTER INSTALLATION OF NEW PUMP HAS BEEN COMPLETED THE CONTRACTOR SHALL PERFORM STANDPIPE SYSTEM FLOW TEST AS REQUIRED BY NYC DOB AND FDNY. TEST REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

<u>LEGEND</u>

TWO HOURS FIRE RATED WALL

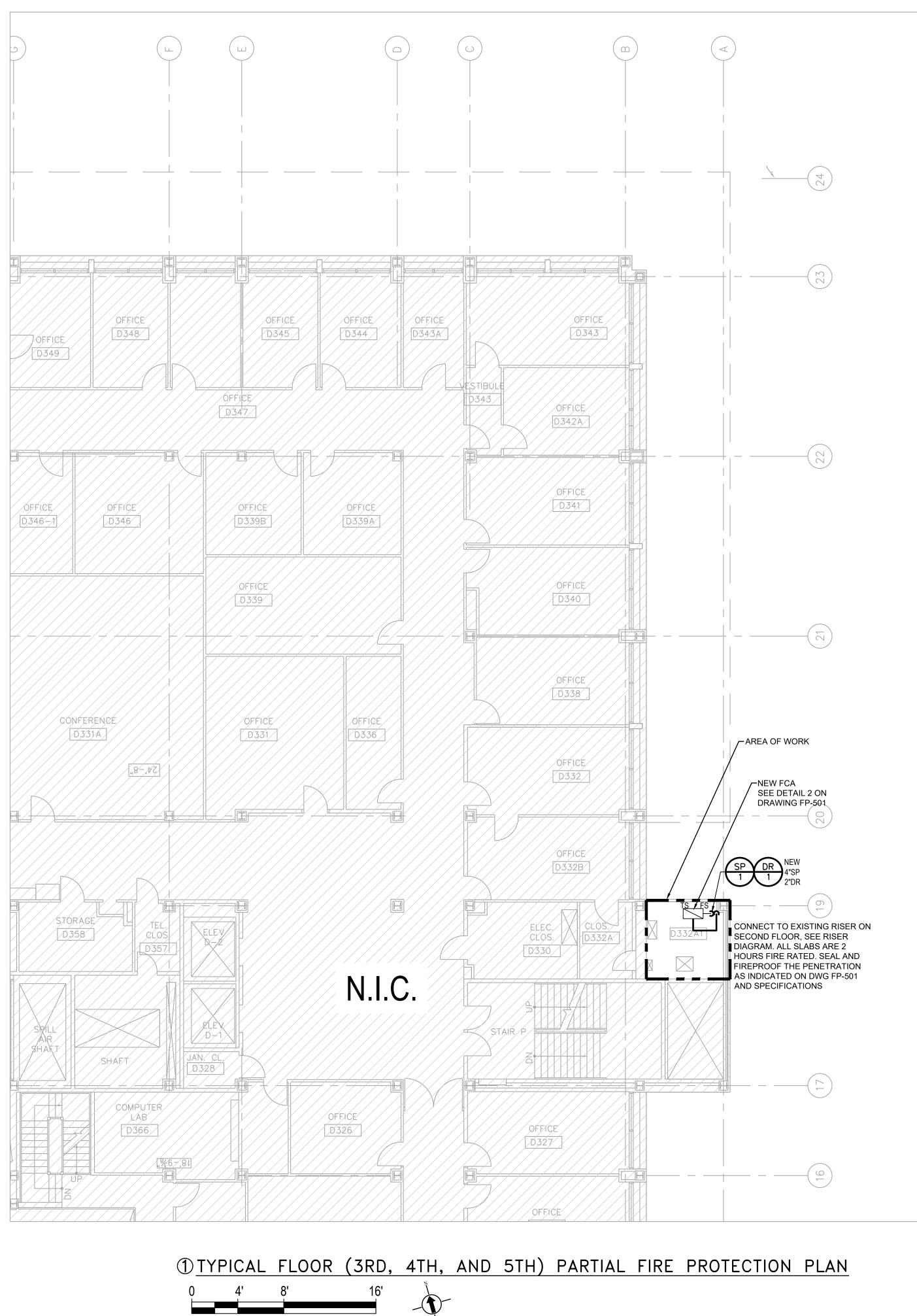
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LOCATION PLAN BLOCK: 777 NOT TO SCALE LOT: 37
Fashion Institute of Technology
227 WEST 27TH STREET
NEW YORK, NY 10001 C1591
MEP Consultant
MG ENGINEERING D.P.C.
116 West 32nd Street New York, NY 10001 / (212) 643-9055
Environmental Consultants
EPM, Inc.
983 Marcus Ave. Suite 109
Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID
NO. DATE REVISION
PROJECT:
FIT Fred P. Pomerantz Art &
Design Center
Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
FIRE PROTECTION
SUB-CELLAR LEVEL
PARTIAL PLAN
SEAL & SIGNATURE: DATE: 02.15.2024
PROJECT No: 8969.76 DRAWING BY: SAN
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DOB page: 4 OF 7

