



SPECIFICATION FOR

WESTCHESTER COMMUNITY COLLEGE SCIENCE BUILDING INFRASTRUCTURE UPGRADE – PHASE 1



WCC BID No.: 26-962
F&D PROJECT #: 24522.00

OWNER: WESTCHESTER COMMUNITY COLLEGE
ADDRESS: 75 GRASSLANDS RD., VALHALLA
CITY: TOWN OF GREENBURGH, NEW YORK



ARCHITECTS:

FULLER AND D'ANGELO, P.C.

Architects and Planners
45 Knollwood Road - Suite 401
Elmsford, New York 10523
Tel: 914.592.4444
Fax: 914.592.1717



Engineering:

Collado Engineering

445 Hamilton Ave., Suite 608
White Plains, NY 10601

The undersigned certifies that to the best of his knowledge, information and belief, the plans and specifications are in accordance with applicable requirements of the New York State Uniform Fire Prevention and Building Code, The State Energy Conservation and Construction Code Standards of the Department of Education.

BID: March 27, 2026

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SECTION 00 0115
LIST OF DRAWING SHEETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DRAWING INDEX

- A. Drawings are listed on Drawing G-1 for all contracts.
- B. Drawings are the property of the Fuller and D'Angelo, Architects and Planners, and shall not be used for any other purpose other than contemplated by the Drawings and Project Manual

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 00 2115
RFI FORM

CONTRACTOR'S REQUEST FOR INFORMATION NO. _____ WCC RFI NO: _____

NAME OF PROJECT: SCIENCE BUILDING - Infrastructure Upgrades - Phase 1.

NAME OF OWNER: Westchester Community College

OWNER'S REPRESENTATIVE'S CONTACT: Ross Garrett, E.I.T., ross.garrett@sunywcc.edu

DATE: _____

WCC CONTRACT NO. _____

FROM (CO. NAME): _____

CONTACT NAME: _____

TELEPHONE NUMBER: _____

SUBJECT: _____

DISCIPLINE/TRADE: _____

DWG./SPEC. REFERENCE: _____

QUESTION: _____

___ FIELD CONDITION _____

___ DRAWING/SPEC _____

___ DISCREPANCY _____

___ OWNER CHANGE _____

___ CLARIFICATION _____

___ CONTRACTOR'S SUGGESTION (IF APPLICABLE): _____

ANSWER _____

OWNER'S REPRESENTATIVE'S SIGNATURE: _____ DATE: _____

Note: review and any responses to this request for information by the architect/engineer is strictly for design intent only and does not constitute acknowledgement or acceptance of any cost or schedule implications unless specifically presented by the contractor. By submission of this request for

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RFI FORM

information, the contractor assumes all responsibility in the absence of an approved change order or work directive.

END OF SECTION

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**SECTION 01 1000
SUMMARY OF CONTRACTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 PROJECT

- A. Project Name: WCC Science Building - Infrastructure Upgrade - Phase 1
- B. Name: Westchester Community College.
- C. Architect's Name: Fuller and Dangelo.
- D. The project involves the installation of a new fire suppression system throughout the entire building, along with associated work. Additionally, it includes improvements to the exterior façade and site wall masonry, as well as enhancements to the exterior lighting for both the building and site wall, with related work connected to these items.
- E. The work at the WCC Science Building includes but is not limited to:
 - 1. Fire Suppression system
 - 2. Various Fire Suppression system related piping.
 - 3. Gypsum Board cutting and patching.
 - 4. Acoustical Ceilings removals and replacement
 - 5. Interior painting.
 - 6. Exterior Sealant removal and installation.
 - 7. Repointing
 - 8. Exterior Masonry Brick wall partial rebuilding with new Pre-cast concrete cap
 - 9. Exterior lighting in Brick Wall (fixture replacement)

1.3 DEFINITIONS

- A. Refer to Section 01 4216 for Definitions .

1.4 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5000 - Contracting Forms and Supplements.

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- B. This project is exempt from the New York State Wick's Law separate bid requirements. All work shall be performed as a single prime contract based on a Stipulated Price.
- C. Contract for this project is as follows:
 - 1. Contract #1 . All work
- D. The work of the Contractor is identified in this Project Manual and on the Drawings.
- E. Local custom and trade-union jurisdictional settlements do not control the scope of Work included in contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected contractor(s) shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
- F. If it becomes necessary to refer to the contract documents to determine which prime Contract includes a specific element of required work, begin by referring to the prime Contracts, themselves; then, if a determination cannot be made from the prime Contracts, refer, in the following order, to the Supplementary Conditions, this section of the Specifications, followed by the other Division-I sections and finally with the Drawings and other Sections of the Specifications.
- G. If, after referring to the contract documents, it cannot be clearly determined which prime Contractor will perform a specific item of required work, then, that item of work will be brought to the Architect's attention in writing for determination.
- H. Summary by References: Work of the contract can be summarized by reference to the General Conditions, Bidding Requirements, Specification sections, Drawings, Addenda , or Modifications to Contract Documents issued subsequent to the initial printing of this Project Manual, and including but not necessarily limited to printed material referenced by any of these. It is recognized that the work of the Contract is unavoidably affected or influenced by governing regulations, natural phenomenon, including weather conditions, and other forces outside the contract documents.

1.5 RELATED REQUIREMENTS

- A. Section 01 1010 - Milestone Schedule.
- B. Section 01 2100 - Allowances.
- C. Section 01 2300 - Alternates: Payment procedures relating to alternates.

1.6 JURISDICTIONAL DISPUTES

- A. It is not the intention of these specifications to transgress the jurisdictional arrangements regarding the division of work between the several trades. Should it appear, however, that these specifications imply that other trades are to perform work which is claimed by any other trades, the Contractor affected shall notify the Owner's Representative and Architect of such fact when submitting his proposal, indicating the additional amount required to include the work in question in the Base Bid. In the event that no such notification is received prior to an acceptance of the Contractor's Proposal, it will be construed that the specifications imply nothing which is unacceptable to the various trades and no extra payments on this account will be granted to any Contractor during the progress of the job.

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- B. The Contractor shall only employ labor on the project or in connection with its work capable of working harmoniously with all trades, crafts and any other individuals associated with the capital improvement work to be performed. There shall be no strikes, picketing, work stoppages, slowdowns or other disruptive activity at the project for any reason by anyone employed or engaged by the Contractor to perform its portion of the work. There shall be no lockout at the project by the Contractor. The Contractor shall be responsible for providing the manpower required to proceed with the work under any circumstance. Should it become necessary to create a separate entrance for a contractor involved in a labor dispute, all costs associated with creating that entrance shall be borne by the contractor involved in the dispute. Such costs shall include, but not be limited to, signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.
- C. If the Contractor has engaged the services of workers and/or subcontractors who are members of trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect or the Owner, any conflict between its agreement with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade.
- D. The Contractor shall ensure that its work continues uninterrupted during the labor dispute and will be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes.

1.7 SUBCONTRACTORS/SUPPLIERS

- A. Refer to WCC front end specifications, Section 3, 32, 3.21

1.8 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of alterations work is indicated on drawings.
- B. Scope of Removals and Replacements shall coincide with installations of Fire Suppression system piping installations, including but not limited to: careful removal, storage and replacement of existing acoustical ceiling tiles, cutting and patching of gypsum board soffits and ceilings and other related wall and ceiling work to install all piping and accessories as required for the entire system to be fully installed and functional.
- C. Fire Suppression Sprinklers: Provide new fire Suppression system in existing building, including all related work.
- D. Exterior Masonry work to include, expansion joint caulking, repointing, brick replacement, wall repairs, new concrete copings, lintel repairs/painting, various exterior caulking and other related work.
- E. Alternative Work Scope to include, Pressure washing and sealing and caulking of windows on various elevations.
- F. Exterior Lighting and wiring systems

1.9 Westchester Community College will remove the following items before start of work:

- A. Related (FFE) Furniture, Fixtures and Equipment in the way of contractor operations.

1.10 OWNER OCCUPANCY

- A. Westchester Community College intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Cooperate with Westchester Community College to minimize conflict and to facilitate Westchester Community College's operations.
- C. Schedule the Work to accommodate Owner's occupancy.

1.11 CONTRACTORS USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas of work as directed by Owner's Representative.
- B. Arrange use of site and premises to allow:
 - 1. Westchester Community College occupancy.
 - 2. Work by Others.
 - 3. Work by Westchester Community College.
 - 4. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by Westchester Community College:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code or directed by the Construction Manager, open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage unless approved by the Owner.
- E. **Time Requirements and Restrictions:**
 - 1. Limit conduct of especially noisy exterior work to the hours of 6AM to 7:45 AM see below.
 - 2. **FOR all in Building Work in First Floor -Corridors, Offices and Laboratories - AUGUST OF 2026 Work - This is a "double shift" project in the hours of First Shift 6AM to 2PM and Second Shift 2PM to 9PM .**
 - 3. **FOR all Exterior work on Brick walls, and Facade elevations, Boiler Room and Stairwell Work - MAY 24th 2026 to August 23rd WORK - This is a "single shift" project, from (6 AM to 4 PM)**
 - 4. **FOR all remaining Building Work (Second and Third Floor) in Corridors, Offices and Laboratories - MAY 24, 2027 to JULY 31, 2027 WORK - This is a "single shift" project from (6AM to 4PM)**

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- F. Contractors shall work in an occupied building providing proper safety measures when in stairwells, corridors and other occupied spaces, to the satisfaction of the College Physical Plant and Security Management Personell.
- G. **NOISY WORK DISRUPTING in 2026 the occupants must be performed with the following hours:**
1. Monday thru Friday: 6 AM to 7:45 AM.
 2. Saturdays/Sundays/ Holidays: 6 AM to 9 AM.
- H. During the entire construction period the contractor shall have limited use of the premises for construction operations, including use of the site as indicated in phasing and schedule of work time table included in the **Milestone Schedule Section** . SPECIFIC TIMES FOR WORK IN ALL AREAS, BOILER ROOM and STAIRWELLS, OFFICES AND CORRIDORS AND SCIENCE LABORATORIES SHALL BE NOTED AS INDICATED.
1. General: Limitations on site usage as well as specific requirements that impact utilization are indicated on the drawings and/or by other contract documents. The Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.
 2. The Contractor shall limit their use of the premises to the work indicated, so as to allow for Owner occupancy and use by the public during the period when the Owner occupies the building.
 3. Contractors are to maintain clear and unobstructed paths of exit discharge from all existing exits.
 4. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not use these areas for parking or storage of materials.
 5. Lock automotive type vehicles such as passenger cars and trucks and other types of mechanized and motorized construction equipment, when parked and unattended, to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.
- I. Only materials and equipment, which are to be used directly in the work, shall be brought to and stored on the project site by the Contractor. After equipment is no longer required for the work, it shall be promptly removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractors.
- J. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated or directed by the Owners representatives. If additional storage is necessary obtain and pay for such storage off-site.
- K. The Contractor(s) and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner's representative, which may be withheld in the sole discretion of the Owner's representative.

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- L. Contractor shall ensure that the work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the work and all adjacent areas. The work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, each contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of:
1. Any areas and buildings adjacent to the site of the work or;
 2. The Building in the event of partial occupancy as more..
- M. Without prior approval of the Owner and Owner's representative, Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitations, lavatories, toilets, entrances and parking areas other than those designated by the Owner's representative. Without limitation of any other provision of the Contract Documents, The Contractor shall use its best efforts to comply with the rules and regulations promulgated by the Owner's representative in connection with the use and occupancy of the Project Site, and the Building, as amended Owner's representative from time to time. The Contractor shall immediately notify the Owner's representative in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. Owner's representative may, in the Owner's representative's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements, applicable to use, and occupancy of the Project Site and the Building.
- N. Maintain the existing building in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. When work is scheduled after hours clean and remove all temporary barriers and protection so that the building can be occupied the following day when normal building occupancy will occur.
- O. Keep public areas such as hallways, stairs, elevator lobbies, and toilet rooms free from accumulation of waste material, rubbish or construction debris.
- P. Smoking, drinking of alcoholic beverages or open fires will not be permitted on the project site.
- Q. Utility Outages and Shutdown:
1. Limit disruptions, shut downs, switch overs, etc. of utility services to hours allowed as the building is not ever unoccupied. Arrange at least 72 hours in advance with the Owner's Representative.
 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers, fire alarm system, electrical, data, and heating system, without 7 days notice to Westchester Community College and authorities having jurisdiction.
 3. Prevent accidental disruption of utility services to other facilities.

1.12 AVAILABILITY OF EXISTING BUILDING

- A. The existing building work areas will be available to the Contractor(s) as follows:
1. Notice of Award to Start of Construction
 - a. 6:00 AM to 9:00 PM Monday thru Friday only when programs and school occupancy are not disrupted and with the approval of the Owner.
 2. Start of Construction to Completion date - PER MILESTONE SCHEDULE Work Areas.
 - a. 6:00 AM to 9:00 PM Monday thru Friday.
 - b. **Work will be permitted Saturday, 6:00 AM - 9:00 PM if the contractor(s) has worked 6:00 AM to 9:00 PM Monday thru Friday and approved by the Owner's representative .**
 - c. Site Work and Facade work: Dawn to Dusk Monday thru Saturday. **No access into the facility will be permitted without authorization by the owner's Representative. Noisy work must be contained to select hours as noted above and elsewhere.**
 3. Owner may impose any hours of work in order to avoid interference with college classes.
 4. Construction operation which create dust, noise or fumes, particularly welding operations shall be scheduled before or after school hours, when directed by the Owner's representative .
- B. Upon request by the Contractor, the building may be made available, at the discretion of the Owner's representative , and at the Cost to the Contractor, during such times as are allowed by local noise ordinance, in addition to the above listed hours. A request for use during these off-regular hours must be made at least two (2) days before the use. Such off-hours may include very early hours during the Week, Saturdays, Sundays, and Holidays.
- C. If the Contractor requests the use of the facility for off-hours to maintain the scheduled completion date, the Contractor shall not pay additional costs in connection with opening, providing security. Comply with other portions of this Section.
1. Saturdays, sundays, Holidays and Night Work (Double Shift for 2026 Work included in BASE BID) , 2027 Work is single shift hours included in BASE BID:
 - a. The contractor shall make no claim for delay for the inability of the Owner's representative to make the site available for off-hours work. Should the Owner's representative make the site available during these hours at the contractor's request, the cost will be borne by the Owner.
- D. THE CONTRACTOR SHALL BE REQUIRED TO PERFORM SCHEDULED WORK WITHIN THE EXISTING BUILDING ONLY DURING THE TIME PERIODS INDICATED AND SHALL INCLUDE IN THE BID ALL COSTS FOR LABOR, MATERIAL, ETC. INCLUDING PREMIUM TIME TO PERFORM THE WORK ON DOUBLE SHIFT (2026 only) , PER PHASE PER TIME PERIOD.

1.13 COMPLETION OF WORK AFTER SCHEDULED COMPLETION DATE

- A. Contractor(s) shall perform work only within these limitations and all manpower, equipment, etc., shall be provided as required to complete the work as per schedule. In the event the contractor does not complete the work as scheduled all work to be performed shall be performed after 9:00 PM when the building is unoccupied and approved by the Owner's representative . All costs shall be borne by the Contractor.
- B. The Contractor shall prepare a progress schedule in detail aligning with the Milestone Schedule listing items of work, floors, sections of building and the time required for each task to be performed.
- C. The Contractor shall provide necessary manpower, equipment, etc., as required to maintain schedule developed within the time limitations as described above.
- D. College Calender is available on the Owner's web site. Calendar is subject to modifications for civil service holidays, changes in education programs, snow days, etc.

1.14 WORK SEQUENCE

- A. Refer to Section 01 1010 - Milestone Schedule.

END OF SECTION

**SECTION 01 1010
MILESTONE SCHEDULE**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Milestone Construction schedule for project durations and phases, all contracts.
- B. Related Sections include the following:
 - 1. Section 01 1000 - Summary of Contracts for work related to each Prime Contract.
 - 2. Section 01 3000 - Administrative Requirements for administrative requirements governing preparation and submittal of Prime Contractors' Construction Schedule.
 - 3. Section 01 3216 - Construction Progress Schedule

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
- B. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
- C. Predecessor activity is an activity that must be completed before a given activity can be started.
- D. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration.
- E. Event: The starting or ending point of an activity.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.
- G. Milestone: A key or critical point in time for reference or measurement.
- H. Double Shift: Two work periods per day at least 7 hours long each.

1.4 REGULATORY REQUIREMENTS

- A. Comply with all applicable requirements as set forth in the WCC specifications, including but not limited to Section 2: Information to Bidders.

1.5 MILESTONE SCHEDULE PREPARATION

- A. A Master Schedule will be developed within 15 work days of Letter of Intent or Award of the Contracts. The Contractor will coordinate activities, forward submittals, deliver materials and provide necessary manpower to meet the milestones listed below.

1.6 REQUIREMENTS

- A. By submitting his/her bid the contractor acknowledges and certify that the project will be completed by the Substantial Completion date and that his/her total base bid has been submitted in accordance with all contract document requirements.
- B. All contractors and their subcontractor's project superintendent, employees, directly or indirectly employed by the contractor to work on the project must at all times, whenever on the school property, wear an ID badge, safety vest, hard hat, etc. and all other required personal protective equipment as required by OSHA.
- C. **Contractor understands sprinkler related work is double shift for August of 2026.**

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 MILESTONE SCHEDULE

- A. Building Hours: Refer to Section 01 1000 - Summary of Contracts.
- B. Administrative Schedule
 - 1. Drawings out to Bid Date March 27, 2026
 - 2. Pre-Bid Meeting Date Per Owners Invitation to bid
 - 3. Contractor's Bid Questions Due Date Per Owners Bid Invitation
 - 4. Bids Received Date Per Owners Bid Invitation
 - 5. Tentative Bid Award Date May 7, 2026
 - 6. See Westchester County Front End Specification.

MILESTONE SCHEDULE

- A. All work required by any of the Owner's representatives and consultants, including the Architect, Architect's consultants, and Owner's Attorneys, etc etc., to execute final close-out of contract after 30 days beyond Milestone dates if determined to be caused by Contractor, shall result in payment(s) to the Owner's representatives and consultants, including the Architect, Architect's consultants, and Owner's Attorneys, etc etc., in the form of a change order deduct to the base contract.
- B. **SEE ATTACHED - PROJECT MILESTONE SCHEDULE**

END OF SECTION

WCC SCIENCE BLDG.-INFRASTRUCTURE- PHASE 1 MILESTONE CONSTRUCTION SCHEDULE - AUGUST 1, 2026 to AUGUST 31, 2026 and May 24, 2027 to JULY 31, 2027

3.20.26

| ID | Task Mode | Task Name | Duration | Start | Finish | 1st Quarter | | | 2nd Quarter | | | 3rd Quarter | | | 4th Quarter | | | 1st Quarter | | | 2nd Quarter | | | 3rd Quarter | |
|----|-----------|--|----------|-------------|-------------|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|--|
| | | | | | | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | Bid | 0 days | Fri 3/27/26 | Fri 3/27/26 | | | | | | | | | | | | | | | | | | | | |
| 3 | | Bids due | 0 days | Wed 4/22/26 | Wed 4/22/26 | | | | | | | | | | | | | | | | | | | | |
| 4 | | Contractor LOI | 0 days | Thu 5/7/26 | Thu 5/7/26 | | | | | | | | | | | | | | | | | | | | |
| 5 | | Shop Drawings Start | 15 days | Thu 5/7/26 | Wed 5/27/26 | | | | | | | | | | | | | | | | | | | | |
| 6 | | Finalized Agreement | 0 days | Fri 6/5/26 | Fri 6/5/26 | | | | | | | | | | | | | | | | | | | | |
| 7 | | Materials Procurement | 15 days | Fri 6/5/26 | Thu 6/25/26 | | | | | | | | | | | | | | | | | | | | |
| 8 | | Exterior Work - (Masonry/EJ Caulking/Electrical) | 43 days | Fri 6/26/26 | Tue 8/25/26 | | | | | | | | | | | | | | | | | | | | |
| 9 | | Potential Alternate Exterior Work | 43 days | Fri 6/26/26 | Tue 8/25/26 | | | | | | | | | | | | | | | | | | | | |
| 10 | | 2026 Sprinkler 1st Floor Corridors and Offices Construction (DOUBLE SHIFT) * | 21 days | Sat 8/1/26 | Fri 8/28/26 | | | | | | | | | | | | | | | | | | | | |
| 11 | | 2026 Boiler Room/Lower Floor Area /Stairwell Piping** (SINGLE SHIFT) | 43 days | Fri 6/26/26 | Tue 8/25/26 | | | | | | | | | | | | | | | | | | | | |
| 12 | | 1st Floor Corridors and Offices (DOUBLE SHIFT)* | 21 days | Sat 8/1/26 | Fri 8/28/26 | | | | | | | | | | | | | | | | | | | | |
| 13 | | 1st Floor Laboratories (DOUBLE SHIFT)* | 21 days | Sat 8/1/26 | Fri 8/28/26 | | | | | | | | | | | | | | | | | | | | |
| 14 | | 2027 2nd and 3rd Floor Corridors and Offices (SINGLE SHIFT) | 45 days | Mon 5/24/27 | Fri 7/23/27 | | | | | | | | | | | | | | | | | | | | |
| 15 | | 2027 2nd and 3rd Floor Laboratories SINGLE SHIFT) | 21 days | Fri 6/25/27 | Fri 7/23/27 | | | | | | | | | | | | | | | | | | | | |
| 16 | | Fire Alarm (interconnect only) | 7 days | Thu 7/15/27 | Fri 7/23/27 | | | | | | | | | | | | | | | | | | | | |
| 17 | | 2026 Punchlist | 5 days | Tue 8/25/26 | Mon 8/31/26 | | | | | | | | | | | | | | | | | | | | |
| 18 | | 2027 Punchlist | 5 days | Mon 7/26/27 | Fri 7/30/27 | | | | | | | | | | | | | | | | | | | | |
| 19 | | * potentially other floors if time allows | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | ** Noise limited | | | | | | | | | | | | | | | | | | | | | | | |

Project: WCC Science - Schedul
Date: Fri 3/20/26

| | | | | | | | | | |
|-----------|--|--------------------|--|-----------------------|--|--------------------|--|-----------------|--|
| Task | | Project Summary | | Manual Task | | Start-only | | Deadline | |
| Split | | Inactive Task | | Duration-only | | Finish-only | | Progress | |
| Milestone | | Inactive Milestone | | Manual Summary Rollup | | External Tasks | | Manual Progress | |
| Summary | | Inactive Summary | | Manual Summary | | External Milestone | | | |

**SECTION 01 2200
UNIT PRICES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.2 RELATED REQUIREMENTS

- A. WCC - as per the WCC Table of Contents

1.3 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Cash Allowance.
- C. Architect Responsibilities:
 - 1. Prepare Change Order.
- D. Contractor Responsibilities:
 - 1. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 2. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Differences in costs will be adjusted by Change Order.

1.4 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.5 MEASUREMENT OF QUANTITIES

- A. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.

- C. Measurement by Area: Measured by square dimension using mean length and width or radius.
- D. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

1.6 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected Products.

1.7 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not complying with specified requirements.

1.8 SCHEDULE OF UNIT PRICES

A. CONTRACTOR SCHEDULE OF UNIT PRICES

1. TESTING AND INSPECTION UNIT COST - ALLOWANCE

- a. **Testing and Inspections Unit Cost - Allowance 1:** Include an allowance of Ten Thousand 00/100 (\$10,000.00) DOLLARS for use by Contractor to provide required Testing and Inspections by Qualified Third Party Inspections Agency of Fire Suppression systems and Firestopping as required by Code. (see MEP Specifications for Scope of Work)

2. ADDITIONAL WORK SCOPE - UNIT PRICES

- a. **UNIT PRICE 1 - Caulking - Additional to the Base Bid amount.**
- b. Description: Removal and replacement of existing sealant at existing exterior facade expansion joints. To be used in multiple areas of the facade, LF can be multiples of the 20 foot cost required, for each 20 Linear feet.

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- a) Unit of Measure: Lineal Foot x 20 LF.
- b) Quantity of Linear Feet to be determined above base bid.

Removal and replacement with new exterior backer rod and sealant 20 LF
@_ \$ _____ per lineal foot for each joint = \$ _____ (Dollars).

c. **UNIT PRICE 2 - Repointing - Additional to the Base Bid amount.**

- d. Description: Removal and replacement of existing sealant at existing exterior facade expansion joints. To be used in multiple areas of the facade, SF can be multiples of the 10 Square foot cost required, for each 10 Square feet.

- e. Description: Removal and Replacement of existing masonry Repointing, in accordance to Construction Documents.

- a) Unit of Measure: Square foot x 10 SF of Wall (of wall size, not combined joint size) .
- b) Quantity of Square Feet to be determined above base bid.

Removal and Replacement with new Masonry Jointing 10 SF @_ \$ _____ per square foot for each area = \$ _____ (Dollars).

PART 3 EXECUTION - NOT USED

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**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.
- B. WCC Proposal Forms, Bid Pages

1.2 SECTION INCLUDES

- A. Description of alternates.

1.3 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Westchester Community College's option. Accepted alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.4 SCHEDULE OF ALTERNATES

A. GENERAL CONSTRUCTION

1. Alternate No. 1 WEST ELEVATION:

- a. The Contractor shall state the amount to be ADDED TO the Base Bid Scope of Work to provide, furnish and install all labor, equipment and material required for The West Elevation -Lifts/Scaffolding, Cleaning, Pressurewashing and Sealing of the entire Facade Walls. Remove and Replace all Window Sealants and Clear Clogged Weep holes. All other work indicated is base bid in accordance with drawings and specifications.

2. Alternate No. 2 NORTH ELEVATION

- a. The Contractor shall state the amount to be ADDED TO the Base Bid to provide, furnish and install all labor, equipment and material required for The North Elevation - Lifts/Scaffolding, Cleaning, Pressurewashing and Sealing of the entire Facade Walls. Remove and Replace all Window Sealants and Clear Clogged Weep holes All other work indicated is base bid in accordance with drawings and specifications.

3. Alternate No. 3 EAST ELEVATION:

- a. The Contractor shall state the amount to be ADDED TO the Base Bid to provide, furnish and install all labor, equipment and material required for The East Elevation - Lifts /Scaffolding, Cleaning, Pressurewashing and Sealing of the entire Facade Walls. Remove and Replace all window Sealants and Clear Clogged Weep holes. All other work indicated is base bid in accordance with drawings and specifications.

4. Alternate No. 4 SOUTH ELEVATION
 - a. The Contractor shall state the amount to be ADDED To the Base Bid to provide, furnish and install all labor, equipment and material required for The South Elevation - Lifts/ Scaffolding, Cleaning, Pressurewashing and Sealing of the entire Facade Walls. Remove and Replace all Window Sealants and Clear all Clogged Weep holes. All other work indicated is base bid in accordance with drawings and specifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.3 RELATED REQUIREMENTS

- A. Section 01 2200 - Unit Prices, for additional unit price requirements.
- B. Section 01 2300 - Alternates, for product alternatives affecting this section.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 6000 - Product Requirements: Fundamental product requirements, definitions for substitutions, product options, delivery, storage, and handling and restrictions on timing of substitution requests.
- E. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.4 DEFINITIONS

- A. Refer to Section 01 6000 - Product Requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Westchester Community College.

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5. Waives claims for additional costs or time extension that may subsequently become apparent.
 6. Agrees to reimburse Architect and Owner Representative for review or redesign services associated with re-approval by authorities.
 7. Statement indicating why specified material or product cannot be provided.
 8. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 9. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 10. Samples, where applicable or requested.
 11. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 12. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 13. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 14. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 15. Cost information, including a proposal of change, if any, in the Contract Sum.
 16. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 17. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:

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- a) Official project name and number, and any additional required identifiers established in Contract Documents.
- b. Substitution Request Information:
 - a) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - b) Indication of whether the substitution is for cause or convenience.
 - c) Issue date.
 - d) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - e) Description of Substitution.
 - f) Reason why the specified item cannot be provided.
 - g) Differences between proposed substitution and specified item.
 - h) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - a) Physical characteristics.
 - b) In-service performance.
 - c) Expected durability.
 - d) Visual effect.
 - e) Sustainable design features.
 - f) Warranties.
 - g) Other salient features and requirements.
 - h) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples: Provide full size actual sample of item proposed for substitution. Sample shall be provided, without exception, even if the originally specified item did not require a sample.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
- d. Impact of Substitution:

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- a) Savings to Westchester Community College for accepting substitution.
 - b) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
- 1. Submit an electronic document, combining the request form with supporting data into single document.
 - 2. Deliver sample to Architect.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittals for Substitutions Prior to Bid:
- 1. No consideration of submitted substitution requests during the bidding period will be considered, bid on specified items only. See 3.3 below.

3.3 SUBSTITUTION PROCEDURES AFTER AWARD OF CONTRACT

- A. Submittal Form:
- 1. Submit substitution requests by completing the form attached to this section. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Substitutions will not be considered under one or more of the following circumstances:
- 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.
 - 3. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.5 ACCEPTANCE

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- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

3.7 ATTACHMENTS

- A. A facsimile of the Substitution Request Form (During Construction) required to be used on the Project is included after this section.

SUBSTITUTION REQUEST FORM

3.8 SUBSTITUTION REQUEST No. _____

- A. **(Only After the Bidding Phase)**
- B. Project: WCC Science Building - Infrastructure Upgrade - Phase 1
- C. Substitution Request Number: _____
- D. From: _____
- E. Date: _____
- F. A/E Project Number: 24522.00
- G. Contract For: _____
- H. Specification Title: _____ Description: _____
- I. Section: _____ Page: _____ Article/Paragraph: _____
- J. Proposed Substitution:
1. Manufacturer: _____ Address: _____ Phone: _____
 2. _____ model no.: _____
 3. Installer: _____ Address: _____ Phone: _____
 4. History: _____ New product _____ 2-5 years old _____ 5-10 yrs old _____ More than 10 years old
 5. Differences between proposed substitution and specified product:

 6. Point-by-point comparative data attached - REQUIRED
 7. Reason for not providing specified item: _____
- K. Similar Installation:
1. Project: _____ Architect: _____
 2. Address: _____ Owner: _____
 3. Date Installed: _____
- L. Proposed substitution affects other parts of Work: ___ No ___ Yes; explain

- M. Savings to Owner for accepting substitution: _____ (\$ _____)

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SUBSTITUTION PROCEDURES

N. Proposed substitution changes Contract Time: ___ No ___ Yes Add ___ Deduct ___ days.

O. Supporting Data Attached: ___ Drawings ___ Product Data ___ Samples ___ Tests Reports

P. The Undersigned certifies:

1. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
2. Same warranty will be furnished for proposed substitution as for specified product.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
6. Proposed substitution does not affect dimensions and functional clearances.
7. Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
8. Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Local support and availability will be available for proposed substitution.

Q. Submitted by: _____

R. Signed by: _____

S. Firm: _____

T. Address: _____

U. Telephone: _____

V. Attachments: _____

W. A/E's REVIEW AND ACTION

X. ___ Substitution approved - Make submittals in accordance with Specification Section 01330

Y. ___ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.

Z. ___ Substitution rejected - Use specified materials.

AA. ___ Substitution Request received too late - Use specified materials.

___ Additional information requested.

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BB. By: _____ Date: _____

CC. Additional Comments: __ Contractor __ Subcontractor __ Supplier __ Manufacturer __ A/E

DD. _____

EE. _____

FF. _____

GG. _____

HH. _____

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END OF SECTION

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SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Coordination drawings.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures / Submittal Cover Sheet

1.3 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary of Contracts: Work covered by this contract .
- B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 7419 - Construction Waste Management and Disposal.

1.4 PROJECT COORDINATION

- A. During construction, coordinate use of site and facilities through the Owner's Representative.
- B. Coordinate carefully work scope with Milestone Schedule and work areas and Timing of the project.
- C. Comply with Owner's Representative procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- D. Comply with instructions of the Owner's Representative for use of temporary utilities and construction facilities.
- E. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- F. Make the following types of submittals to Owner's Representative.
 - 1. Requests for interpretation.

2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Overall Progress schedule and Weekly Progress Schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Owner's Representative will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. Westchester Community College.
 2. Architect.
 3. MEP Consultants.
 4. Contractor and Major Sub- Contractors.
- C. Agenda:
 1. Letter of Award
 2. Execution of Westchester Community College-Contractor Agreement.
 3. Submission of executed bonds and insurance certificates.
 4. Distribution of Contract Documents.
 5. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule within 7 days.
 6. Designation of personnel representing parties to Contract and Architect.

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7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling of the project.
 9. Use of premises by Westchester Community College and Contractor(s) .
 10. Westchester Community College's requirements and occupancy prior to completion.
 11. Construction facilities and controls provided by Westchester Community College.
 12. Temporary utilities provided by Westchester Community College.
 13. Survey existing facilities prior to starting construction.
 14. Security and housekeeping procedures.
 15. Procedures for testing.
- D. Owner's Representative or Architect will record minutes and distribute copies within five days after meeting to all participants. Objections to the Minutes should be submitted in writing within three business days otherwise they will be considered substantially correct. Contactor shall distribute to all entities of the Contractor affected by decisions made.

3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work in Summer of 2026 at one week intervals, in 2027 at two week intervals.
- B. Attendance Required:
 1. Contractor.
 2. Westchester Community College.
 3. Architect.
 4. Mechanical Consultants.
 5. Contractor's Superintendent.
 6. Major Subcontractors.
- C. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.

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5. Review of submittals schedule and status of submittals.
 6. Review construction safety programs.
 7. Review exiting and and separation of construction
 8. Maintenance of progress schedule.
 9. Corrective measures to regain projected schedules.
 10. Planned progress during succeeding work period.
 11. Coordination of projected progress.
 12. Maintenance of quality and work standards.
 13. Effect of proposed changes on progress schedule and coordination.
 14. Review change Orders, RFI's and Clarification Sketches.
 15. Other business relating to Work.
- D. Owner's Representative or Architect will record minutes and distribute copies within five days after meeting to all participants. Objections to the Minutes should be submitted in writing within three business days otherwise they will be considered substantially correct. Contactor shall distribute to all entities of the Contractor affected by decisions made.

3.3 WEEKLY COORDINATION MEETINGS

- A. The Contractor shall schedule and hold separate weekly general project coordination meetings with the Owner's Representative, to review the work schedule for the week in order to insure the planned work does not conflict with facility operations.

3.4 CONSTRUCTION PROGRESS SCHEDULE

- A. See Section 01 3216
- B. Responsibility
1. The Contractor shall be responsible for preparing and updating the contract progress schedule. _____
 2. If preliminary schedule requires revision after review, submit revised schedule within 2 days.
 3. Within 1 days after joint review, submit complete schedule.
 4. **Within 15 Working Days after the LOA for the work, the Contractor shall forward the Construction Progress Schedule.**
 5. Submit updated schedule with each Application for Payment.

3.5 PROGRESS PHOTOGRAPHS

- A. Submit above ceiling work photographs at least once per week, within 3 days after being taken.
- B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- C. Photography Type: Digital; electronic files.
- D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- E. In addition to periodic, recurring views, take photographs of each of the following events:
- F. Views:
 - 1. Consult with the Mechanical engineers for instructions on views required.
 - 2. Provide factual presentation of overall Views and Detailed work, later to be hidden.
 - 3. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Via email.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.6 COORDINATION DRAWINGS

- A. Procedures for coordination drawings shall be in accordance with paragraph below, to be submitted and signed off by Contractors prior to ordering of materials, this is considered a mandatory and priority operation of the work scope.
- B. Review drawings prior to submission to Engineer and Architect.
- C. **Indicate all Sprinkler Piping and related items, coordinate with all existing above ceiling , ductwork, electrical conduits and piping, including elevations and dimensions to all fixed building elements, such as beams; columns; slabs; ceilings, including ceiling suspension; framing; floors; walls; doors, including door swings; and windows affected by the equipment, ductwork, and piping.**
- D. Indicate all existing lighting, smoke detectors, ceiling mounted devices and duct diffusers and proposed sprinkler heads. Contractor shall verify all existing components and indicate both new and existing on the coordination drawings to ensure that efficient and orderly installation of all new and existing components.

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- E. Show location of all piping, valves, dampers, fire and smoke devices and panels), etc. requiring access for service and maintenance.
- F. Show all registers, grilles, diffusers, radiators and convectors, and other terminal elements.
- G. Locate all access doors.
- H. Include large-scale details and sections as required to fully delineate the conditions in congested areas..
- I. Show plan layout of all piping with anchorage and fasteners

3.7 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format within twenty work (20) days after Notice to Proceed.
 - 1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 - 2. Coordinate with Contractor's construction schedule and schedule of values.
 - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 - 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), and description of item of work covered.
 - 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.8 COORDINATION PROCEDURES

- A. Procedures for coordination drawings shall be in accordance with paragraphs below.
- B. The Contractor shall retain the services of a professional coordinator experienced in the preparation of coordination drawings, to coordinate the installations for all the work by means of coordination drawings, as specified herein.
- C. Coordination Drawings shall be submitted within 20 work days of the Letter of Award, as timing is critical for this work scope.
- D. The Contractor shall furnish sufficient experienced drafting and engineering personnel to prepare coordination drawings and participate in coordination meetings scheduled and directed by the Owner's Representative.
- E. **Within 20 work days after LOA for the work, the Contractor shall forward Coordination Drawings and Sprinkler System Shop Drawings for the project. Should this work scope be required ahead of**

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this schedule to produce product for the job site, then sooner than 20 work days shall be considered mandatory.