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SCALE: 1/8" = 1'-0"

ISSUED FOR BID

02/28/2024

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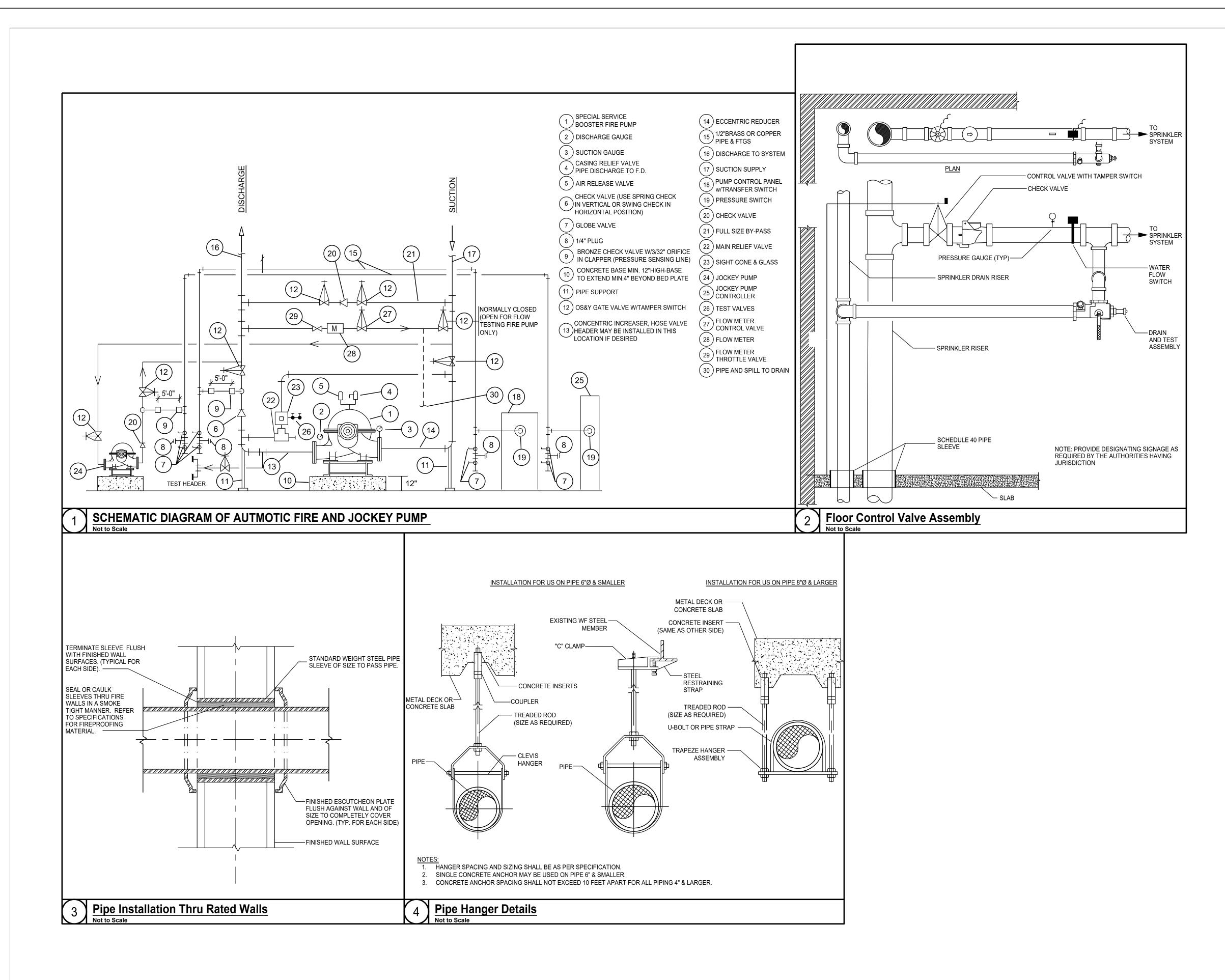
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WEST 28TH STREET
LOCATION PLAN BLOCK: 777 NOT TO SCALE LOT: 37
Fashion Institute of Technology
227 WEST 27TH STREET NEW YORK, NY 10001
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MG ENGINEERING D.P.C. 116 West 32nd Street
New York, NY 10001 / (212) 643-9055 #8969.76
Environmental Consultants EPM, Inc.
983 Marcus Ave. Suite 109 Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID NO. DATE REVISION
PROJECT:
FIT Fred P. Pomerantz Art &
Design Center Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
DRAWING TITLE: FIRE PROTECTION PARTIAL FLOOR PLAN - TYPICAL FOR 3RD, 4TH AND 5TH
SEAL & SIGNATURE: DATE: 02.15.2024 PROJECT No: 8969.76
DRAWING BY: SAN CHK BY: CN
SCALE: AS NOTED DWG No:
FP-101.00