- F. Coordination drawings shall be completed and submitted for distribution in time so as not to delay the construction. The coordination drawings may lack complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items affected.
- G. The Contractor shall initiate coordinating the installations for all the trades by means of coordination as specified herein.
1. The Contractor shall prepare CADD drawing on CD indicating their equipment and appurtenances for each floor and phase, at not less than 3/8" scale. The drawings shall show beams, columns, ceiling grid and heights, walls/partitions, casework, floor to floor dimensions, floors, windows, door swings etc. that relates to the construction. Coordination of all new piping with items above ceilings and light fixtures diffusers and other piping and conduits shall be provided by the contractor.
 2. The Contractor shall verify elevations and dimensions to all fixed building elements, such as beams; columns; slabs; ceilings, including ceiling suspension; framing; floors; walls; doors, including door swings; and windows. Differing types of ceilings shall be considered and indicated.
 3. The Contractor shall review and verify all beams, columns, ceiling grid and heights, walls/partitions, casework, floor to floor dimensions, floors, windows, door swings etc. that relates to the construction. Hard and soft ceilings shall be noted and depicted. **Areas required to be removed and reinstalled shall be indicated. Refer to Section 01 07310 Cutting and Patching for additional information.**
 4. The Contractor shall attend coordination meetings and participate as directed by Engineer, Owner's Representative or Architect to resolve interference and conflicts. All such coordination work is included in the contract responsibility of each involved contractor. When mutually agreed, make minor changes in ductwork, piping, or conduit routing or equipment location required to avoid space conflicts, but do not resize items or relocate exposed items without the Architect's approval. Do not make changes in wall or chase locations, ceiling heights, door swings or locations, window or other openings, or other items affecting the function or aesthetic effect of the building. If conflicts or interference cannot be satisfactorily resolved with such minor changes, notify the Owner's Representative who shall obtain a decision from the Architect.
 5. The Contractor shall prepare coordination drawings without awaiting final product approval of piping, heads etc. Provide sufficient space for such items and re-coordinate as required when final product approval is obtained.
 6. Should any problems of coordination require architectural or structural changes of design, this change shall be submitted in writing to the Architect for approval.
 7. After the set has been coordinated and all necessary changes have been made, these drawings shall then be signed off by the Contractor and each of the sub contractors, indicating their awareness of and agreement with the indicated routings and layouts and their inter-relationship with the adjoining or contiguous work of all trades. Thereafter, no unauthorized deviations will be

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permitted and if made without the knowledge or agreement of the Engineer, Architect and Owner's Representative will be subject to removal and correction at no additional cost to the Owner.

8. After final coordination and sleeve drawings have been agreed upon and signed by all contractors. The Contractor shall provide and distribute on Flash Drive in PDF Format copies to each of the sub contractors, the Owner's Representative and one (1) copy to the Architect and Engineer for reference and record purposes.
9. NO EXTRA COMPENSATION will be paid to the Contractor for relocating any duct, pipe, ceiling mounted devices, conduit, or other material installed without coordination among trades involved.
10. All changes in the work whether a change in price is given or not, shall be shown on the coordination drawings.
11. Coordination drawings shall not be used for "shop drawings" or "as-built" drawings except where approved by the Owner's Representative.
12. Upon completion of the project, the Contractor shall turn over, on flash drive, coordination drawings.

3.9 SUBMITTALS FOR REVIEW

- A. Submittal cover sheet: Attached to the end of this Section.
- B. All submittals are the product and the property of the Contractor. The Owner, Owner's Representative, or Architect shall not be responsible for the contractor's construction means, methods or techniques: safety precautions or programs; Acts or admissions; or failure to carry out the work in accordance to the contract documents
- C. **Shop Drawing Submittal Log no later than ten (10) days after Letter of Award of Contract.**
- D. **Schedule of Values no later than 15 days after Letter of Award of Contract.**
- E. When the following are specified in individual sections, including but not limited to the following, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for verification.
- F. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- G. Samples will be reviewed only for aesthetic, color, or finish selection.
- H. The Architect shall review and approve or take other appropriate action on the Contractor submittals, such as shop drawings, product data, samples and other data, which the Contractor is required to submit, but only for the limited purpose of checking for conformance with the design concept and the information

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shown in the Construction Documents. This review shall not include review of the accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes, construction means or methods, coordination of the work with other trades or construction safety precautions, all of which are the sole responsibility of the Contractor. The Architect's review shall be conducted with reasonable promptness while allowing sufficient time in the Architect's judgment to permit adequate review. Review of a specific item shall not indicate that the Architect has reviewed the entire assembly of which the item is a component. The Architect shall not be responsible for any deviations from the Construction Documents not brought to the attention of the Architect, in writing, by the Contractor. The Architect shall not be required to review partial submissions or those for which submissions of correlated items have not been received.

- I. Marking or comments on shop drawings shall not be construed as relieving the Contractor from compliance with the contract project plans and specifications, nor departure therefrom. The contractor remains responsible for details and accuracy for conforming and correlating all quantities, verifying all dimensions, for selecting fabrication processes, for techniques of assembly and for performing their work satisfactorily and in a safe manner.
- J. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
- K. **Architect will review the original submittal and one (1) re submittal. Additional reviews will be additional services provided to the Owner and charged accordingly. The Owner will back charge the contractor accordingly.**
- L. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- M. **Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.**

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Westchester Community College. No action will be taken.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Refer to Westchester County Front end.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. All submittals shall be in electronic PDF format and conforming to the following:
1. Each item shall be in a separate file.
 2. Each file name shall start with the specification section number and contain an abbreviated explanation of what it contains; for example:
 - a. 09 9000 Painting.
 3. Add Revision number (Rev2 Rev3, etc) to the file name when resubmitting items, for example:
 - a. 09 9000 Painting Rev 1.
 4. Use capital letters and spaces to make the names "readable" do not use special characters, underscores, hyphens, etc.
 5. Keep the file names short, no more than 25 characters.
 6. Provide a transmittal with each electronic submittal and list each item that's included.
 7. Provide a Cover Sheet with each item - in the same file as the technical submittal.
 8. Do not add dates to the file names, the files are automatically dated when created..
 9. Do not zip the files, and do not put the files in Folders.
 10. Do not email electronic submittal attachments larger than 5 MB.
 11. Do not email multiple electronic submittals- rather burn the submittals on a CD and send the CD via FedEx or other overnight mail.
 12. Make all technical submittals at one time per trade- refer to the specification for additional submittal requirements for example:
 - a. Concrete; Masonry; Miscellaneous Fabrications; Roofing; etc.
 13. Do not send MSDS with the technical submittals; collate all of the MSDS needed for the entire project in three ring binders, organized by specification section, and submit the binders to the Owner's Representative and maintain one copy at the project site.
- B. Documents for Information: Submit two copies.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.

2. Approved sample will be retained at the project site.
3. Retained samples will not be returned to Contractor unless specifically so stated.
4. Submit with each sample, in electronic PDF, data, cuts, photos, color, charts, etc.

3.13 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. Transmit each submittal with a copy of approved submittal form.
- C. Shop drawings are the product and the property of the Contractor. The Owner, Owner's Representative,, or Architect shall not be responsible for the contractor's construction means, methods or techniques: safety precautions or programs; Acts or admissions; or failure to carry out the work in accordance to the contract documents.
- D. Transmit each submittal with transmittal.
- E. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- G. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 1. Contractor's submittal of shop drawings certifies that the contractor has reviewed and coordinated this shop drawing and they are in conformance to the plans, specifications, applicable codes and other provisions of the Contract Documents.
- H. Deliver any required product submittals to Architect or Engineer at business address.
- I. Schedule submittals to expedite the Project, and coordinate submission of related items.
- J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- K. Provide space for and Architect and consultants review stamps.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

- N. Submittals not requested will not be recognized or processed.

3.14 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. General: Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the Architect/Engineer will review each submittal, mark with appropriate "Action".
- C. Action Submittals: Architect/Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. After Engineers Stamp (if work scope applies to same), Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- D. Final Unrestricted Release: Where the submittals are marked as follows, the work covered by the submittal may proceed provided it complies with the requirements of the contract documents; acceptance of the work will depend upon that compliance.
1. Marking: "No Exceptions Taken"
- E. Final-But-Restricted Release: When the submittals are marked as follows, the work covered by the submittal may proceed provided it complies with both the Architect's/Engineer's notations or corrections on the submittal and with the requirements of the contract documents; acceptance of the work will depend on that compliance.
1. Markings: "Make Correction Noted"
- F. Returned for Re-submittal: When the submittal is marked as follows, do not proceed with the work covered by the submittal, including purchasing fabrication, delivery or other activity. Revise the submittal or prepare a new submittal in accordance with the Architect's/Engineer's notations stating the reasons for returning the submittal; resubmit the submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the following marking to be used at the project site, or elsewhere where work is in progress.
1. Marking: "Revise and Resubmit"
- G. Marking: "Rejected".
- H. Other Action: Where the submittal is returned, marked with the Architect/Engineer's explanation, for special processing or other Contractor activity, or is primarily for information or record purposes, the submittal will not be marked.

3.15 SUBMITTAL COVERSHEET

Westchester Community College

WCC Science Building - Infrastructure Upgrade - Phase 1

Westchester Community College

ARCHITECT:

OWNER:

Fuller and D'Angelo Architects

Westchester Community College

45 Knollwood Rd.

75 Grasslands Rd.

Elmsford, NY10523

Valhalla, NY 10595

CONTRACTOR: _____ **CONTRACT:** _____

ADDRESS: _____

DATE _____ **TELEPHONE:** _____ **EMAIL:** _____

Facility Name: Westchester Community College

Type of Submittal: Re-submittal: [] No [] Yes [] Certificate [] Warranty [] Color Sample

[] Shop Drawings [] Product Data [] Schedule [] Sample [] Test Report [] Certificate

SUBMITTAL DESCRIPTION: _____

PRODUCT NAME: _____

MANUFACTURER: _____

SUBCONTRACTOR/ _____

SUPPLIER: _____

SPEC.# _____ **DWG. #s** _____ **PAR.#:** _____ **RM. OR DETAIL #s:** _____

STAMP SHEET

Contractor Remarks And Stamp:

We the undersigned certify that we have reviewed and coordinated this shop drawings with job conditions and Contract requirements and they are in conformance to the plans, specifications and other provisions of the Contract Documents. Any deviations from the contract documents have been identified in writing.

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Construction Manager's Comments and Stamp:

Architect's Comments and Stamp:

Consultant's Comments and Stamp

A.

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NAME: _____ DATE: _____

Westchester Community College

WCC Science Building - Infrastructure Upgrade - Phase 1

Westchester Community College

ARCHITECT: _____ OWNER: _____

Architect Westchester Community College

45 Knollwood Rd.

75 Grasslands Rd.

Elmsford, NY10523

Valhalla, NY 10595

CONTRACTOR: _____ CONTRACT: _____

ADDRESS: _____

DATE _____ TELEPHONE: _____ EMAIL: _____

Facility Name: Westchester Community College

Type of Submittal: Re-submittal: [] No [] Yes [] Certificate [] Warranty [] Color Sample

[] Shop Drawings [] Product Data [] Schedule [] Sample [] Test Report [] Certificate

SUBMITTAL DESCRIPTION: _____

PRODUCT NAME: _____

MANUFACTURER: _____

SUBCONTRACTOR/ _____

SUPPLIER: _____

SPEC.# _____ DWG. #s _____ PAR.#: _____ RM. OR DETAIL #s: _____

STAMP SHEET

Contractor Remarks And Stamp:

We the undersigned certify that we have reviewed and coordinated this shop drawings with job conditions and Contract requirements and they are in conformance to the plans, specifications and other provisions of the Contract Documents. Any deviations from the contract documents have been identified in writing.

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Construction Manager's Comments and Stamp:

Architect's Comments and Stamp:

Consultant's Comments and Stamp

NAME: _____ **DATE:** _____

END OF SECTION

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01 1000 - Summary of Contracts: Work sequence.

1.3 SUBMITTALS

- A. Within 20 calendar days after Letter of award submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 calendar days.
- C. Within 5 calendar days after review of preliminary schedule, submit complete final schedule for review.
- D. Schedule to be detailed per floor and with broken out work scope items, per area of floor. Including Basement and Boiler Room, and to include but not limited to Stairwells, Corridors, Offices and Laboratories in every 4 quadrants of the typical floor plate.
- E. Submit in PDF format.

1.4 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.5 SCHEDULE FORMAT

- A. Sheet Size: Multiples of 8-1/2 x 11 inches (216 x 280 mm).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide legend for symbols and abbreviations used.

3.2 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.3 REVIEW AND EVALUATION OF SCHEDULE

- A. Evaluate project status to determine work behind schedule and work ahead of schedule.
- B. After review, revise as necessary as result of review, and resubmit within 10 days.

3.4 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Indicate changes required to maintain Date of Substantial Completion.
- E. Submit reports required to support recommended changes.

3.5 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Westchester Community College, and other concerned parties.

END OF SECTION

**SECTION 01 3553
SECURITY PROCEDURES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Security measures including entry control, personnel identification, miscellaneous restrictions, and per WCC procedures.

1.2 SECURITY PROGRAM

- A. Protect Work , existing premises and Westchester Community College's (WCC) operations from theft, vandalism, and unauthorized entry.
- B. Initiate program in coordination with Westchester Community College's existing security system at project mobilization.
- C. Maintain program throughout construction period as per Westchester Community College direction, note this may change at various times during construction.

1.3 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities. Per protocol set by WCC Security Personell.
- B. Workers to Park vehicles only in Lots 3 and 4
- C. Allow entrance only to authorized persons with proper identification.
- D. Maintain log of workers and visitors, make available to Westchester Community College on request.

1.4 PERSONNEL IDENTIFICATION

- A. Provide identification badge to each person authorized to enter premises.
- B. Badge To Include: Personal photograph, name, assigned number , expiration date and employer.
- C. Require return of badges at expiration of their employment on the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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**SECTION 01 4000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Submittals.
- B. Testing and inspection agencies and services.
- C. Contractor's design-related professional design services.
- D. Control of installation.
- E. Mock-ups.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4219 - Reference Standards.
- C. Section 01 4533 - Quality Requirements
- D. Section 01 6000 - Product Requirements: Requirements for material and product quality.
- E. Section 06 1000 - Rough Carpentry
- F. Various Mechanical Sections

1.4 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2019).
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2022.
- D. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.

1.5 DEFINITIONS

- A. **Design Data: Design-related, signed and sealed Fire Suppression System and Related Work - Shop Drawings drawings, calculations, specifications, certifications, pipe drawings, risers and other submittals provided by Contractor, or Fire Suppression System Subcontractor and prepared directly by, or under direct supervision of, appropriately licensed design professional.**

1.6 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Mechanical Sub- Contractor or Prime contractor if Mechanical Contractor is the Prime.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Fire Suppression System and Related Work

1.7 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time specialist and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit one copy of Testing agency licensed to perform Inspections and Testing of Fire Suppression Systems and Related Work.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and or installation/application subcontractor to Owner and Architect, in quantities specified for Product Data.
 - 1. Certificates may be recent or previous test results on material or product, but must be acceptable to Owner and Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, for the Westchester Community College's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Westchester Community College.
 - 1. Submit report in duplicate within 5 days of observation to Architect for information.

1.8 REFERENCES AND STANDARDS - See Section 01 4219

- A. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1.9 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform specified testing. Costs for such work scope shall be paid by the Owner to the Contractor under the Unit Price Allowance for Inspections and Testing Services, by a Liscensed Inspection Agency.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Integrated Exterior Mock-ups: construct integrated exterior mock-up as indicated on Drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.

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- D. Notify Architect and Engineering Consultant seven (7) working days in advance of dates and times when mock-ups will be constructed.
- E. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- F. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- G. Assemble and erect one unit in each typical case of specified items with specified attachment and anchorage devices.
- H. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- I. Accepted mock-ups shall be a comparison standard for the remaining Work.
- J. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Balancing reports for air and water.
 - 3. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 4. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.

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- b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
5. Notify Owner and Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 6. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 7. Arrange with Westchester Community College's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.4 CONTRACTOR'S TESTING AND INSPECTION

- A. Testing and Inspections shall be conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction and as indicated in individual Specification Sections as the contractor's responsibility including:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Owner's Representative, Contractor, or Architect promptly of irregularities and deficiencies observed in the work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Owner's Representative, with copy to Contractor and to authorities having jurisdiction.
 4. Submitting again a final wiring termination report book of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and re-inspecting corrected work.
 7. Testing and Inspections of Fire Suppression Systems and Related Work - Costs paid under Unit Price - Allowance

3.5 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

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- B. Submit qualifications of observer to Architect 10 days in advance of required observations.
 - 1. Observer subject to approval of Westchester Community College.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.6 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 01 4216
DEFINITIONS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.3 DEFINITIONS

- A. Owner: The term "Owner shall mean Westchester Community College and their duly authorized representative.
- B. Architect: The term "Architect" shall mean the Professional Architect responsible for the contract documents Fuller & D'Angelo, P.C. Architects & Planners 45 Knollwood Road, Elmsford, N.Y. 10523 and the Word "Engineer" shall mean Collado Engineering, 445 Hamilton Avenue, Suite 608, White Plains, NY 10601
- C. Owner's Representative: The term Owner's Representative shall mean Westchester Community College personnel.
- D. Contractor for Construction: The term "Contractor for Construction", "General Contractor" "Contractor for General Work" "Construction Contractor" shall have the same meaning.
- E. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract and Section 01300 Submittal Procedures.
- F. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- G. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- H. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- I. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

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- J. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- L. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- M. The term "Building Code" shall mean the Building Code of the State of New York including all amendments and reference standards to date.
- N. "Work" - Labor, materials, equipment, apparatus, controls, accessories, and all other items customarily furnished and/or required for proper and complete disconnection and reconnection, installation of new work.
- O. "Wiring" - Conduit, fittings, wire, junction and outlet boxes, switches, cutouts, and receptacles and all items necessary or required in connection with or relating to such wiring.
- P. "Concealed" - Embedded in masonry or other construction, installed behind wall furring, within double partitions, or hung ceilings, in trenches, or in crawl spaces.
- Q. "Exposed" - Not installed underground or "Concealed" as defined above.
- R. Furnish: The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations..
- S. Install: The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- T. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- U. Provide: To furnish and install complete and ready for the intended use.
- V. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 4219
REFERENCE STANDARDS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirements relating to referenced standards.

1.3 RELATED REQUIREMENTS

- A. Document 00 7200 - General Conditions: Reference standards.

1.4 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date for receiving bids, except where a specific date is established by applicable code.
- C. Obtain copies of standards when required by the Contract Documents.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

1.5 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract and Section 01100 Summary of Contracts.

1.6 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents, including reference standards in codes having jurisdiction, include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- C. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
- D. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

PART 2 CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

2.1 Abbreviations and Names:

3.1 AA -- ALUMINUM ASSOCIATION, INC.

- A. AA DAF-45 - Designation System for Aluminum Finishes; 2003 (Reaffirmed 2009).
- B. AA SAAA-46 - Standards for Anodized Architectural Aluminum; 1978.
- C. AA BDAS-516161 - Behavior and Design of Aluminum Structures; 1992.

3.2 AHRI -- AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.

3.3 AMCA -- AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.

3.4 ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASHRAE Guideline 5 - Guideline to Commissioning Smoke Management Systems; 1994 (Reaffirmed 2001).

3.5 ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.
- B. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2020.

- C. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.

3.6 ASTM A Series -- ASTM INTERNATIONAL

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.

3.7 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

- A. NFPA 3 - Recommended Practice on Commissioning and Integrated Testing of Fire Protection and Life Safety Systems; 2018.
- B. NFPA 4 - Standard for Integrated Fire Protection and Life Safety System Testing; 2021.
- C. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 13-2016 - Standard for the Installation of Sprinkler Systems; 2016, with Errata (2017).
- E. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems; 2019, with Amendment.
- F. NFPA 15 - Standard for Water Spray Fixed Systems for Fire Protection; 2022.
- G. NFPA 25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems; 2020, with Amendment (2021).
- H. NFPA 45 - Standard on Fire Protection for Laboratories Using Chemicals; 2019.
- I. NFPA 170 - Standard for Fire Safety and Emergency Symbols; 2021.

3.8 NRMCA -- NATIONAL READY MIXED CONCRETE ASSOCIATION

- A. NRMCA CLSM - Guide Specification for Controlled Low Strength Materials; Current Edition.

3.9 NSI -- NATURAL STONE INSTITUTE

- A. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

3.10 PDCA -- PAINTING AND DECORATING CONTRACTORS OF AMERICA

- A. PDCA (MAN) - Architectural Specification Manual; 1986.

END OF SECTION

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CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES
SECTION 01 4533

CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.
- D. Manufacturers' field services.
- E. Fabricators' field services.

1.3 OWNER RESPONSIBILITY

- A. All Code required testing will be performed and paid for by the Owner and Construction Contractor. Within the Allowance for Testing and Inspections

1.4 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements
- B. Section 01 4219 - Reference Standards.
- C. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.5 ABBREVIATIONS AND ACRONYMS

- A. AHJ: Authority having jurisdiction.
- B. IAS: International Accreditation Service, Inc.
- C. NIST: National Institute of Standards and Technology.

1.6 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the Building Code of New York State (BCNYS).
- B. Contractor will schedule a Special Inspections preconstruction meeting at least 7 days prior to initial planned date for start of construction.
 - 1. Discussions shall include the following:

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- a. Review of specifications and Schedule of Special Inspections for work requiring Special Inspections.
 - b. Responsibilities of the Prime Contractors, Owner, Testing Agency, Special Inspector, and Registered Design Professional.
 - c. Notification and reporting procedures.
2. Attendees shall include Owner's Representative, Contractor, Testing Agency, and Special Inspector(s).

1.7 DEFINITIONS

- A. Code or Building Code: ICC (IBC), International Building Code, Most Recent Edition Adopted by New York State, Including All Applicable Amendments and Supplements and specifically, Chapter 17 - Special Inspections and Tests.
1. Including New York State Department of Education (SED).
- B. NIST: National Institute of Standards and Technology.
- C. Registered Design Professional(RDP): Licensed Professional Engineer or Registered Architect whose seal appears in the Construction Drawings. Unless noted otherwise, references to the Registered Design Professional (RDP) in this section refer to Architect or Consultants for building design.
- D. The term Owner's Representative shall mean Owner or Owner's Representative or other designee of the Owner.
- E. Special Inspection:
1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the State Building Code that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
 2. Special inspections are separate from and independent of tests and inspections conducted by Contractor and Special Inspector for the purposes of quality assurance and contract administration.
- F. Special Inspector: A Professional Engineer registered in the State of New York that has a minimum of four years of design experience with buildings and qualified to perform inspections assigned including structural, HVAC, plumbing, and electrical.
- G. Testing/Inspecting Agency: Agent retained by Contractor and coordinated by Contractor to perform some inspection services on behalf of Owner. Firestopping and Fire Suppression System as Specified elsewhere and by Code and AHJ.
- H. Statement of Special Inspections: Documents prepared by the Registered Design Professional and filed with and approved by the Owner's Representative and Testing Agency, listing materials and work requiring Special Inspections. These documents include this specification and the Schedule of Special Inspections.

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- I. Schedule of Special Inspections: An itemized list of inspections, verifications, and tests (including frequency) required for the project and individuals, agencies, or firms who will be retained to perform these services. The Schedule of Special Inspections is located in this section
- J. Periodic Special Inspections: Part-time or intermittent observation of work by the or Testing Agency for work that has been or is being performed and at completion of work.

1.8 QUALIFICATIONS

- A. Special Inspections shall be performed by agents who have relevant experience for each category of inspections indicated in the drawings and within specifications.

1.9 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications: Prior to the start of work, the Testing Agency is required to:
 - 1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit certification that Testing Agency is acceptable to AHJ.
 - 4. Submit documentation that Testing Agency is accredited by IAS according to IAS AC89.
- C. Manufacturer's Qualification Statement: Manufacturer shall submit documentation of manufacturing capability and quality control procedures.
- D. Fabricator's Qualification Statement: Fabricator shall submit documentation of fabrication facilities and methods as well as quality control procedures.
- E. Special Inspection Reports: After each special inspection, Special Inspector shall promptly submit one electronic copy of report, in PDF format, to Owner's Representative, Contractor, and Registered Design Professionals for Structural Engineering and for Architecture..
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.

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- g. Type of special inspection.
 - h. Date of special inspection.
 - i. Results of special inspection.
 - j. Compliance with Contract Documents.
 - 2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.
- F. Test Reports: After each test or inspection, promptly submit one electronic copy, in PDF format, to Owner's Representative, Architect, Construction Manager, Contractor, and Special Inspector.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test or inspection.
 - h. Date of test or inspection.
 - i. Results of test or inspection.
 - j. Compliance with Contract Documents.
 - 2. Compliance with referenced standard(s).
- G. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Owner, Architect, and Contractor, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Owner's Representative and Special Inspector .
- H. Manufacturer's Field Reports: Submit reports to:
 - 1. Submit report in, electronic copy, in PDF format, within 15 days of observation to Owner's Representative, Architect, Contractor, and Special Inspector for information.

2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.

1.10 SPECIAL INSPECTION AGENCY

- A. Contractor will employ and pay for services of a Special Inspection Agency to perform inspections and associated testing in accordance with ASTM E329 and required by the building code. Funds shall be repaid to the contractor, from the Allowance amount in the construction documents.
- B. The Special Inspection Agency may employ and pay for services of an independent testing agency to perform testing associated with special inspections and required by the building code.
- C. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.11 TESTING AND INSPECTION AGENCIES

- A. Contractor will employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code or specification.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.12 QUALITY ASSURANCE

- A. Special Inspection Agency Qualifications:
 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 2. Accredited by IAS according to IAS AC291.
- B. Testing Agency Qualifications:
 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 2. Accredited by IAS according to IAS AC89.

PART 2 PRODUCTS

2.1 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
 1. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

2.2 SPECIAL INSPECTIONS FOR FIRE RESISTANT PENETRATIONS AND JOINTS

- A. Verify penetration firestops in accordance with ASTM E2174.

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- B. Verify fire resistant joints in accordance with ASTM E2393.

2.3 OTHER SPECIAL INSPECTIONS

- A. Provide for special inspection of work that, in the opinion of the Owner and Architect, is unusual in nature.
- B. For the purposes of this section, work unusual in nature includes, but is not limited to:
1. Construction materials and systems that are alternatives to materials and systems prescribed by the building code.
 2. Unusual design applications of materials described in the building code.
 3. Materials and systems required to be installed in accordance with the manufacturer's instructions when said instructions prescribe requirements not included in the building code or in standards referenced by the building code.

PART 3 EXECUTION

3.1 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

- A. Special Inspection Agency shall:
1. Provide qualified personnel at site. Cooperate with Owner's Representative and Contractor in performance of services.
 2. Perform specified sampling and testing of products in accordance with specified reference standards.
 3. Ascertain compliance of materials and products with requirements of Contract Documents.
 4. Promptly notify Owner's Representative, Architect, and Contractor of observed irregularities or non-conformance of work or products. Owner
 5. Perform additional tests and inspections required by Owner's Representative, Architect, and Contractor.
 6. Attend preconstruction meetings and progress meetings.
 7. Submit reports of all tests or inspections specified. Reports shall include:
 - a. Project Name.
 - b. Owner Name.
 - c. Inspector Name.
 - d. Special Inspector.
 - e. Statement stating the testing, inspection in conformance with these requirements and any discrepancies have been identified and corrected.

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- f. Comments or other information.

- B. Limits on Special Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the work.

- C. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Owner's Representative and Architect.

- D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.2 TESTING AGENCY DUTIES AND RESPONSIBILITIES

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Owner's Representative, Architect, and Special Inspector in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Owner's Representative, Contractor, and Special Inspector of observed irregularities or non-conformance of work or products.
 - 5. Perform additional tests and inspections required by Testing Agency, Special Inspector, and AHJ.
 - 6. Attend preconstruction meetings and progress meetings.
 - 7. Submit reports of all tests or inspections specified within maximum of one (1) week.

- B. Limits on Testing or Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the work.

- C. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Owner's Representative and Architect.

- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.3 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 2. Cooperate with Special Inspector agency and laboratory personnel; provide access to the work, to manufacturers' facilities, and to fabricators' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Owner's Representative and laboratory three (3) days prior to expected time for operations requiring testing or inspection services.
 5. Arrange with Owner's Representative and Special Inspector pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. As the work proceeds, perform remedial work, as directed and sign non-conformance reports stating remedial work has been completed to the Special Inspector.
 7. Retain special inspection records.
- B. Seismic Force-Resisting Systems: Submit written statement of responsibility for each item listed, to Owner's Representative prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.

3.4 COMMUNICATION

- A. Testing/Inspecting Agency shall immediately notify Contractor, Special Inspector, and Registered Design Professional by telephone, fax, or e-mail of test results failing to comply with requirements of Contract Documents.
- B. Special Inspector shall immediately notify Contractor of work found to be in non-conformance with Contract Documents during inspections. If nonconforming work is not corrected while Special Inspector is on-site, Special Inspector shall notify Registered Design Professional within 24 hours (one business day) and issue an inspection report noting the non-conformance.
- C. Special Inspector and each Testing/Inspecting Agent shall use a log to record and track non-conforming work during construction. Non-Conformance log shall include the following information:
1. Description of non-conformance.
 2. Date of non-conformance.

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3. Description of RDP response if received.
 4. Status of non-conformance: 'Open' or 'Closed.'
- D. Updated log shall be attached to each inspection report. Special Inspector or Testing/Inspecting Agent may use Non-Conformance Log form provided at end of this section or other similar form.
- E. If non-conforming work is not corrected at time of substantial completion of structure or other appropriate time, Special Inspector shall notify Architect, Construction Manager, and Contractor.

3.5 FINAL REPORT OF SPECIAL INSPECTIONS

- A. At completion of work, each Testing/Inspecting Agency shall submit Agent's Final Report of Special Inspections to Special Inspector stating work was completed in substantial conformance with Contract Documents and appropriate inspections and tests were performed. Testing/Inspecting Agency may use Agent's Final Report of Special Inspections form provided at end of this section or other similar form.
- B. At completion of work, Special Inspector shall compile a Final Report of Special Inspections including each Agent's Final Report of Special Inspections. The Final Report of Special Inspections shall state required inspections have been performed and itemize nonconforming work not corrected or resolved as required by the NYSUC. Interim reports from all Agents will not be included unless specifically requested by the Owner or Code Enforcement Official. The Final Report shall be stamped by a New York State Professional Engineer.
- C. Special Inspector may use Final Report of Special Inspections form provided at end of this section or other similar form based on .
- D. Special Inspector shall submit Final Report of Special Inspections to Registered Design Professional and Code Enforcement Official prior to issuance of a Certificate of Use and Occupancy.

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CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

Final Report of Special Inspections

Project Name: WCC Science Building - Infrastructure Upgrade

Special Inspector: _____

Project No.: _____

RDP: _____

Owner: WCC

Owner Address: 75 Grasslands Rd.

Valhalla, NY

Architect of Record: Fuller and D'Angelo, P.C. Fuller & D'Angelo Project No.: 24522.00

Engineer of Record: collado Engineering

To the best of my information, knowledge, and belief, Special Inspections required for this project, as indicated in the Statement of Special Inspections, (which includes Specification Section 014533 and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

(Attach continuation sheets if required to complete description of uncorrected discrepancies.)

Interim reports submitted prior to this Final Report form a basis for and are to be considered an integral part of this Final Report. Upon request, the interim Testing and Special Inspection reports can be provided. Agent's Final Reports of Special Inspections are attached and are also a part of this Final Report.

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Submitted By,

Signature Special Inspector

Title

__ Page _____

Print Name

Professional Seal

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Testing/Inspection Agent's Final Report of Special Inspections

Project Name: WCC Science Building - Infrastructure Upgrade

Special Inspector: _____

Special Inspector Project No.: _____

RDP: _____

Owner: WCC

Owner Address: 75 Grasslands Rd.

Valhalla, NY

Architect of Record: Fuller and D'Angelo, P.C. Fuller & D'Angelo Project No.: 24522.00

To the best of my information, knowledge, and belief, the Special Inspections and testing required for this project and designated for this Agent in the Statement of Special Inspections (which includes Specification Section 014533 and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

(Attach continuation sheets if required to complete description of uncorrected discrepancies.)

Respectfully submitted,

Agent of the Special Inspector

Title

(Type or print name)

City, State Zip _____

Design Professional Seal or Certification

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APPROVED AGENCY NON CONFORMANCE LOG

Project: _____

Project NO.: _____

| Non-Conformance Item # (See Note 1) | Special Report No. Reference/Date | Summary of Non-Conformance | Date SEOR Response Received within 24 hr | Reinspection Required | Date Contractor Verification Received (See Note 1) | Status (See Note 2) |
|--|--|-----------------------------------|---|------------------------------|---|-------------------------------------|
| NC-1 | | | | | | |
| NC-2 | | | | | | |
| NC-3 | | | | | | |
| NC-4 | | | | | | |
| NC-5 | | | | | | |
| NC-6 | | | | | | |
| NC-7 | | | | | | |

1. New items are in bold. For each non-conformance item above, the general contractor or subcontractor must sign and submit the contractor verification statement located in the RDP response report.
2. Non-conformance items remain " open" until the contractor verification have been received. When the signed verifications have been received by the RDP, the item will be " closed" distributed with 7 days

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END OF SECTION

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SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary sanitary facilities.
- B. Temporary Controls: Barriers, enclosures, and fencing.
- C. Security requirements.
- D. Waste removal facilities and services.

1.2 RELATED REQUIREMENTS

- A. Section 01 5100 - Temporary Utilities.

1.3 TEMPORARY UTILITIES - See Section 01 5100

- A. Westchester Community College will provide the following:
 - 1. Electrical power and metering, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Provide and Owner will pay for all electrical power and water required for construction purposes.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.6 FENCING

- A. Provide 6 foot (1.8 m) high fence around construction staging area and storage area as depicted on drawings; equip with vehicular and pedestrian gates with locks.

1.7 SECURITY - See Section 01 3553

- A. Provide security and facilities to protect Work, existing facilities, and Westchester Community College's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Westchester Community College's security program.

1.8 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 5050
PIPE SCAFFOLDING AND SIDEWALK BRIDGES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. New Safety Fence and Sidewalk Bridges: The Contractor shall furnish, install, maintain and pay for new safety fences and/or sidewalk bridges. Removal and replacement shall be coordinated so that new fences and bridges are installed the same day the old ones are removed.
 - 1. Maintain the safety fences and sidewalk bridges until the all work is complete.
- B. Pipe Scaffolding: Install and maintain pipe scaffolding where masonry replacement work is specified and shall be available at all times for progress inspections, punch lists and final inspection by the Architect.
 - 1. At Contractor's option lifts may be used. Refer to Section 01 5000.
 - 2. Scaffolding may be installed and removed in phases as the work of each phase is completed and approved by the Architect
- C. Install and maintain warning signs, and snow fence and saw horse barricades to alert persons on or about the site, and direct them away from the work areas.
 - 1. Maintain safe egress to and from the building at all times. Do not block any entrances.
 - 2. Maintain the safety fence, sidewalk bridges and scaffold until all work is complete.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 3553 - Security Procedures.
- B. Section 01 5000 - Temporary Facilities and Controls
- C. Section 04 0100 - Maintenance of Masonry.

1.4 QUALITY ASSURANCE

- A. Obtain all components of pipe scaffolding and sidewalk bridging from a single source supplier or manufacturer.
 - 1. Install the pipe scaffolding and sidewalk bridging using personnel thoroughly skilled and competent in the work.
 - 2. Perform the work causing as little inconvenience to the public and building occupants as possible. Refer to Section 01 1000 - Summary of Contracts

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PIPE SCAFFOLDING AND SIDEWALK BRIDGES

3. Furnish and install all pipe scaffolding and sidewalk bridging, including supports, fastenings, connections, and details that are designed, sealed and signed by a New York State licensed Professional Engineer, utilizing a minimum safety factor of not less than four times the maximum weight intended to be placed thereon when in use.
4. Post signage on the pipe scaffolding and sidewalk bridging, to indicate the safe permissible pipe scaffolding and sidewalk bridging design load. Do not load the pipe scaffolding and sidewalk bridging in excess of the safe design loads.

1.5 SUBMITTALS

- A. Manufacturer's technical product data, specifications, and installation instructions for all components of pipe scaffolding and sidewalk bridges.
 1. Shop drawings showing the locations, dimensions, and details for all components and assemblies of any pipe scaffolding and/or sidewalk bridges if used, must be signed, sealed and stamped by a professional engineer licensed in New York State.
 2. Evidence that all wood products used (for example planking) are fire retardant where required by code.

1.6 PROJECT CONDITIONS

- A. Bidders must visit the work site to determine the existing conditions and take whatever measurements are needed before submitting bids.
 1. Pipe scaffolding and sidewalk bridging shall be provided as required for contractors and all subcontractors requiring access to scope of the work areas.
 2. Lifts can be provided for areas where they have safe and secure access to perform the work scope, per OSHA standards and manufacturers limitations of slope, reach and safety. This is solely a contractors Means and Methods decision.

PART 2 - PRODUCTS

2.1 MATERIALS FOR PIPE SCAFFOLDING

- A. Pipe scaffolding and sidewalk bridging shall be constructed of tubular metal sections, or other non-combustible material, to meet at a minimum the NYS Building Code, and OSHA requirements.
 1. Lumber used in the erection of the scaffold or sidewalk bridges shall be at least equal in strength and quality to construction grade Douglas fir, and treated with a recognized fire retardant.
 2. Fasteners to secure lumber and timber shall be galvanized nails or bolts of a suitable size to produce a secure joint capable of withstanding the design load.
 3. Mud sills shall be 2 X 10 inch wood planks.

2.2 MATERIAL FOR SIDEWALK BRIDGES

- A. Posts - 3-1/2 inch standard pipe spaced 8 feet on center longitudinally.

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1. Beams - 6 I to 10 I structural steel beams, dependent upon sidewalk width and live load.
2. Joists - 3 I to 6 I structural steel beams, or 3 x 6 inch to 4 x 8 inch timber, dependent upon joist spacing and live load.
3. Decking - nominal 2 inch thick planking, dependant upon joist framing and live load.
4. Top platform perimeter fence – 1/2 inch hardware cloth mesh, installed 4 feet high above the top platform, fastened to catch and prevent material or debris from sliding down the roof and off the scaffold.
5. Bracing - 1-1/2 inch standard pipe for girts and railings, 3/4 standard pipe for cross bracing.
6. Mud Sills - 2 x 10 inch wood planks.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE SCAFFOLDING

- A. Install and maintain pipe scaffolding and sidewalk bridging waist height at all masonry, window, and louvers to access masonry areas being repointed ,
 1. Except as otherwise indicated, install planks to overhang their end supports at least 6 inches, and fasten them securely to prevent dislodgement. Do not allow planks to overhang in excess of 18 inches. Lay planks tight together, to form a full scaffold width platform.
 2. Install guardrails and toe boards on the sides and ends of every scaffold platform.
 3. Install wire screening along the outside edge of scaffold to prevent debris and material from falling off.
 4. Install cross bracing supports in all scaffold bays.
 5. Install at one set of scaffold access stairs from grade to each work level, at each section of the building where / when work is underway. Provide a 12 foot high plywood fence, and a hinged gate with a padlock to secure the bottom of each set of stairs. Distribute twelve padlock keys to representatives of the Owner's Representative and other authorized personnel.
 6. Install plywood to cover the bottom 8 feet of scaffold, where public access is possible – for example, adjoining entrance doors and where the scaffold is not' surrounded by the safety fence.