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DOB page: 5 OF 7





NEW YORK C	ITY BUILDING DE	PARTMENT APPF	ROVAL NOTE
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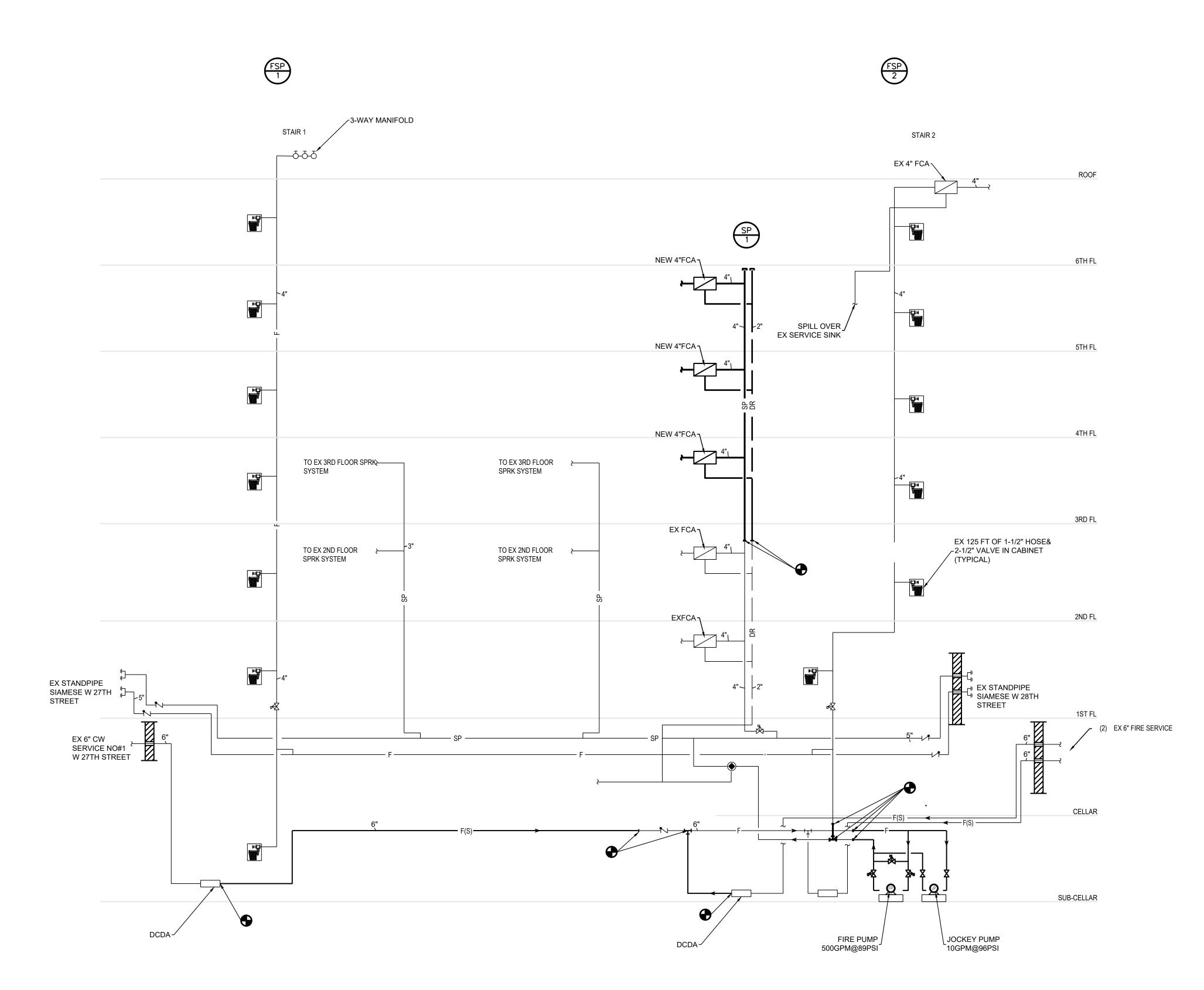
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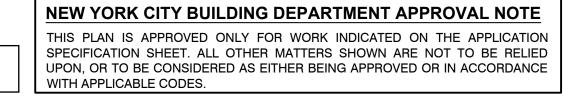
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CODE.