3.2 INSTALLATION OF SIDEWALK BRIDGES

- A. Maintain pipe scaffolding and sidewalk bridging to maintain public egress pathways to and from the building.
 1. Install the sidewalk bridging such that they do not block lighting fixtures, fuel oil intakes, exhaust vents and doors.
 2. Plank over the sidewalk bridging the full width of the egress path.

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3. Brace the sidewalk bridging longitudinally and horizontally in each bay. Make connections with clamps.

3.3 MAINTENANCE

- A. Maintain work areas free of waste materials, debris and rubbish. Maintain the site in a clean and orderly condition.
 1. Immediately provide temporary measures to safe guard any pipe scaffolding and sidewalk bridging, which is damaged or otherwise adversely effected for any reason, and persons on or about the site, and repair or replace the effected portions of pipe scaffolding and sidewalk bridging within 48 hours, but before any further use.

3.4 OWNER & ARCHITECT ACCESS

- A. Permit representatives of the Owner's Representative and Architect access to the pipe scaffolding and lifts at all times until final acceptance by Owner's Representative and Architect.

3.5 DISMANTLING AND REMOVAL

- A. Carefully dismantle and remove pipe scaffolding, sidewalk bridging, and fences, only after all work, and all Punch List work is complete and approved in writing by the Owner's Representative and Architect.
 1. Remove pipe scaffolding and sidewalk bridging material from the site the same day it is disassembled. Do not store material at the site except with the specific prior permission of the Owner's Representative.
 2. Post signs, erect barricades and station flag man around the pipe scaffolding and sidewalk bridging site to prevent accidents and to insure the protection of the public.
 3. Clean and repair damage caused by the installation and removal of the pipe scaffolding. Restore existing facilities used or affected by construction activities to their original condition.

END OF SECTION

**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- C. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.2 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit Coordination Drawings and Shop Drawings for Fire Suppression System, with Third-Party calculations and layout coordinated with Building above ceiling spaces and conditions. Third -Party shall be signed and sealed documents.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

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- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS
SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirement for installer certification that they did not use any non-compliant products.
- B. VOC restrictions for product categories listed below under "DEFINITIONS."
- C. All products of each category that are installed in the project must comply; Westchester Community College's project goals do not allow for partial compliance.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- D. Section 07 9200 - Joint Sealants: Emissions-compliant sealants.

1.4 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants..
 - 3. Products making up wall and ceiling assemblies.
 - 4. Thermal and acoustical insulation.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings.
 - 2. Interior adhesives and sealants.
- C. Interior of Building: Anywhere inside the exterior weather barrier.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.5 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
- C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.

1.7 QUALITY ASSURANCE

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
 - 1. Wet-Applied Products: State amount applied in mass per surface area.
 - 2. Paints and Coatings: Test tinted products, not just tinting bases.
 - 3. Product data submittal showing VOC content is NOT acceptable evidence.
 - 4. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Westchester Community College reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Westchester Community College.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

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INFRASTRUCTURE UPGRADE PHASE I
EXECUTION AND CLOSEOUT REQUIREMENTS

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Inspections prior to start of work.
- B. Examination, preparation, and general installation procedures.
- C. Requirements for alterations work, including selective removals.
- D. Areas of Ceilings removals, ACT and hard ceilings
- E. General installation of products.
- F. Progress cleaning.
- G. Protection of installed construction.
- H. Correction of the Work.
- I. Pre-installation meetings.
- J. Removals and dust control.
- K. Cutting and patching.
- L. Dust control
- M. Cleaning and protection.
- N. Final Cleaning.
- O. Demonstration and instruction of Westchester Community College personnel.
- P. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- Q. General requirements for maintenance service.

1.3 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary of Contracts: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

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- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.
 - 2. Limitations on cutting structural members.

1.4 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022.
- B. FGDC-STD-007.4 - Geospatial Positioning Accuracy Standards - Part 4: Architecture, Engineering, Construction, and Facilities Measurement; 2002.
- C. SMACNA (SRM) Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.
- D. State Plane Coordinate System for New York.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers and Construction Manager.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Refer to Section 01 7310 - Cutting and Patching for requirements.
- C. Project Record Documents: Accurately record revisions to the contract drawings.

1.7 QUALIFICATIONS

- A. Refer to individual sections for additional requirements.

1.8 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof barriers between construction areas and library areas and areas continuing to be occupied by Westchester Community College. Book areas are especially sensitive to dust.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

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EXECUTION AND CLOSEOUT REQUIREMENTS

1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers. See Noise restrictions for this project in other Sections
2. Outdoors: Limit conduct of especially noisy exterior work to specified work hours..
3. Indoors: Limit conduct of especially noisy interior work to specified work hours.

1.9 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate completion and clean-up of work of separate sections.
- D. After Westchester Community College occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Westchester Community College's activities.

1.10 MANDATORY OSHA CONSTRUCTION SAFETY AND HEALTH TRAINING

- A. Pursuant to NYS Labor Law §220-h - On all public work projects all laborers, workers and mechanics working on the site are required to be certified as having successfully completed an OSHA construction safety and health course of at least 10 hours prior to performing any work on the project.

PART 2 PRODUCTS

2.1 MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 2500 - Substitution Procedures.
- D. Barriers shall be constructed of sturdy lumber having a minimum size of 2 x 4.
 1. Signs shall be made of sturdy plywood of 1/2" minimum thickness and shall be made to legible at a distance of 50 feet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to start of construction take photographs, video's or similar documentation as evidence of existing project conditions as follows:
 - 1. Interior views: Each room and areas of outside work area which could be construed as caused by the contractor.
 - 2. Exterior views: Each area of work and areas of outside work area which could be construed as caused by the contractor.
- B. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Notify Architect and Owner Representative five (5) working days in advance of meeting date.
- C. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- D. Record minutes and distribute copies within two days after meeting to participants, with one copies to Architect and Construction Manager, participants and those affected by decisions made.

3.4 REMOVAL AND DUST CONTROL

- A. The following procedures shall be followed when removals will create dust:
1. Asbestos and lead containing material shall be removed as per asbestos and lead abatement sections of the specifications.
 2. Exterior
 - a. Work must be in compliance with OSHA Construction Standard (29 CFR 1926.62).
 - b. Windows directly below, above and adjacent to the work area shall be closed.
 - c. Provide tarps on the outside of the building to catch all dust, debris and paint chips when items are being removed and installed.
 3. Interior:
 - a. Floor surfaces shall be provided with a minimum of one layer of six mil plastic.
 - b. Library Shelving in areas of work shall receive one layer of six mil plastic, sealed at all edges to protect books.
 - c. All air vents in the room shall be closed, shut off and sealed.
 - d. Access to all rooms undergoing removals shall be restricted to prevent unauthorized entry.
 - e. All Electronics - TV's, smart boards, and clocks, electronic moveable objects will be removed or protected by the Owner. Items to remain, floors, desks and other fixed furniture, etc. shall be covered with a six mil plastic by the Contractor
 - f. All corridors from renovated areas to exitways, corridors, used by Contractor, shall be mopped and /or vacuumed and left clean daily by the Contractor.
 4. The Contractor shall provide labor for daily cleanup on the interior and the exterior of the building as required or directed by the Owner's Representative. Any visible debris shall be removed prior to occupancy the following day.
 - a. Only wet cleaning methods and/or HEPA vacuuming shall be used to clean.
 5. All debris shall be disposed of properly in accordance with Federal, State and Local Regulations. Refer to Section 01 5000 - Temporary Facilities and Controls and asbestos and lead abatement sections for containers required.
 6. Do not leave any openings unprotected at end of work day or during periods of excessive cold weather or precipitation.
 7. At completion of each work area HEPA vacuumed and wet wiped.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Saw cut all concrete slabs and asphalt paving.
- E. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- F. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- G. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Owner's Representative before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction suitable to maintaining clean conditions in areas of work.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 3. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

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EXECUTION AND CLOSEOUT REQUIREMENTS

- E. Protect existing work to remain.
 - 1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 2. Repair adjacent construction and finishes damaged during removal work.
 - 3. Patch as specified for patching new work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 - 2. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- J. Do not begin new construction in alterations areas before demolition is complete.
- K. Comply with all other applicable requirements of this section.

3.7 CUTTING AND PATCHING

- A. Refer to Section 01 7310 - Cutting and Patching.

3.8 WATCHMAN

- A. The Owner will not provide watchman. The Contractor will be held responsible for loss or injury to persons or property or work where his work is involved and shall provide such watchman and take such precautionary measures as he may deem necessary to protect his own interests.

3.9 SECURITY SYSTEM

- A. The existing building contains a security alarm system maintained and operated by the Owner. Access into the existing building shall not be permitted unless the owner is notified and arrangements made to deactivate the system.

3.10 VERIFICATION OF CONDITIONS

- A. All openings, measurements, door frames, existing conditions and other similar items or conditions shall be field measured prior to submission of any shop drawings or manufacturers literature for approval.
 - 1. The Contractor shall investigate each space into and through which equipment must be moved. Equipment shall be shipped from manufacturer in sections, of size suitable for moving through restricted spaces. Where sectional fabrication and or delivery cannot be achieved, openings, enlargements etc shall be provided by each contractor whose equipment requires access, at no additional cost to the Owner.

3.11 SALVAGEABLE MATERIALS:

- A. The Owner will prepare a list of salvageable items it wishes to retain. All salvageable items shall be delivered by the Contractor to a storage area designated by the Owner's Representative on site. All demolished equipment etc., except those items specifically requested by the Owner's Representative shall become the Contractor's property and shall be removed from the premises.

3.12 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- E. The Contractor is responsible for their own daily debris removal into containers provided by the Contractor. Working areas are to be cleaned on a daily basis by the Contractor.
- F. If daily cleaning and dust protection is not provided the Contractor will be back charged for cleanup performed by employees of the Owner or a separate contractor retained by the Owner.

3.13 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

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- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.14 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.15 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.16 FINAL CLEANING

- A. Final cleaning shall be the responsibility of the Contractor and all costs for final cleaning shall be included in their Base Bid. Final cleaning responsibility shall be limited to all areas where renovations occur.
- B. Execute final cleaning prior to final project assessment.
 - 1. Clean areas to be occupied by Westchester Community College prior to final completion before Westchester Community College occupancy.
- C. Use cleaning materials that are nonhazardous.
- D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- E. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- H. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- I. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

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- J. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
- K. Remove tools, construction equipment, machinery, and surplus material from Project site.
- L. Remove snow and ice to provide safe access to building.
- M. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- N. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- O. Sweep concrete floors broom clean in unoccupied spaces.
- P. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- Q. Remove labels that are not permanent.
- R. Touch up and otherwise repair and restore marred, exposed finishes and surfaces evidence of repair or restoration. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show
- S. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- T. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- U. Replace parts subject to unusual operating conditions.
- V. Clean ducts, blowers, and coils if units were operated without filters during construction.
- W. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- X. Leave Project clean and ready for occupancy.
- Y. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.17 CLOSEOUT PROCEDURES - Refer to WCC Front End Specifications.

END OF SECTION

**SECTION 01 7310
CUTTING AND PATCHING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. This Section includes procedural requirements for cutting and patching.
 - 1. Refer to other Sections for specific requirements and limitations applicable to cutting and patching.
 - 2. Requirements of this Section apply to all contracts. Refer to various sections and divisions of these specifications for other requirements and limitations applicable to cutting and patching.
 - 3. Contractor acknowledges that the work involves renovation and alteration of existing improvements and, therefore, cutting and patching of the work is essential for the Project to be successfully completed. The Contractor shall perform any cutting, altering, patching and fitting of the work necessary for the work and the existing improvements to be fully integrated and to present the visual appearance of an entire, completed, and unified project. In performing any work which requires cutting, fixing, or patching, Contractor shall use its best efforts to protect and preserve the visual appearance and aesthetics of the project to the reasonable satisfaction of both the Owner and the Architect.
 - 4. The Contractor shall do all cutting, patching, repairing as necessary for their work. In all cases, the cutting, patching, repairing and finishing shall be performed by mechanics skilled in the particular trade required at no additional cost to the Owner.

1.3 RELATED SECTIONS

- A. Division 1 Section "Selective Removals" for removals of selected portions of the building for alterations.
- B. Division 7 Section "Through-Penetration Firestop Systems" for patching fire-rated construction.
- C. Division 9 Section 09 2116 Gypsum Board Assemblies
- D. Division 9 Section 09 9123 Interior Painting
- E. Divisions 2 through 26 Sections for additional requirements and limitations applicable to cutting and patching individual parts of the Work.

1.4 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.5 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching; show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.6 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 1. Primary operational systems and equipment.
 - a. Air or smoke barriers.
 - b. Fire-protection systems.
 - c. Control systems.
 - d. Communication systems.

- e. Conveying systems.
 - f. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- 1. Water, moisture, or vapor barriers.
 - a. Membranes and flashings.
 - b. Equipment supports.
 - c. Piping, ductwork, vessels, and equipment.
 - d. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.
- B. Prior to cutting and patching verify with Construction Manager all existing warranties in effect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

- B. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- B. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition. A sufficient time in advance of the construction of new walls or floors etc. The Contractor shall be responsible for properly locating and providing in place all sleeves, inserts and forms required for work.
- C. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete/Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
- D. Where sleeves, inserts or openings are required in existing walls, floors, roofs, vaults and pavements of existing buildings or structures, all necessary cutting, furnishing and installing of sleeves, inserts, lintels, etc., shall be done by the Contractor.
- E. Contractor(s) are hereby notified that the existing walls in the existing building are concrete masonry unit. All openings greater than 5" in existing walls shall be provided with steel lintels, minimum 4"

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bearing each side and 8" wide x wall thickness concrete masonry units filled solid on each side of the opening for proper support.

- F. Adequate blocking, fastening, etc., required to support equipment, casework, etc., from existing terra cotta walls shall be included as required to complete work.
- G. All surfaces where existing items are removed from existing walls, floors, ceilings, roofs, vaults, etc. shall be patched to match existing surfaces.
 - 1. All patching shall be provided with prime and finish paint or other material to match existing. In areas indicated to be completely painted/finished by the Contractor for Construction, other prime contractors shall be required only to patch existing surfaces to match as required to accept new finishes.
 - 2. Proceed with patching after construction operations requiring cutting are complete.
- H. Removals of selected portions of the building for alterations is included in Section "Selective Removals".
- I. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

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END OF SECTION

**SECTION 01 7330
SELECTIVE REMOVALS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK:

- A. Location of selective removal work is indicated on drawings only in a general manner and it is not all inclusive in the overall scope of removal work. The Contractor shall provide all inclusive removals required for new and renovated work.
 - 1. The Contractor will be responsible for all related removals and re-work of the existing systems, as required for new work.

1.3 SUMMARY

- A. This Section includes but is not limited to the following:
 - 1. Repair procedures for selective removals operations.
- B. Work including but not limited to:
 - 1. Removal and Replacement of existing ceiling areas, tile systems and gypsum board systems.
 - 2. Patching and replacement of all areas of cutting and removals.
 - 3. Steel Lintel restoration and associated work
 - 4. Select brick repointing and masonry maintenance
 - 5. Site Brick wall repairs and new coping stones
 - 6. Exterior Electrical Fixture replacement
 - 7. Building Fire Suppression System and related work.
 - 8. Select HVAC for greenhouse
 - 9. Firestopping as specified in Section 07 8400 - Firestopping.
 - 10. Cutting and patching as Specified in Section 01 7310 - Cutting and Patching.

1.4 RELATED SECTIONS:

- A. Division 1 Section "Summary of Contracts" for use of the premises and phasing requirements.
- B. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

- C. Section 017310 - Cutting and Patching for cutting and patching procedures for selective removals operations.
- D. Section 07 8400 - Firestopping.

1.5 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. 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.
 - 1. Protect construction indicated to remain against damage and soiling during selective removals.
- D. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.6 SUBMITTALS

- A. Refer to Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- C. Schedule of selective removals Activities: Indicate the following:
 - 1. Detailed sequence of selective removals and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services.
 - 3. Locations of temporary partitions and means of egress.
 - 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Pre demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective removals operations. Submit before Work begins.
- E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective removals. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Pre demolition Conference: Conduct conference at Project site to comply with requirements in Section 01 3000 - Administrative Requirements. Review methods and procedures related to selective removals including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective removals schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

1.8 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective removals area. Conduct selective removals so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Before selective removals, Owner will remove the following items:
 - a. All loose furniture, desks, chairs, computers etc. for renovated areas.
 - b. Contractor Contract #1 shall cover all floors, fixed furniture, book cases, doors /opening into adjacent rooms opening into the work areas.
- C. Storage or sale of removed items or materials on-site will not be permitted.
 - 1. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective removals operations.
 - a. Maintain fire-protection facilities in service during selective removals operations.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective removals, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
 - 3. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective removals required.
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective removals operations.
 - 1. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective removals and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- B. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Erect temporary protection, such as fences, railings, sidewalk bridges, where required by authorities having jurisdiction.

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- D. Protect existing site improvements, appurtenances, and landscaping to remain.
- E. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- F. Provide protection to ensure safe passage of people around selective removals area and to and from occupied portions of building.
- G. Provide temporary weather protection, during interval between selective removals of existing construction on exterior surfaces and the new window replacement. to prevent water leakage and damage to structure and interior areas.
- H. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective removals operations.
- I. Cover and protect furniture, furnishings, and equipment that have not been removed.
- J. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- K. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
- B. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Wet mop floors to eliminate tackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- D. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- E. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective removals operations. Return adjacent areas to condition existing before selective removals operations began.

3.5 SELECTIVE REMOVALS

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

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1. Proceed with selective removals systematically, from higher to lower level. Complete selective removals operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Locate selective removals equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of removed items and materials promptly.
9. Return elements of construction and surfaces that are to remain to condition existing before selective removals operations began.
10. Existing Facilities: Comply with Owner's representative's requirements for using and protecting , stairs, walkways, loading docks, building entries, and other building facilities during selective removals operations.
11. Removed and Reinstalled Items: Comply with the following:
 - a. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - a) Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
12. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective removals. When permitted by Owner's representative , items may be removed to a suitable, protected storage location during selective removals, cleaned, and reinstalled in their original locations after selective removals operations are complete.

3.6 PATCHING AND REPAIRS Refer to Section 01 7310

- A. General: Promptly repair damage to adjacent construction caused by selective removals operations.

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1. Patching: Comply with Division 1 Section "Cutting and Patching."
2. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
3. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
4. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
5. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
6. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

3.7 SPECIAL REQUIREMENTS

- A. All existing systems are required and shall remain operational during the performance of the work.
- B. Notwithstanding anything contained in the Contract Documents to the contrary, the contractor(s) shall not be permitted to disrupt operation of any building system or any of the services without Owner's prior written consent, which shall not be unreasonably withheld. Any request to perform such work shall be in writing, received by Owner and Architect no less than 5 working days prior to the commencement of the request for disruption, and shall detail:
 1. The exact nature and duration of such interruption;
 2. The area of the Building affected, and;
 3. Any impact upon the Construction Schedule caused by such proposed temporary disruption. All Work shall be performed during the hours and on the days set forth in the Specifications.
 4. All required shutdowns shall be performed after hours or weekend.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.9 CLEANING

- A. Sweep the building broom clean and vacuuming of carpet on completion of selective removals operation.