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① FIRE PROTECTION RISER DIAGRAM



NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

ISSUED FOR BID 02/28/2024

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GENERAL PLUMBING NOTES:

- EACH BIDDER SHALL VISIT THE SITE AND BECOME INFORMED AS TO THE CONDITION OF THE PREMISES AND THE EXTENT AND CHARACTER OF WORK REQUIRED. NO ADDITIONAL COMPENSATION WILL BE APPROVED DUE TO THE FIELD CONDITIONS.
- ALL EXISTING SYSTEMS SHALL BE LEFT IN PERFECT WORKING ORDER UPON COMPLETION OF ALL NEW WORK.
- 3. EXACT SIZES AND LOCATIONS OF ALL EXISTING PIPING SHALL BE VERIFIED ON THE SITE.
- 4. NO EXISTING OR REMOVED PIPING SHALL BE REUSED UNLESS OTHERWISE INDICATED.
- THIS CONTRACTOR SHALL NOT INTERRUPT ANY OF THE SERVICES OF THE EXISTING BUILDING NOR INTERFERE WITH THE SERVICES IN ANY WAY WITHOUT THE EXPRESSED PERMISSION OF THE OWNER. SUCH INTERRUPTIONS AND INTERFERENCES SHALL BE MADE AS BRIEF AS POSSIBLE.
- UNDER NO CIRCUMSTANCES WILL THIS CONTRACTOR OR HIS WORKMEN BE PERMITTED TO USE ANY PART OF THE BUILDING AS A SHOP, EXCEPT PART DESIGNATED BY THE OWNER FOR SUCH PURPOSES.
- UNNECESSARY NOISE SHALL BE AVOIDED AT ALL TIMES AND NECESSARY NOISE SHALL BE REDUCED TO A MINIMUM.
- WHERE THE WORK MAKES TEMPORARY SHUT DOWN OF SERVICES UNAVOIDABLE, THEY SHALL BE MADE AT NIGHT OR AT SUCH TIMES THAT WILL CAUSE THE LEAST INTERFERENCE WITH THE ESTABLISHED OPERATING ROUTINE OF THE BUILDING.
- THIS CONTRACTOR SHALL ARRANGE ALL WORK CONTINUOUSLY, INCLUDING OVERTIME AS REQUIRED, TO ASSURE THAT SERVICES WILL BE SHUT DOWN AND CUT-INS ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTION TO EXISTING WORK.
- 10. THIS CONTRACTOR SHALL GIVE AMPLE WRITTEN NOTICE IN ADVANCE TO THE OWNER OF ANY REQUIRED SHUT DOWNS.
- 11. ANY AND ALL REQUIRED DEMOLITION WORK TO BE PERFORMED ABOVE EXISTING SUSPENDED CEILINGS AND FURRED OUT WALLS SHALL BE DONE AT THE TIME WHEN THE EXISTING CEILINGS AND FURRED OUT WALLS ARE REMOVED BY THE GENERAL CONTRACTOR.
- 12. TO ENSURE CONTINUOUS OPERATION, MAKE ALL NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. ALL COST RESULTING FROM TEMPORARY SHUTDOWNS SHALL BE BORNE BY THIS CONTRACTOR.
- 13. ALL VENT, HOT WATER CIRCULATION, HOT AND COLD WATER PIPING ARE AT CEILING OR IN HUNG CEILING: EXCEPT IN PIPE CHASES OR OTHERWISE NOTED.
- 14. CONTRACTOR SHALL CHECK AND VERIFY THE EXACT LOCATION OF ALL PIPE PENETRATIONS, PIPE ELEVATIONS, DRAINS, ETC.
- 15. ACCESS DOORS SHALL BE PROVIDED FOR ALL CLEANOUTS, VALVES, FLUSH VALVES, AND ANY OTHER EQUIPMENT AND ACCESSORIES THAT MAY REQUIRE ACCESS FOR MAINTENANCE OR OPERATION WHICH ARE LOCATED BEHIND WALLS AND PARTITIONS OR CONCEALED IN HUNG CEILINGS. COORDINATE INSTALLATION WITH GENERAL CONTRACTOR.
- 16. THIS CONTRACTOR SHALL OBTAIN A COPY OF THE BUILDING RULES AND REGULATIONS AND PROVIDE ALL WORK AS REQUIRED TO CONFORM TO ALL REQUIREMENTS.
- 17. THIS CONTRACTOR SHALL PROVIDE ALL WORK AT THE CEILING OF THE FLOOR BELOW AS INDICATED ON THE DRAWINGS. COORDINATE EXACT ROUTING OF PIPING IN THE FIELD WITH EXISTING CONDITIONS AND WORK OF OTHER TRADES. ALL WORK SHALL BE SCHEDULED AND COORDINATED TO ACCOMMODATE TENANT AND BUILDING ENGINEER.
- 18. THIS CONTRACTOR SHALL PROVIDE CUTTING AND PATCHING OF ALL WORK AS REQUIRED INCLUDING WORK OUTSIDE OF THE GENERAL PROJECT LIMIT LINES (I.E. CEILING OF THE FLOOR BELOW).
- 19. THIS CONTRACTOR SHALL PROVIDE CAPPED/VALVED OUTLETS FOR FUTURE CONNECTIONS WHENEVER CONNECTING INTO AN EXISTING CAPPED/ VALVED OUTLET. SIZE OF NEW CAPPED/VALVED OUTLET SHALL MATCH EXISTING.