END OF SECTION

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SCIENCE BUILDING
INFRASTRUCTURE UPGRADE PHASE I
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Westchester Community College requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

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- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Westchester Community College.

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3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards (cubic meters).
 - c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 3 EXECUTION

2.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- C. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. **Manager:** Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. **Communication:** Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Westchester Community College, and Architect.
- C. **Instruction:** Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. **Meetings:** Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. **Facilities:** Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. **Hazardous Wastes:** Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. **Recycling:** Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. **Reuse of Materials On-Site:** Set aside, sort, and protect separated products in preparation for reuse.

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- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

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PROCEDURES AND SPECIAL CONDITIONS, SINGLE PRIME
SECTION 01 7600
PROCEDURES AND SPECIAL CONDITIONS, SINGLE PRIME

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. The types of minimum requirements for procedures and performance or control work of a general nature, to be fulfilled collectively by the prime contractor.

1.3 USE OF PREMISES Refer to Section 01100 Summary of Contract(s)

1.4 MISCELLANEOUS PROVISIONS:

- A. Except as otherwise indicated comply with applicable requirements of Division 22, 23 & 26 sections for electrical provisions within units of general (Divisions 31 - 33) work.

1.5 DISSIMILAR METAL

- A. Wherever dissimilar metals would otherwise come in contact with each other, they must be isolated by use of an approved, permanent non-staining material. Where one of the metals is aluminum, a coat of zinc-chromate primer followed by a coat of alkali-resistant bituminous paint shall be applied.

1.6 MODIFICATION OF WORK

- A. Where necessary, because of job or space conditions, the Contractor shall modify his work to suit these conditions, within accepted standards and limitations. No allowance will be made for this modification. Comply with Section [01200].
 - 1. If work is executed without regard for other trades as cited above, the Architect may direct its removal and modification. No allowance will be made for this work.

1.7 QUIET OPERATION

- A. All work shall operate under all conditions of load without any sound or vibration which, in the opinion of the Architect or Owner's Representative, is objectionable. In the case of moving machinery, sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Architect or Owner's Representative shall be corrected in an approved manner by the Contractor at his expense. Provide vibration isolators on all moving machinery.

1.8 ACCESSIBILITY, SIZE AND LOCATION OF EQUIPMENT AND WORK

- A. The Contractor shall investigate each space into and through which equipment must be moved. Equipment shall be shipped from manufacturer. in sections. of size suitable for moving through restricted spaces.

PROCEDURES AND SPECIAL CONDITIONS, SINGLE PRIME

- B. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate thickness of partitions, and sizes of duct enclosures, for the proper installation of his work. They shall cooperate with the all other contractors whose work is in the same spaces and shall advise the Construction Contractor of their requirements. Such spaces and clearances shall, however, be kept to the minimum size required.
- C. The Contractor shall locate all equipment, which must be serviced, operated or maintained in fully accessible positions. Equipment shall include, but not be limited to: panels, controllers, racks, etc. Minor deviations from drawings may be made to allow for better accessibility, but changes of magnitude or which involves extra cost shall not be made without approval.

1.9 ACCESS DOORS Refer to Section 08310 for additional requirements.

- A. Provide all access doors for all dampers, valves, cleanest, junction boxes, pull boxes or similar items located above finished ceilings or ceiling breaks or extensions, behind finished walls or below finished floors. The access doors shall be steel, hinged types as required for type of construction.
 - 1. Where feasible locate all dampers, valves, cleanest, junction boxes, pull boxes or similar items above acoustical tile and hard ceilings, provide access panels as required in hard ceilings.

1.10 DRIP PANS

- A. The respective mechanical contractor shall provide 20 oz. copper all soldered reinforced pans with 2" high lips under all heating, domestic water piping, soil and waste piping which runs over electric switchboards, mounting boards, motors or electric motor starters. Each drip pan shall have a copper drain piped to discharge where shown on the drawings, or if not shown, to discharge to the nearest available open drain where directed by the Architect. All piping shall be copper 1-1/2" minimum in diameter.

1.11 CONCEALMENT OF UNSIGHTLY INSTALLATIONS

- A. Piping and conduit work is to be run concealed in all areas, in partitions, construction and pipe spaces. Obtain exact dimensions locations of partitions, use special care to see that no Joints, fittings, piping or conduit will be exposed except as shown or specified. In the event of any unsightly exposed piping or conduit work or unsightly partitions resulting, the responsible Contractor shall rebuild, and re-run lines at his own expense.

1.12 VERMIN CONTROL

- A. All piping, ducts and the like passing through non rated walls, floors, slabs, ceilings and other solid construction, shall be sealed to prevent the passage of vermin.
 - 1. These seals shall be by means of Johns-Manville Uni-seal or Duxseal packed sleeves or other approved construction. Philip Carey Corp., and 3M Company, shall be considered equal.
- B. All piping, ducts and the like passing through rated walls, floors, slabs, ceilings and other solid construction, shall be fire stopped in accordance with Section 07841 Through Penetration Firestop Systems.

1.13 CHEMICAL FUMES AND OTHER CONTAMINATES

- A. The Contractor shall be responsible for the control of chemical fumes, gases and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes.
- B. The Contractor shall be responsible to ensure that activities and materials which result in “off-gassing” of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc., are scheduled, cured or ventilated in accordance with manufacturer’s recommendations before a space can be occupied.

1.14 PROTECTION OF WORK AND MATERIAL

- A. The Contractor shall be responsible for the protection of all his work and shall make good all damage which may occur to his work prior to the date of the final acceptance. Ends of piping and/or conduit shall be plugged during construction to prevent debris and water from entering therein.
 - 1. Mechanical and electrical equipment shall be delivered and stored at the site, properly packed and crated. Each piece of equipment shall remain packed and crated at location until final installation. Uninstalled and installed equipment and materials shall be protected against damage by weather, water, paint, plaster, moisture, fumes, dust or physical damage.

1.15 DAMAGE TO OTHER WORK

- A. The Contractor shall be held responsible for and be required to make good at his own expense any and all damage done to the Owners property, adjoining property, and/or to any work or material in place in the premises, or included in his contract, which is caused by his work or workmen. The decision as to which contractor is responsible for specific damages shall be the responsibility of the Architect/Engineer.
 - 1. From the commencement to the completion of the Project, each Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause of

1.16 SUPPORTS FROM OVERHEAD CONSTRUCTION

- A. Where overhead equipment does not permit fastening of supports for equipment, furnish at no additional cost to the Owner, additional framing, supplementary steel, etc., as required, subject to approval by the Architect. Specific types of hangers and supports which are required in certain areas are to be installed as indicated on the drawings.

1.17 ESCUTCHEONS

- A. Where exposed un-insulated mechanical piping or conduits pass through floors, ceilings or walls of finished rooms, apply, approved hinged escutcheon of sufficient outside diameter to cover the pipe sleeve.
 - 1. Where exposed insulated pipes pass through walls, floors, or ceilings of finished rooms, provide escutcheons fastened to the sleeves.
 - 2. Finish shall be stainless steel in toilets, janitor’s closet and similar “wet areas”. Submit samples.

1.18 PUMPING

- A. The General Construction Contractor shall provide, maintain and operate pumps of adequate capacity required to maintain excavations, pits, trenches and depressions within the Contract Limit Lines as well as the Buildings free of water accumulated at any time and as necessary to permit the proper installation of the work required under all contracts. Disposal of pumped water shall be done with due respect to the rights of adjoining buildings. All costs in connection with the removal of water as above provided for shall be borne by the Contractor.

1.19 FLASHINGS

- A. Through Wall Flashing:
 - 1. All through wall flashings brick wall coping stone work will be by the General Construction Contractor.

1.20 WATERPROOFING

- A. Where any work pierced waterproofing, including waterproof concrete, the method of installation shall be approved by Architect before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required making openings absolutely watertight.

1.21 SALVAGEABLE MATERIALS:

- A. The Owner will shall have the right of first refusal to all items to be removed including but not limited to doors, hardware etc. All salvageable items shall be delivered by the Contractor to a storage area designated by the Owner on site. All demolished equipment etc., except those items specifically requested by the Owner shall become the Contractor's property and shall be removed from the premises.

1.22 MATERIALS AND WORKMANSHIP

- A. All material, apparatus and accessories shall be new and of the best quality of their respective kind.
 - 1. Work and materials shall conform to the latest applicable requirements of the New York State Building Code including Reference Standards or National Board of Fire Underwriters and Local Municipal codes, where applicable.
 - 2. All labor shall be performed in a first-class workmanlike manner, and adequate supervision must be provided to insure against neglect or faulty installations of any part of the systems during the progress of the work.
 - 3. Any inferior material and/or workmanship shall be removed at once, when directed by the Architect or Owner's Representative and replaced with material and workmanship in accordance with the true intent and meaning of the drawings and specifications, at no additional cost to the Owner.
 - 4. If material or equipment is installed before it is approved, as to manufacture and shop drawings, the Contractor shall be liable for the removal and replacement at no extra charge, if in the opinion of the Architect the material or equipment does not meet the intent of the drawings and specifications.

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5. If after installation (with or without prior approval) operation of any equipment proves to be unsatisfactory by reasons of defects, workmanship, error or omissions, the Owner reserves the right to operate equipment until it can be removed from service for correction or replacement by the Contractor. The Contractor shall pay for the repair of all damage to work of other prime contractors caused by this defective equipment and its correction or replacement.
6. No advertising matter exclusive of nameplates containing required data shall appear on any equipment without the written consent of the Architect. The equipment furnished under this specification shall be essentially the standard product of a manufacturer regularly engaged in the manufacture of such equipment. Where two or more units of the same class of equipment are required, the units shall be products of a single manufacturer; however, the component parts of the equipment need not be products of the same manufacturer.

1.23 SELECTIVE REMOVAL OF EXISTING MECHANICAL, ELECTRICAL AND RELATED WORK

- A. Comply with 01 7330 Selective Removals and Section 26 0150 Electrical
- B. All selective removal work shall be in accordance with the time schedule as specified herein.
 1. All electrical removals shall be performed as required to complete the work as intended.
 2. Electrical Contractor shall check with local utility company and implement in the work any further requirements from the utility company.
 3. Remove all electrical apparatus, equipment, specialties, controls, hangers, bases supports, conduit, panels, switches, wiring, and electrical fixtures, etc., that are not incorporated in the new layout or required.
 4. Where removal is indicated, or implied, or not incorporated in the new layout, the item itself is to be removed completely together with all connecting conduits, specialties, supports, controls, etc. Connecting conduits are to be removed back to the mains and panels where they are to be capped or disconnected. All abandoned open ends shall be sealed and capped or disconnected. Patching and finishing of all surfaces to match existing shall be performed by Contractor doing the removal.
 5. Where existing conduit, etc., enter inaccessible trenches, tunnels, shafts, walls, and ceilings, inside of the existing building, they shall be cut back at least 2" into such inaccessible spaces and shall be suitably capped and sealed by the Contractor.
 6. The Contractor shall exercise all normal caution to prevent unnecessary cutting and damage to the existing building. Any excessive damage, as determined by the Owner shall be repaired and paid for by the Contractor causing the damage.

1.24 GENERAL LABELING

- A. All mechanical and electrical equipment such as unit ventilators, heating and ventilating units, exhaust fans, etc., together with their component parts, control boards, electric panels, gauges, thermometers, switches, controls, valves, dampers shall have appropriate descriptive labels, identification tags and nameplates, furnished and installed under the respective control under which the corresponding item is provided, and shall be properly placed and permanently secured to (or adjacent to) the item being installed.

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1. In general, labels shall be the lamacoid type of sufficient size to permit easy identification, black coated, white edged, with letters 3/16" high. Major equipment, apparatus, control boards, electric panels, etc., shall have 8" x 4" lamacoid plates with lettering of appropriate size.
2. Submit complete schedules, listings, and descriptive data, together with samples for checking and approval before purchasing.
3. Mount of laminated plastic boards with transparent surface all valves, and charts, wiring diagrams, control diagrams, instruction charts, permits, etc.

1.25 IDENTIFICATION OF PIPING

- A. The respective Mechanical Contractor shall provide on all new exposed, insulated and uninsulated piping, semi-rigid, wrap-around plastic identification markers.
 1. Each marker background is to be appropriately color-coded with a clearly printed legend to identify the contents of the pipe conformance with the Scheme for the Identification of Piping Systems (ASA A13.1-1956). Direction of flow arrows is to be included on each marker.
 2. Exposed locations for the pipe markers to be as follows:
 - a. Adjacent to each valve.
 - a) At each branch and riser take-off.
 - b) At each pipe passage through wall, floor and ceiling construction.
 - c) On all horizontal pipe runs - marked every 15 feet.
 - d) At each inlet and outlet of coils, pumps, etc.

1.26 PAINTING

- A. All apparatus, cabinets, etc., furnished under the Electrical Sections of the specifications, shall be provided with a priming coat, and enamel finish. All patched surfaces and surfaces where removals have occurred (by each Contractor) shall receive a prime coat and a finish coat to match adjacent surfaces acceptable to the Architect or Owner's Representative unless noted otherwise.
 1. All finish painting of new insulated and uninsulated piping, new duct work, apparatus, and appurtenances, will be performed by each contractor, unless noted otherwise.
 2. All concealed supports and ironwork not otherwise protected against corrosion shall be given two (2) coats of bituminous base paint.

1.27 TEMPLATES:

- A. The contractor shall prepare templates showing all dimensions and shall furnish all anchor bolts and sleeves required for all equipment, boilers, transformers, tanks, etc., and submit to Contractor who requires this information.

1.28 EQUIPMENT BASES

- A. The contractor shall submit for approval of the Architect, detail drawings of all equipment foundations and shall furnish all templates for his foundation.
 - 1. Unless otherwise indicated Construction Contractor will furnish and install their equipment bases. It is the responsibility of each Contractor to place any templates and anchor bolts and to supervise the construction of the equipment bases regardless of who installs the bases.
 - a. Concrete equipment bases for shall be minimum 3,000 psi test strength at 28 days and shall conform to the requirements of the Section 03300. Provide minimum 6/6 x 10/10 welded wire mesh.

1.29 CONTROL WIRING :

- A. Control wiring is required wiring, conduit, relays, contractors, electro-mechanical, hydraulic activators and solid state regulating devices either low or line voltage, to the controlled device that is regulated by the controller and necessary for the operation, controlling, sequencing etc. of the equipment or system. Control wiring shall be furnished and installed by each contractor furnishing and installing such equipment or systems.
 - 1. Power wiring to equipment, including wiring and installation of magnetic starters and disconnect switches, where required, shall be the responsibility of the Electrical Sub Contractor Contractor. The Electrical Sub contractor Contractor shall furnish and install all disconnect switches, where required, and install all magnetic starters. All magnetic starters shall be furnished by each contractor furnishing the equipment or systems.
 - 2. The Contractor shall supervise the wiring of all equipment included under his Contract.

1.30 SUPPORTS FROM OVERHEAD CONSTRUCTION

- A. Where overhead construction does not permit fastening of supports for equipment, furnish additional framing, subject to approval by Architect or Owner's Representative.

1.31 UNDERWRITERS' LABORATORIES CERTIFICATION

- A. All mechanical and electrical equipment shall bear the UL label of approval where such inspection service is furnished for the particular type of equipment.

1.32 LOCATIONS AND MEASUREMENTS

- A. The locations of fixtures, appliances, conduits, etc., are specified and shown on the plans as accurately as possible, but in all cases, they are to be adjusted to the surrounding conditions. Contractor must take all measurements at the building, and should the space allotted for any appliance be inadequate, it shall be the Contractor's responsibility to immediately notify in writing, and shall he fail to do so, he must bear the expense necessary to correct the conditions. All work shall be coordinated with the work of other trades.

1.33 GROUNDING

- A. Standards set forth by the latest edition of the National Electric Code, relative to the grounding of system and equipment, shall be followed together with the rules and regulations of the Utility Company. All non-

PROCEDURES AND SPECIAL CONDITIONS, SINGLE PRIME

current carrying metal parts shall be solidly grounded. All motor frames that are not clamped to supply conduits shall be grounded by suitable wire and ground clamp.

1. The identified neutral wire or white wire of the interior wiring system shall be permanently grounded to the water services. The grounded wire shall be connected to the supply side of the main service switch and mechanically connected to an approved ground clamp and securely bonded to the water service at the point of entry. The ground connection shall be made on the supply side of the first main control valve. The conductors shall be protected from mechanical injury by rigid steel conduit to which the conductors shall be securely bonded in each length of connection. Conduit system shall be securely grounded to the above described ground of wiring system.
2. Ground connections to water mains shall be made to non-current carrying metal parts of distribution panels, instrument cases, and instrument transformer cases.

1.34 JURISDICTIONAL DISPUTES Refer to Section 01100

1.35 FIRESTOPPING:

- A. All openings thru walls, floors, shafts, etc. shall be fire stopped with approved material to maintain rating. See Section 07840.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 04 0100
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to:
 - 1. Remove and restore exterior masonry.
 - 2. Prepare and repoint mortar joints.
 - 3. Clean and prepare the wall joints, remove and restore select areas of exterior masonry site wall and then install new masonry flashings, coping stones and joints.
 - 4. Carefully dismantle and rebuild exterior masonry.
 - 5. Remove and reset loose bricks and concrete masonry units at walls and above lintels.
 - 6. Pressurewash, Clean and Provide a sealer to facade masonry walls as indicated - SEE ALTERNATES PER FACADE
 - 7. Related Requirements
 - a. Sheet Metal Flashing & Specialties - Section 07 6200

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor in the work area when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the Supervisor's resume upon request.
 - d. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner.

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MAINTENANCE OF MASONRY

- a) The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b) Submit the reference list upon request.
- B. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.
- C. Pre-construction conference: Attend the pre-construction meeting and discuss the following:
- 1. How and when masonry work will be performed.
 - 2. How the masonry work will be coordinated with other work.
 - 3. How roof & building surfaces will be protected.
 - 4. How the building will be kept watertight as masonry work progresses.
 - 5. Weather to anticipate during construction.
 - 6. The availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 - 7. A schedule for Manufacturer and Architect inspections.

1.4 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any other work on site:
- 1. A pre-work site and building inspection report with photos, to document conditions before any other work starts on site.
 - 2. Manufacturer's technical literature for all materials.
 - 3. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 - 4. Samples to show sizes, grade and color, prior to mock-up erection, of each new exposed masonry material. Include the full range of colors and textures needed in the samples.
 - a. Bricks: four samples of solid colors, twelve samples of blended colors.
 - b. Mortar: four 6 inch long 1/2 inch wide strips set in metal or plastic channels.
 - c. Anchors: four pieces of each type of anchor.
 - 5. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 - a. Submittals shall be prepared and made by the firm that will perform the actual work.

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- b. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - c. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
6. Payment requisitions will not be processed until all submittals are received and approved.

1.5 JOB MOCK UPS

- A. Prepare mock-ups of masonry work in actual job locations.
 - 1. For repointing - provide 2 foot square mockups to show how the joints will be cut, and 2 foot square mockups to show new pointing.
 - 2. For sealant joints - provide 2 foot long mockups to show how the joints will be prepared, and 2 foot long mockups to show new backer rod and sealant.
- B. Mock-ups shall be constructed to establish the minimum acceptable standard of materials and workmanship, and to assure that completed work which matches the mock ups will be fully functional and serve the purpose for which it was designed.
- C. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock up is approved.
- D. Do not proceed with masonry work until mock-ups are installed, inspected and approved in writing.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories in suitable packs or pallets or in heavy cartons.
- B. Deliver material to the site in the Manufacturer's original and unopened containers and packaging, bearing labels which identify the types and names of the products and Manufacturers. Unload and handle to prevent chipping and breakage.
- C. Protect masonry materials and aggregates during storage and construction from excess wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.
- D. Protect grout, mortar and cement products from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Protect liquid components from freezing.
- E. Do not overload the structure when storing materials on the roof.
- F. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.7 GUARANTEE

- A. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, joint separation and movement.
 - 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 - 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make repairs.
- B. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.

1.8 JOB CONDITIONS

- A. Perform masonry work only when the air temperature is 40 degrees F and above and will remain so until the masonry has dried, but for not less than 72 hours after work ends.
- B. Erect temporary covers over pedestrian walkways and at building entrances and exits which will remain active as the work progresses.
- C. Prevent mortar from staining the face of surrounding masonry and other building surfaces; immediately remove any which falls or spills. Protect sills, ledges and projections from mortar droppings.
- D. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.
- E. Prevent masonry work from rapid drying during hot weather. Use burlap to shield fresh masonry from direct sunlight, and mist fresh masonry with potable water so it cures slowly for at least 72 hours.
 - 1. Remove and replace any new masonry that develops shrinkage cracks, or isn't bonded well to adjoining masonry.

PART 2 PRODUCTS

2.1 MASONRY UNITS

- A. Face Brick: Severe weather (SW) grade face brick and accessories, including special bricks for corners, and other special conditions, to match the color, surface texture, shape and size of existing bricks.
 - 1. Manufacturer: Glen-Gery

2. Distributor: Extech Building Materials.
3. Product: Windam Modular, Lot #0600 LD.

2.2 MORTAR

- A. Pointing Mortar:
 1. Factory blended Type N masonry cement, aggregate and custom coloring agent, ready to use when mixed with clean potable water, as supplied by Spec-Mix.

2.3 MISCELLANEOUS MATERIALS

- A. Anchors: Fabricated from Type 304 stainless steel to match existing.
- B. Reinforcement Bar: minimum #4 epoxy coated steel rebar, with factory formed ridges.
- C. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.
- D. Backer Rod: Closed cell polyethylene foam, non-absorbent, compressible, chemically inert rod.
- E. Masonry Water Repellent: Cloudy odorless water-based penetrating liquid, UV stable, alkali resistant, translucent floural carbon emulsion, containing no volatile organic compounds: Cathedral Stone Products, Inc. R-97 Water Repellent.

PART 3 EXECUTION

3.1 GENERAL

- A. Carefully perform work so the structural integrity of masonry adjoining the work is preserved. Simultaneously remove only limited sections of existing masonry; support and protect masonry remaining next to and above the removal areas.
- B. Completely remove and replace any existing masonry that moves, or if cracks form in the mortar joints between the masonry units, or within the masonry units.
- C. Cure all mortar by misting it with potable water to maintain it in a damp condition for not less than 72 hours. Shield fresh mortar from direct sunlight with wet burlap, and prevent fresh mortar from prematurely drying during the curing period. Remove and replace mortar joints that dry pre-maturely.
- D. Cut and remove existing masonry using hand and machine methods. Equip each cutting machine with a separate dedicated vacuum and manufacturer's blade guard vacuum attachment, and control the amount of dust produced so there are no visible plumes. Comply with OSHA crystalline silica standards for construction.
- E. Do not overcut brick head joints and allow the blade to nick the bricks; remove and replace bricks damaged during the cutting and repointing preparation process at no cost to the Owner.

3.2 MORTAR MIXES

- A. Measurement and Mixing:
 - 1. Measure general construction mortar materials when dry by volume using a pail or similar container. Do not measure with a shovel.
 - a. Mix mortar using 1 part mortar cement and 3 parts sand aggregate.
 - b. Thoroughly mix cement and aggregate in a clean mechanical batch mixer before adding water; then continue mixing and add only enough water to produce a workable mix.
 - c. Do not mix mortar by hand.
 - d. Mix factory blended pointing mortar in a clean mechanical batch mixer, adding only enough water to produce a workable mix.
 - a) Do not mix mortar by hand.
 - e. Use mortar within 45 minutes of final mixing; do not re-temper or use partially hardened material.
- B. Mix and install mortar with the same ingredients used to produce the approved mock-up. Do not adjust the color or proportions without written approval. Do not use admixtures of any kind in the mortar unless specifically approved.

3.3 BRICK REMOVAL AND REPLACEMENT

- A. Simultaneously remove only limited sections of existing brick masonry; support and protect masonry remaining next to and above the removal areas.
- B. Carefully remove bricks on a piece-by-piece basis. Cut out full units from joint to joint and to permit replacement with full size units. Clean the edges of the remaining bricks, to remove all mortar, dust, and loose debris in preparation for rebuilding.
- C. Wet bricks which have initial rates of absorption (suction) greater than 30 grams per 30 square inches per minute, (in accordance with ASTM C 67), to ensure the bricks are nearly saturated with water, but surface dry when laid.
- D. Install new brick to replace removed brick. Fit replacement bricks to match the original bond and course pattern. Use a motor driven diamond blade wet saw to cut bricks with clean, sharp unchipped edges.
- E. Lay replacement brick with completely filled bed, head and collar joints. Butter the ends with sufficient mortar to fill the head joints and shove the bricks into place.
- F. Install new bricks with mortar joints to match the width of the adjoining brick joints. Tool the new joints to match existing joints in surrounding brickwork.
- G. Do not cut off the backs of the new bricks if a full wythe of brick doesn't fit. Notify the Architect and obtain his direction before proceeding further.

3.4 REPOINTING EXISTING MASONRY

A. Joint Preparation:

1. Remove existing mortar and foreign material from the mortar joints to a minimum depth of 1 inch, and deeper where needed to expose sound unweathered mortar.
2. Remove mortar from the sides of the joints to provide joints with square backs and to expose the masonry for contact with the pointing mortar. Brush or vacuum the joints to remove dirt and loose debris.
3. Remove mortar and other foreign material from the surface of masonry adjacent to the joint.
4. Do not spall the edges of adjacent masonry or widen the joints. Replace any masonry which is damaged.

B. Joint Pointing:

1. Rinse the joint surfaces with water to remove dust and mortar particles just prior to repointing. Time the rinse, so when repointing occurs, excess water has evaporated and the existing masonry is damp but free of standing water.
2. Apply pointing mortar in 1/2 inch thick layers, and thoroughly compact each layer before adding the next layer, to completely fill each joint.
3. Slightly recess pointing mortar from the face of the adjacent masonry units. Do not spread mortar on the edges or faces of the masonry. Do not featheredge the mortar.
4. Tool repointed joints when the mortar is thumbprint hard. Remove excess mortar from the edges of the joints with a soft bristle brush.

C. Cleaning:

1. Immediately after the mortar has fully hardened, thoroughly clean masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water.
2. Do not use metal scrapers or brushes. Do not use acid or alkali cleaning agents. Do not pressure-wash the masonry or new pointing mortar.

3.5 SEALANT JOINTS

A. Carefully remove existing sealant and back up material from within the joints to a minimum depth of 1-1/2 inches, and from the surface of adjoining masonry at the edges of the joints.

1. Use hand tools and work to avoid damage to adjoining masonry.
2. Replace adjoining masonry damaged during sealant removal work.

B. Install new backer rod without puncturing or tearing it, to snugly fill the joint at a depth to yield a sealant joint twice as wide as it is deep.

1. Do not twist backer rods, or install multiple pieces of undersized rod, when the correct size rod is not onsite.
- C. Mask the edges of all joints prior to installing sealant.
1. Push sealant into the joint to completely fill it, tool the sealant to produce a slightly concave, neat recessed joint, and remove joint masking before excess sealant sets.

3.6 PRESSURE WASHING, CLEANING and SEALER (WATER REPELLENT) SEE ALTERNATES - PER ELEVATION

- A. Prepare and clean masonry surfaces to receive sealer/water repellent utilizing hand, chemical and pressure water methods as needed to remove all dirt, dust, efflorescence, mold, stains, salt, grease, oil, asphalt, laitance, paint and other foreign materials.
- B. Allow the masonry surfaces to dry for a minimum of 48 hours at a temperature above 50° F.
- C. Mask and protect adjoining surfaces i.e., the roof, flashings, windows, side walls and site plantings from over spray.
- D. Apply two coats of water repellent using a low pressure (15-20 psi maximum) wet fan type nozzle or 1 inch nap roller in a “flooding” application, to thoroughly saturate the masonry, starting at the bottom so the material runs 6 to 8 inches below the points of application.
 1. Apply the second coat of water repellent about 10 minutes after the first coat, and as soon as the first coat has soaked into the masonry, but before the first coat dries.

3.7 CAULKING AND WATERTIGHTNESS - BASE BID

- A. Conduct an inspection of the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Remove and replace building area caulking to include but not limited to expansion joints, window areas indicated and window surrounds, with other indicated areas and scope of work included.
- D. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- E. Do not perform caulking replacement work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- F. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the various work areas, grounds and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.

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- G. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps. Do not allow debris to enter the drainage system or you shall be required to clean and clear same.

END OF SECTION

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**SECTION 04 7200
CAST STONE MASONRY**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Architectural cast stone.
- B. Units required are:
 - 1. Exterior units, including wall copings..

1.3 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints indicated to be left open for sealant.
- B. Section 07 6200 - Sheet metal flashings and trim
- C. Section 07 9200 - Joint Sealants: Materials and execution methods for sealing soft joints in cast stone work.

1.4 Reference Standards

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- B. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2019.
- C. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2019.
- D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2019, with Editorial Revision (2020).
- E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- F. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.
- G. ASTM C 231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- H. ASTM C 426 – Standard Test Method for Linear Shrinkage of Concrete Masonry Units.
- I. ASTM C 260 – Standard Specification for Air Entrained Admixtures for Concrete.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

- K. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
- L. ASTM C 618 – Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Concrete
- M. ASTM C 666 – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
- N. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- O. ASTM C 989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete.
- P. ASTM C 1194 – Standard Test Method for Compressive Strength of Architectural Cast Stone
- Q. ASTM C 1195 – Standard Test Method for Absorption of Architectural Cast Stone.
- R. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2019.
- S. ASTM D 2244 – Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- T. Cast Stone Institute® Technical Manual Cast Stone Institute® Technical Manual.

1.5 DEFINITIONS

- A. Cast Stone – a refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.
 - 1. 2. Wet Cast Concrete Products - manufactured from measurable slump concrete.
 - a. Wet casting method: manufactured from measurable slump concrete and vibrated into a mold until it becomes densely consolidated.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
 - 1. Include one copy of ASTM C1364 for Architect's use.
- C. Shop Drawings: Include plans, elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. Mortar Color Selection Samples.
- E. Verification Samples: Pieces of actual cast stone components not less than 12 inches (305 mm) square, illustrating range of color and texture to be anticipated in components furnished for the project.
- F. Source Quality Control Test Reports.
- G. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm with a minimum of 5 years of experience in producing cast stone of the types required for project and:
 - 1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
 - 2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.
- B. Standards: Comply with the requirements of the Cast Stone Institute® Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.
- C. Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - 1. Job Site Testing - One (1) sample from production units may be selected at random from the field for each 500 cubic feet delivered to the job site. Perform tests in accordance ASTM C 1194 and C 1195.
 - 2. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
 - 3. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 - 4. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195
- D. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer

1.8 MOCK-UP

- A. Mock-Up: Provide full size cast stone components for installation in mock-up of exterior wall. See mock up requirements as indicated in Section 04 4200.
- B. See Section 01 4000 - Quality Requirements for additional requirements.
 - 1. Approved mock-up will become standard for appearance and workmanship.
 - 2. Mock-up may remain as part of the completed work.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Package units and protect them from staining or damage during shipping and storage.
- B. Provide an itemized list of product to support the bill of lading.
- C. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

- D. Number each piece individually to match shop drawings and schedule.
- E. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- F. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- G. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- H. Store mortar materials where contamination can be avoided.
- I. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports
- J. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following
 - a. Sun Precast Co. Inc.
 - b. Architectural Cast Stone, Inc
 - c. Metropole Clifton NJ.
 - d. Continental Cast Stone East.

2.2 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C1364.
 - 1. Compressive Strength: 6,500-psi minimum at 28 days
 - a. Maximum Water-Cement Ratio at Point of Placement: 0.40
 - 2. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days
 - 3. Air Content - ASTM C173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Air entrainment is not required for VDT products
 - 4. Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C 1364. The CPWL shall be less than 5% after 300 cycles of freezing and thawing.

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5. Linear Shrinkage - ASTM C 426: Shrinkage shall not exceed 0.065%.
 6. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet (6 meters).
 7. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in. 2 (25 mm²) and not obvious under direct daylight illumination at a 5 ft (1.5m) distance.
 8. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft (3m) distance.
 9. Color: Selected by Architect from manufacturer's full range.
 10. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch (3 mm) or length divided by 360, whichever is greater, but not more than 1/4 inch (6 mm).
 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
1. Pieces More than 12 inches (305 mm) Wide: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

2.3 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 1. For Units: Type I, white or gray as required to match Architect 's sample.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
- E. Admixtures: ASTM C 494/C 494M for water reducing, retarding, accelerating and high range admixtures.

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- F. Air-Entraining Admixture: ASTM C 260, certified by the manufacturer to be compatible with other admixtures used.
 - 1. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 5 to 7 percent
- G. Water: Potable.
- H. Reinforcing Bars: ASTM A615/A615M deformed bars, epoxy coated.
- I. Steel Welded Wire Reinforcement: ASTM A884/A884M, epoxy coated.
- J. Cast Stone Anchor:
 - 1. Type 304 Stainless Steel, eye rod anchor with 7-1/2" x 1/4" diameter shank,
 - a. 167-A, with 1-1/2" bend, stone anchor ,by Hohmann & Barnard
 - 2. Spring Loaded Dowel: 3/8" x 3", stainless steel rod with 3'2": stainless steel spring.
 - a. #355 Heckmann Building Products.
 - 3. Type 304 Stainless Steel Dowel: 3/8" x 3".
 - a. #155 Heckmann Building Products.
 - 4. Anchor Pin: Type 304 Stainless Steel, 8" x 1/2"diameter.
 - a. #407 by Hohmann & Barnard.
 - 5. Back-up Wall Anchor: Type 304 stainless steel.
 - a. "Pos-I-Tie" with triangle wire tie by Heckman Building Industries.
- K. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- L. Shelf Angles and Similar Structural Items: Type 304 stainless steel, of shapes and sizes as required for conditions.
- M. Mortar: Portland cement-lime, ; do not use masonry cement.
- N. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.4 Source Quality Control

- A. Test compressive strength and absorption of specimens selected at random from plant production.
 - 1. Test in accordance with ASTM C642.

2. Select specimens at rate of 3 per 500 cubic feet (3 per 14 cubic m), with a minimum of 3 per production week.

2.5 FABRICATION

- A. Provide cast stone units complying with ASTM C 1364.
- B. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364.
- C. Reinforce units as indicated and as required by ASTM C 1364. Use epoxy-coated reinforcement when covered with less than 1-1/2 inches of material.
 1. Reinforce units as required for safe handling and structural stress.
- D. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
 1. Slope exposed horizontal surfaces at least 1:12, unless otherwise indicated.
 2. Provide drips on projecting elements.
- E. Fabricate all corner coping stones in 90 degree sections or other angles as required, if field cut treat end of epoxy rebar with epoxy paint system to match.
- F. Cure and finish units as follows:
 1. Cure units in totally enclosed curing room under dense fog and water spray at 95 percent relative humidity for 24 hours.
 2. Yard cure units until the sum of the mean daily temperatures for each day equals or exceeds 350 deg F.
 3. Acid etch units to remove cement film from surfaces indicated to be finished.
 4. Colors and Textures: As selected from manufacturer's full range of colors and textures..

2.6 MORTAR MATERIALS

- A. Provide mortar materials that comply with specifications.

2.7 ACCESSORIES

- A. High Impact resilient setting shims.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.

- B. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Mechanically anchor cast stone units indicated; set remainder in mortar.
- B. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
 - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
 - 5. Set dowels with epoxy grout.
 - 6. Build concealed flashing into mortar joints as units are set.

3.3 TOLERANCES

- A. Joints: Make all joints 3/8 inch (9.5 mm), except as otherwise detailed.
 - 1. Rake mortar joints 3/4 inch (19 mm) for pointing.
 - 2. Remove excess mortar from face of stone before pointing joints.
 - 3. Point joints with mortar in layers 3/8 inch (9.5 mm) thick and tool to a slight concave profile.
 - 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, parapets, cornices, sills.
 - b. Joints in projecting units.
 - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
 - d. Joints below lugged sills
 - e. Joints below ledge and relieving angles.
 - f. Joints labeled "expansion joint".
- B. Setting Anchored Cast Stone with Sealant-Filled Joints.
 - 1. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
 - a. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.

- b. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
2. Keep cavities open where unfilled space is indicated between back of cast stone units and backup wall; do not fill cavities with mortar or grout.
3. Fill anchor holes with sealant.
 - a. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
4. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.
5. Keep joints free of mortar and other rigid materials. Remove temporary shims and spacers from joints after anchors and supports are secured in place and cast stone units are anchored. Do not begin sealant installation until temporary shims and spacers are removed.
 - a. Form open joint of width indicated, but not less than 3/8 inch (10 mm).
6. Prepare joints and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 9200 - Joint Sealants.
 - a. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant, unless otherwise indicated.

3.4 TOLERANCES

A. Manufacturing Tolerances:

1. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. (3mm) from approved dimensions.
2. Length of units shall not deviate by more than length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater, not to exceed $\pm 1/4$ in. (6 mm).
 - a. 1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
3. Warp, bow or twist of units shall not exceed length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater.
 - a. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features - On formed sides of unit, 1/8 in. (3 mm), on unformed sides of unit, 3/8 in.

B. Installation Tolerances:

1. Variation from Plumb: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.

2. Variation from Level: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches (3 mm in 900 mm) or 1/4 of nominal joint width, whichever is less.
 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch (1.5 mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.
- C. Color and Finish:
1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
 - a. Total color difference - not greater than 6 units.
 - b. Total hue difference - not greater than 2 units
 2. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft (6 m) distance.

3.5 CLEANING

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet (6 m).
1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
 2. Repair methods and results subject to Architect 's approval.
- B. Clean completed exposed cast stone after mortar is thoroughly set and cured.
1. Wet surfaces with water before applying cleaner.
 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
 3. Remove cleaner promptly by rinsing thoroughly with clear water.
 4. Do not use acidic cleaners.

3.6 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.
- C. Protect from splashing by mortar and other damage.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHINGS AND SPECIALTIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Sheet metal work that is compatible with the roofing systems specified, including cap and through wall flashings, hook strips, fascia, drip edges, gravel stops, factory fabricated roof edge systems, batten seam panels and caps, and miscellaneous flashings.