2022 NYC PLUMBING NOTES

THE PLUMBING SYSTEMS (SANITARY, WASTE, STORM, VENT, GAS, WATER DISTRIBUTION) AND ALL ASSOCIATED EQUIPMENT WILL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE FULL REQUIREMENTS OF THE 2022 BUILDING CODE OF THE CITY OF NEW YORK AS CITED IN CHAPTER 29, THE 2022 NEW YORK CITY PLUMBING CODE AND THE 2022 FUEL GAS CODE.

- WITH THE GENERAL PROVISIONS OF CHAPTER 7.
- PROVIDED IN FULL ACCORDANCE WITH CHAPTER 3.
- FULL COMPLIANCE WITH CHAPTER 4.
- WITH SECTION PC CHAPTER 4.
- COMPLIANCE WITH SECTION CHAPTER 3.
- MAINTAINED IN FULL COMPLIANCE WITH CHAPTER 6.
- IN FULL COMPLIANCE WITH SECTIONS CHAPTER 7.
- INSTALLED IN FULL COMPLIANCE WITH CHAPTER 9.
- IN FULL COMPLIANCE WITH CHAPTER 11.

304.

PC 306.

NYC DOB SPECIAL INSPECTION NOTES

AN INDEPENDENT SPECIAL INSPECTOR SHALL BE RETAINED TO PERFORM SPECIAL INSPECTIONS AS WELL AS FILE FORM TR-1 FOR PLUMBING SYSTEM DESIGN AS DOCUMENTED ON THESE PLANS IN ACCORDANCE WITH THE NYC BUILDING CODE.

- SPECIAL INSPECTION REQUIRED FOR FIRE-RESISTANT PENETRATIONS AND JOINTS PER 2022 NYCBC 1705.17.
- PER 2022 NYCBC 1705.37.

NYC DOB FILING NOTE

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

SCOPE OF WORK REPLACE EXISTING SINGLE CHE WITH NEW AS APPROVED BY DE

1. THE SANITARY SYSTEM SHALL BE PROVIDED IN FULL ACCORDANCE

2. THE MATERIALS USED IN THE PLUMBING SYSTEM SHALL BE

3. EQUIPMENT HOOK-UP AND THE JOINING OF PIPING SHALL BE IN

4. THE INSTALLATION OF FIXTURES SHALL BE IN FULL ACCORDANCE

5. TRAPS FOR FIXTURES AND DRAIN LINES SHALL BE PROVIDED AND CLEANOUTS INSTALLED IN FULL COMPLIANCE WITH CHAPTER 10 AND CLEANOUTS INSTALLED IN FULL COMPLIANCE WITH CHAPTER

6. VERTICAL AND HORIZONTAL PIPING SHALL BE HUNG AND SUPPORTED AS DIRECTED IN SPECIFICATIONS AND WITH THE FULL

7. THE WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND

8. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED

9. THE VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE

10. THE STORM DRAINAGE SYSTEM AND PIPING SHALL BE INSTALLED 11. RODENT PROOFING SHALL BE IN ACCORDANCE WITH SECTION PC

12. TEMPORARY TOILET FACILITIES SHALL BE PROVIDED FOR

WORKMAN AS PER SECTION PC 311. 13. ALL TRENCHING SHALL BE DONE IN ACCORDANCE WITH SECTION

2. SPECIAL INSPECTION REQUIRED FOR POST-INSTALLED ANCHORS

K	
ECK VALVE BACKFLOW PREVENTERS EP	

	PLUMBING A	BRKE
AFF	ABOVE FINISHED FLOOR	MIN
BFP	BACKFLOW PREVENTER	MISC
BLDG	BUILDING	MTD
BOP	BOTTOM OF PIPE	MTL
BOT	воттом	NC
BSMT	BASEMENT	NIC
CI	CAST IRON	No
CLG	CEILING	NO
CONST	CONSTRUCTION	NOM
CONT	CONTINUATION	NTS
CV	CHECK VALVE	OC
CW	COLD WATER	OPNG
CWPD	COLD WATER PUMP DISCHARGE	OVHD
CWVO	COLD WATER VALVED OUTLET	PL
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY	PLBG
DET	DETAIL	PO
DIA	DIAMETER	PRV
DIAM	DIAMETER	PSIG
DIM	DIMENSION	PTN
DN	DOWN	RCV
DR	DRAIN	REINF
DWG	DRAWING	REQT'S
EA	EACH	REV
EL	ELEVATION	RM
ELEC	ELECTRICAL	RPM
EMER	EMERGENCY	RPZ
ENG	ENGINEER	RV
ENTR	ENTRANCE	S
EQUIP	EQUIPMENT	SA
EXIST	EXISTING	SCHEE
EXT	EXTERIOR	SECT
FD	FLOOR DRAIN	SHT
FF	FINISH FLOOR	SLV
FIN	FINISH(ED)	SIM
FIN FL	FINISH(ED) FLOOR	SS
FIN GR	FINISH(ED) GRADE	SQ
FL	FLOOR	SQ.FT
FT	FEET	SP
FTG	FITTING	STD
FXT	FIXTURE	STL
GA	GAUGE	STOR
GC/CM	GENERAL CONTRACTOR/CONST. MANAGER	STRUC
GAL	GALLONS	SUSP
GALV GPM	GALVANIZED GALLONS PER MINUTE	
GPM	GRADE	TEMP
HGT	HEIGHT	THRU
HORIZ	HORIZONTAL	TOS
HP	HORSEPOWER/HIGH POINT	
HR	HOUR	TTB TYP.
HTG	HEAT(ING)	UON
HTR	HEATER	VCO
HZ	HIGH ZONE	VERT
ID	INSIDE DIAMETER	VERT
INSUL	INSULATION	VEST VO
IW	INDIRECT WASTE	
LP		
LZ	LOW ZONE	
MAX	MAXIMUM	WP
MER	MECHANICAL EQUIPMENT ROOM	
MFR	MANUFACTURER	\neg

DR	MIN	МІЛІМИМ
R	MISC	MISCELLANEOUS
	MTD	MOUNTED
	MTL	METAL
	NC	NORMALLY CLOSED
	NIC	NOT IN CONTRACT
	No	NUMBER
	NO	NORMALLY OPEN
	NOM	NOMINAL
	NTS	NOT TO SCALE
	ос	ON CENTER
	OPNG	OPENING
CHARGE	OVHD	OVERHEAD
JTLET	PL	PLATE
OR ASSEMBLY	PLBG	PLUMBING
	PO	PLUGGED OUTLET
	PRV	PRESSURE REDUCING VALVE
	PSIG	POUNDS PER SQUARE INCH (GAUGE)
	PTN	PARTITION
	RCV	RISER CONTROL VALVE
	REINF	REINFORCED
	REQT'S	REQUIREMENTS
	REV	REVISED
	RM	ROOM
	RPM	REVOLUTIONS PER MINUTE
	RPZ	REDUCED PRESSURE ZONE BACKFLOW
	RV	PREVENTER RELIEF VALVE
	s	SANITARY/SOIL
	SA	SHOCK ABSORBER
	SCHED	SCHEDULE
	SECT	SECTION
	SLUT	SHEET
	SLV	SLEEVE SIMILAR (TO)
	SIM	
	SS	STAINLESS STEEL
	SQ SO ET	
	SQ.FT.	SQUARE FOOT (中)
	SP	STREET PRESSURE
	STD	STANDARD
	STL	STEEL
CONCT MANAGED	STOR	STORAGE
CONST. MANAGER	STRUCT	STRUCTURAL
	SUSP	SUSPENDED
	TDH	
	TEMP	TEMPORARY
	THRU	THROUGH
	TOS	TOP OF SLAB
	TS	TAMPER SWITCH
NT	ТТВ	TIGHT TO BEAM
	TYP.	TYPICAL
	UON	UNLESS OTHERWISE NOTED
	VCO	VALVED & CAPPED OUTLET
	1	

VERTICAL

VESTIBULE

WASTE WITH

VALVED OUTLET

WALL HYDRANT

WATER PROOFING / WATER PROOFED

PLUMBIN P-00 P-010 P-10

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NEW YORK CITY BUILDING DEPARTMENT APPROVAL NOTE
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WITH APPLICABLE CODES.

ISSUED FOR BID

02/28/2024

	WING LIST
P-001.00	PLUMBING NOTES, SYMBOL LIST, ABBREVIATIONS AND DRAWING LIS
P-010.00	PLUMBING SUB-CELLAR LEVEL - DEMOLITION
P-100.00	PLUMBING PARTIAL PLANS
PLUM	BING SYMBOLS
	DOMESTIC COLD WATER PIPING
⊱ S ≀	SOIL, WASTE OR SANITARY PIPING
x – x – x – x –	EX PIPING TO BE DEMOLISHED
∼0	ELBOW TURNED UP
≥⊃	ELBOW TURNED DOWN
×−××−	GATE VALVE
<u>ک</u> ے ک	VALVE ON VERTICAL
PD/FD R.D. P.D.	FLOOR/AREA/ROOF OR PLENUM DRAIN (PLAN VIEW)
<u>کا اس ا</u>	METER (SERVICE AS NOTED)
<mark>⊱−−−RPZ−−−−</mark> ⊀	REDUCED PRESSURE ZONE BACKFLOW
	DOUBLE CHECK VALVE BACKFLOW
/#	REVISION NUMBER
\bullet	CONNECT NEW WORK TO EXISTING

DISCONNECT EXISTING WORK & CAP

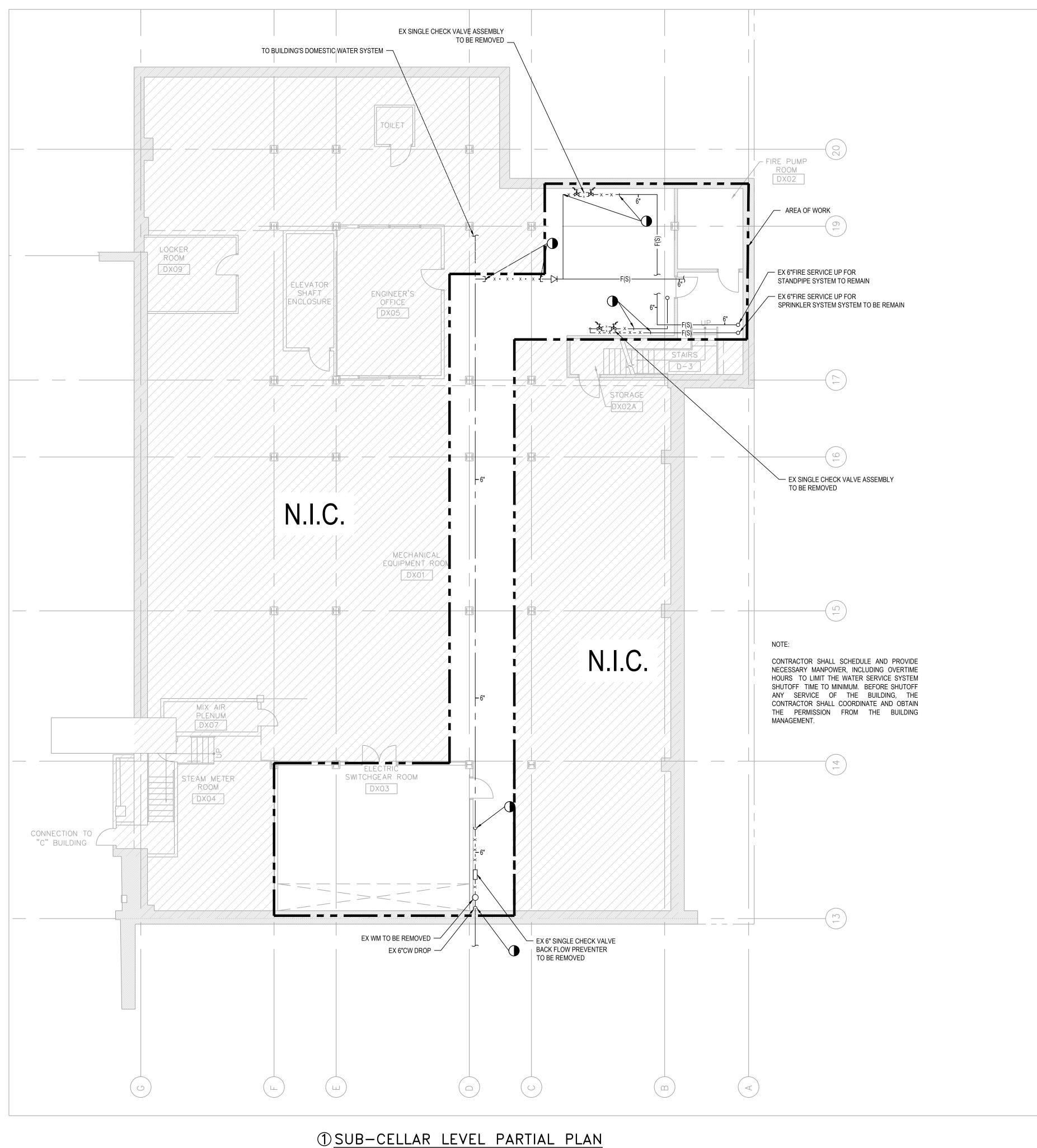
WEST 28TH STREET
AREA OF WORK WORK WEST 27TH STREET WEST 26TH STREET
LOCATION PLAN BLOCK: 777 NOT TO SCALE LOT: 37
Fashion Institute of Technology 227 WEST 27TH STREET NEW YORK, NY 10001 C1591
MEP Consultant MG ENGINEERING D.P.C. 116 West 32nd Street
New York, NY 10001 / (212) 643-9055 #8969.76 Environmental Consultants
EPM, Inc. 983 Marcus Ave. Suite 109 Lake Success, NY 11042 / (516) 328-1194
00-28-2023 ISSUED FOR BIDING
NO. DATE REVISION
FIT Fred P. Pomerantz Art & Design Center Fire Pump Upgrade 300 7th Avenue, NY, NY 10002
DRAWING TITLE: PLUMBING NOTES SYMBOL LIST, ABBREVIATIONS AND SCHEDULES
SEAL & SIGNATURE:DATE:02.15.2024PROJECT No:8969.76DRAWING BY:SANCHK BY:CNSCALE:NTSDWG No:

P-001.00

DOB page:

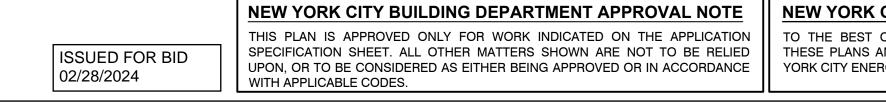
1 OF 3





2/27/2024 4:25 PM M:\8969-76\DRAWINGS

0 4' 8' 16' SCALE: 1/8" = 1'-0"



NEW YORK CITY ENERGY CONSERVATION CODE TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 NEW YORK CITY ENERGY CONSERVATION CODE.

WEST 28TH STREET
WEST 26TH STREET
LOCATION PLAN NOT TO SCALE LOT: 37
Fashion Institute of Technology
227 WEST 27TH STREET NEW YORK, NY 10001
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116 West 32nd Street New York, NY 10001 / (212) 643-9055 #8969.76
Environmental Consultants
EPM, Inc. 983 Marcus Ave. Suite 109
Lake Success, NY 11042 / (516) 328-1194
01-18-2024 ISSUED FOR BID
NO. DATE REVISION
FIT Fred P. Pomerantz Art &
Design Center
Fire Pump Upgrade
300 7th Avenue, NY, NY 10002
PLUMBING
SUB-CELLAR LEVEL
- DEMOLITION
SEAL & SIGNATURE: DATE: 02.15.2024 PROJECT No: 8969.76
DRAWING BY: SAN CHK BY: CN
SCALE: 1/8"=1'-0" DWG No:
P-010.00

DOB page: 2 OF 3