1.3 RELATED DOCUMENTS

- A. Section 04 0100 - Maintenance of Masonry
- B. Section 04 7200 - Cast Stone Masonry

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing sheet metal work similar to that required for this project, employing personnel skilled in the work specified.
 - a. Installer shall be approved by the manufacturer of the existing warranty.
 - 2. The Installer shall directly employ the personnel performing the work of this section.
 - 3. The Installer shall have a full time supervisor overseeing work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - a. Submit the supervisor's resume upon request.
 - 4. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. The Installer shall provide the reference list prior to contract award if requested.

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- B. Material Quality:
1. Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
 2. Obtain copper and pre-finished sheet metal items from the same mill run to maintain consistent color hue and surface finish
 3. Obtain material from manufacturer maintaining warranty.
- C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
1. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 2. The condition of the substrate, curbs, penetrations and other preparatory work needed.
 3. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 4. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
1. A pre-work site and building inspection report with photos to document conditions before any other work starts on site.
 2. Manufacturer's technical literature for all materials.
 3. Test reports and certifications substantiating compliance with specification requirements if requested by the Owner's Representative and Architect.
 4. Shop drawings or 2 foot long samples of each sheet metal item, to show how it will fit on adjoining masonry.
- B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building to the Owner and Owner's Representative'

- D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 JOB MOCK-UPS

- A. After the submittals are approved, prepare in actual job locations, mock-ups of cap and through wall flashings, hook strips, drip edges, fascia, gravel stops, factory fabricated roof edge systems, copings, gutters, leaders, and all other items of sheet metal and related work, for inspection and approval by the Owner's Representative and Architect.
- B. Construct mock-up of two full lengths of metal, fastened, connected to the related coping system, to show the following:
1. Type, gauge, color, cross-sectional dimensions and shape, and joint techniques.
 2. Related masonry work and the attachment techniques and fasteners for all wood and metal components.
 3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.
- C. Mock-ups shall be constructed to establish the minimum standard of materials and workmanship, and to assure that completed work which matches the mock-ups will be fully functional and serve the purpose for it has been designed.
- D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock-up is approved.
- E. Do not purchase or fabricate sheet metal items until mock-up installation, inspection and approval are completed and approval is documented in writing.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers.
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.

1.8 GUARANTEE

- A. A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect guaranteed repairs.

4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee coverage shall take affect no more than 30 days before the completion of all punch list work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Copper sheet: ASTM B370, 99.0 % pure copper, thickness 16 ounces per square foot. Use copper for all metal items not otherwise indicated, coat as below.
- B. Zinc-Tin coated copper: copper sheet, coated on both sides, with a smooth uniform coating of zinc and tin, base metal weight 16 ounces per square foot, cold rolled temper, available as Freedom Gray Copper by Revere.
- C. Solder: 50-50 tin and lead for plain copper, supplied in one pound bars with the alloy mixture stamped into the bar by the Manufacturer.
- D. Rivets to keep separate peices together for soldering.
- E. Flux: Water-Soluble Liquid Flux, Kester #3345 for iron soldering of tin coated copper.
- F. Fasteners: Stainless steel, or to match the sheet metal being fastened.

PART 3 EXECUTION

3.1 GENERAL

- A. Accurately reproduce the details and design shown, and form profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.
- B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.
- C. Provide expansion bends at coping joints 32 feet OC +/-

3.2 INSPECTION

- A. Examine surfaces to receive work of this section and report any defects to the Owner. Commencement of work will be construed as complete acceptance of surfaces.

3.3 INSTALLATION

- A. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.

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1. Form all joints, except loose locked sealant filled expansion joints, to overlap 2 inches.
 2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.
 3. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.
 4. Clean soldered joints daily, immediately after soldering, by washing them with soap and water applied with a soft bristle brush, then rinsing with clear water.
- B. Securely fasten and anchor all work, and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only, use a hook strip on the other edge.

3.4 THROUGH WALL FLASHINGS

- A. Install new zinc-tin coated copper through wall flashings to extend the entire width of the masonry wall, turn down 1-1/2 inches with a 3/8 inch hem on the exterior and 4 inches with a 1/2 inch hem on the interior.
1. Skim coat the top of the wall with mortar to level the wall and create a smooth surface before installing the through wall flashing.
 2. Solder all joints, except from 2 inch wide flat locked sealant filled expansion joints spaced a maximum of 32 feet on center.
 3. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint then sweat solder the joint.
- B. Install stainless steel dowels 3 inches into the underlying masonry through the new through wall flashings.
1. Pre- tin the dowels prior to installation.
 2. Tightly drive the dowels into drilled holes in the masonry or set the dowels in epoxy.
 3. Position the dowels so that each piece of superimposed masonry will be secured with at least two dowels.
 4. Solder the dowels to the through wall flashing to form a watertight seal.

3.5 DRIP EDGES

- A. Fabricate drip edges to extend 1-1/2 inches past the roof edge and turn down to ensure water cannot track back and run down the brick wall or fascia. Secure the drip edge with roofing nails along the top edge, spaced 4 inches apart along the raw metal edge. Form joints in the drip edge with 6 inch wide concealed underplates which duplicate the profile of the drip edge.

3.6 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Conduct an inspection of the areas of work and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner's Representative will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire work area to remove all residual debris when all work is complete. After cleaning the work area, thoroughly clean all drain sumps and drain lines. Do not allow debris to enter the drainage system.

1.

END OF SECTION

**SECTION 07 8400
FIRESTOPPING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not.
- B. Fire Ratings required:
 - 1. Stairs - 2 hr. construction
 - 2. Boiler Rm. - 2 hr. construction
 - 3. Shafts - 2 hrs.
 - 4. Corridor - 1 hr. construction
 - 5. Floor to Floor - 1 hr. construction
 - 6. Any space not identified above - 1 hr.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.4 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015.
- D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).
- E. ITS (DIR) - Directory of Listed Products; current edition.
- F. FM 4991 - Firestop Contractors; 2013.
- G. FM (AG) - FM Approval Guide; current edition.
- H. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

- I. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- J. UL (FRD) - Fire Resistance Directory; Current Edition.
- K. UL 2079 - Standard Test Method of Fire Resistant Joints

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

1.6 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD) or FM (AG) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:

PART 2 PRODUCTS

2.1 MATERIALS

- A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.2 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.3 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

A. Gypsum Board Walls:

1. Wall-to-Wall Joints That Have Movement Capabilities (Dynamic-D):
 - a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
2. Head-of-Wall Joints at Concrete Over Metal Deck:
 - a. 2 Hour Construction: UL System HW-D-0034; Specified Technologies Inc. ES Elastomeric Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0043; Specified Technologies Inc. AS200 Elastomeric Spray.
3. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

2.4 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Penetrations Through Floors or Walls By:

1. Multiple Penetrations in Large Openings:
 - a. 1 & 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 & 2 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.
3. Electrical Cables Not In Conduit:
 - a. 1 & 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
4. Insulated Pipes:
 - a. 1 & 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX intumescent Firestop Sealant.
5. HVAC Ducts, Uninsulated:

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- a. 1 & 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- B. Penetrations Through Floors By:
1. Multiple Penetrations in Large Openings:
 - a. 1 & 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 & 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
- C. Penetrations Through Walls By:
1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3095; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 4. HVAC Ducts, Uninsulated:
 - a. 1 & 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
 5. HVAC Ducts, Insulated:
 - a. 1 & 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.5 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
- B. Penetrations By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 3. Electrical Cables Not In Conduit:
 - a. 1 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
 - 4. Insulated Pipes:
 - a. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 5. HVAC Ducts, Insulated:
 - a. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.6 MATERIALS

- A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
 - 1. Manufacturers:
 - a. 3M Fire Protection Products; Product CP-25WB: www.3m.com/firestop.
 - b. Substitutions: See Section 01 2500 Substitution Procedures.
- C. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:
 - 1. Density: 4 lb/cu ft (- kg/cu m).
 - 2. Manufacturers:

- a. Thermafiber, Inc: www.thermafiber.com.
- 3. Substitutions: See Section 01 2500 Substitution Procedures.
- 4. Substitutions: See Section 01 2500 Substitution Procedures.
- D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.3 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. FIRESTOP ALL PENETRATIONS
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Install labeling required by code.

3.4 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

**SECTION 07 9200
JOINT SEALANTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.4 REFERENCE STANDARDS

- A. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Sample product warranty.
 - 7. Certification by manufacturer indicating that product complies with specification requirements.

- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Executed warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Westchester Community College's name and register with manufacturer.

1.8 MOCK-UP

- A. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution:
 - 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
 - 3. Sika Corporation: www.usa-sika.com.
 - 4. W.R. Meadows, Inc: www.wrmeadows.com/sle.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

2.3 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

2.4 NONSAG JOINT SEALANTS

- A. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Color: To be selected by Architect from manufacturer's standard range.
 3. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
 4. Manufacturers:
 - a. Pecora Corporation; Dynatrol I; www.pecora.com.
 - b. Sika Corporation; Sikaflex-1a: www.usa-sika.com/#sle.
 5. Applications: Use for:
 - a. All exterior and interior joints.
 6. Substitutions: 01 2500 - Substitution Procedures

2.5 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 2. Open Cell: 40 to 50 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

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- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Metal stud soffit framing.
- B. Gypsum wallboard.
- C. Gypsum wallboard repairs.
- D. Joint treatment and accessories.

1.3 RELATED REQUIREMENTS

- A. Section 01-7310 - Cutting and Patching
- B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- D. Section 09 9123 - Interior Painting
- E. Section 07 9200 - Joint Sealants

1.4 REFERENCE STANDARDS

- A. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Amendment (2020).
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.

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- G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.
- H. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- L. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
- M. UL (FRD) - Fire Resistance Directory; Current Edition.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with cutting and patching as detailed on the drawings..
- C. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, illustrating finish color and texture.

1.6 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840.
- B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

1.7 Delivery, Storage, and Handling

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.2 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
1. Structural Grade: As required to meet design criteria.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
1. Marino: www.marinoware.com.
 2. Substitutions: 01 2500 - Substitution Procedures
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - a. Products:
 - a) MBA Building Supplies; ProSTUD: www.mbastuds.com/#sle.
 - b) R-stud; R-stud: www.rstud.com/#sle.
 - c) Super Stud Building Products, Inc; The EDGE: www.buysuperstud.com/#sle.
 - b. Minimum Base Metal Thickness: 0.0312 (20 gauge).
 - c. Depth: As required to match existing

2.3 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
1. Georgia-Pacific Gypsum: www.gpgypsum.com.
 2. National Gypsum Company: www.nationalgypsum.com/#sle.
 3. USG Corporation: www.usg.com.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut. Tapered edges - Match existing thicknesses
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Thickness:

- a. 1/2" or 5/8 inch (16 mm) Field verify where existing adjacent thickness is to be matched.
Walls and Ceilings
3. Type:
 - a. Type X

2.4 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness 2 inches (50.8 mm). Match Existing
- B. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 1. Types: As detailed and required for finished appearance.
 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 3. Products:
 - a. Same manufacturer as framing materials.
 - b. Substitutions: 01 2500 - Substitution Procedures
- C. Expansion Joints:
 1. Type: V-shaped metal with factory-installed protective tape.
 2. Products:
 - a. Phillips Manufacturing Co; 093 Expansion Control Joint: www.phillipsmfg.com/#sle.
 - b. Substitutions: 01 2500 - Substitution Procedures
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 2. Mold resistant and asbestos free.
 3. Ready-mixed vinyl-based joint compound.
- E. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- F. Utility angle: 2"x 2" 20 ga. for attachments of intersection framing and right angle corner enclosures.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center (at 400 mm on center).unless shown otherwise
 - 1. Extend partition framing to structure in all locations.
 - 2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Blocking: Install wood blocking for support of:
 - 1. Framed openings.
 - 2. Window frames as detailed on the drawings and as required.
- E. Blocking: Install blocking for support of window frames. Comply with Section 06 1000 for wood blocking.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

- D. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints as indicated on drawings.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.6 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

3.7 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

3.8 FINISH LEVEL SCHEDULE

- A. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.
- B. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

**SECTION 09 9113
EXTERIOR PAINTING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
 - 2. Soffit Areas of Building Stucco
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 9123 - Interior Painting.

1.3 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

- D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- E. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Materials: Furnish the following for Westchester Community College's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.7 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Locate where directed by Architect.
- C. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- C. Paints:
 - 1. Base Manufacturer: Sherwin Williams - Stucco and Pittsburgh Paints - Lintels.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete and Stucco .
1. One top coat and one coat primer.
 2. Primer(s): Exterior Latex; MPI #10 .
 - a. Products:
 - a) Sherwin-Williams Loxon XP Exterior. (MPI #10)
 3. Top Coat(s): Exterior Latex, Paint; MPI #10 .
- B. Paint ME-OP-3A - Ferrous Metals, Existing Metal Lintels and related work, after cleaning - unprimed, Alkyd, 1 Primer Coat: Alkyd MPI #23 Surface tolerant (non- sandblasted) 1 Finsh Coats: Aklyd MP #94 High Durability
1. One coat of alkyd Anti - Corrosive Metal Primer.
 2. Semi-gloss: One coat of alkyd Enamel Finish Coat .
 - 3.

2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Anti-Corrosive Alkyd Primer for Metal; MPI #79.
 - a. Products:
 - a) Pittsburgh Paints Speedhide LV Rust-Inhibitive Alkyd Metal Primer, 6-212N Series. (MPI #79)
 2. Interior/Exterior Alkyd Topcoat for Metal; MPI #94 .
 - a. Products:

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Scrape ,wire brushing, grind with pad and clean Lintels to accept manufacturers paint finished - **level st3**.
- D. Mask all windows or adjacent spaces, prior to promer and finish coat.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Exterior Plaster and Stucco: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete:
- G. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
- H. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.

2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.7 Color Schedule

- A. Steel Lintels: Color as selected by Architect from manufacturers full range.

END OF SECTION

**SECTION 09 9123
INTERIOR PAINTING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Gypsum Board walls.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Brick, architectural concrete and cast stone.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 7310 - Cutting and Patching
- C. Section 09 2116 - Gypsum Board Assemblies

1.4 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.5 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- E. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).
- F. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Westchester Community College's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 10 years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.8 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide frame assembly illustrating paint color, texture, and finish.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.10 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions. Refer to Section 01 2500 - Substitution Procedures for additional requirements.
- B. Paints:

1. Base Manufacturer: Benjamin Moore & Co: www.benjaminmoore.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: 01 2500 - Substitution Procedures.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 5. Supply each paint material in quantity required to complete entire project's work from a single production run.
 6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: As indicated on drawings.

2.3 PAINT SYSTEMS - INTERIOR

- A. All Interior surfaces indicated to be painted, unless otherwise indicated; Including gypsum board, concrete masonry and shop primed steel.
 1. Two top coats and one coat primer for new surfaces.
 2. One top coat and one coat primer for existing surfaces.
 3. Primer(s): As recommended by manufacturer of top coats.
 4. Colors to match existing or as directed by Owner.

- B. Ferrous metals, primed, Alkyd, 2 coat:
 - 1. Touch up with alkyd primer.
- C. Ferrous metals, primed, Acrylic Latex, 2 coat:
 - 1. Touch up with latex primer.
 - 2. Semi-gloss: 2 coats of Super Spec HP DTM Acrylic (P29),
 - 3. or 2 coats of Super Spec Interior Latex (276)
- D. Gypsum Board/Plaster, Latex, 3 coat: (New Surfaces)
 - 1. One coat of Moore Super Spec Latex Enamel Undercoater & Primer Sealer.(253)
 - 2. Semi-Gloss: 2 coats of Latex Enamel; Moore Super Spec Interior Latex (276)
- E. Gypsum Board/Plaster, Latex, 2 coat: (Existing Surfaces)
 - 1. One coat of Alkyd Primer sealer, Moore Super Spec Latex Enamel Undercoater & Primer Sealer.(253)
 - 2. Semi-Gloss: 1 coats of Latex Enamel; Moore Super Spec Interior Latex (276)
 - 3. Eggshell: 1 coats of Latex Enamel; Moore Super Spec Interior Latex # C274
 - 4. Colors to match existing as directed by Owner

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Paint all cut and patched surfaces from edge of area to edge of area, for soffits wall to wall, for ceilings to extent of ceiling edges in each direction etc. No spot painting will be accepted.
- C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- E. Test shop-applied primer for compatibility with subsequent cover materials.

- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
 2. Plaster and Stucco: 12 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Masonry:
1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 2. Prepare surface as recommended by top coat manufacturer.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Galvanized Surfaces:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and SSPC-SP 3. Protect from corrosion until coated.
- K. Cleaning Existing Walls: Remove all loose paint, plaster and other coatings.
1. Working from bottom to top, apply prepared cleaning solution to a dry surface.

2. Leave solution on the surface for 5-20 minutes. If solution begins to dry, reapply.
3. Gently scrub heavily soiled areas.
4. Rinse thoroughly with clean water with by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip.
5. Apply after wash. Let the Afterwash stay on the surface for three to five minutes.
6. Pressure rinse from the bottom of the treated area to the top.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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SECTION 210000

GENERAL PROVISIONS FOR FIRE SUPPRESSION WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 DEFINITIONS

- A. "Provide": to furnish, install, and make complete, safe, and operable, the particular work referred to unless specifically indicated otherwise.
- B. "Furnish" or "supply": to purchase, procure, acquire, and deliver complete with related accessories.
- C. "Install": to erect, mount, and make complete with related accessories.
- D. "Work": includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation for fully functioning and operational systems.
- E. "Piping": includes pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related accessories.
- F. "Wiring": includes wire, raceway, fittings, boxes, and related accessories.
- G. "Concealed": not in view, installed in masonry or other construction, within furred spaces, double partitions, hung ceilings, trenches, crawl spaces, or enclosures.
- H. "Exposed": in view, not installed underground or "concealed" as defined above.
- I. "Indicated," "shown," or "noted": as indicated, shown, or noted on drawings or specifications.
- J. "Similar" or "equal": to base bid manufacturer, equal in quality, materials, weight, size, performance, design and efficiency of specified product, conforming with "Base Bid Manufacturers" as determined and approved by Engineer.
- K. "Approved": satisfactory as reviewed.
- L. "Accepted As Noted": accepted with comments.
- M. "Revise and Resubmit": resubmit with revisions.
- N. "Disapproved": not approved.
- O. "Submit Specified Item": provide specified item directed by Engineer.
- P. "Reviewed": assessed for reference only final approval by others.

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- Q. "Substitutions": Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

1.2 WORK INCLUDED

- A. The work covered by this section includes the construction described in the Contract Documents, labor necessary to perform and complete such construction, materials and equipment incorporated or to be incorporated in such construction, and services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Related Work not Included in this Division but Specified Elsewhere:
1. Requirements of GENERAL CONDITIONS and Division No. 1.
 2. Finish painting, except for prefinished equipment or as otherwise specified.
 3. Concrete work, except equipment inertia and floating bases.
 4. Base flashing for piping.
 5. Waterproofing.
 6. Power wiring for motors and motor controllers.
 7. Installation of access doors and frames.
 8. Cutting and patching.
 9. Fire alarm wiring.

1.3 DESCRIPTION OF BID DOCUMENTS

- A. Specifications describe quality and character of materials and equipment.
- B. Drawings are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation. Provide additional offsets, fittings, hangers, supports, valves, drains as required for construction and coordination with work of other trades.
- C. Scaled and indicated dimensions are approximate and are for estimate purposes only. Before proceeding with work, check and verify dimensions and field conditions.
- D. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
- E. Typical details, where shown on the drawings, apply to each item of the project where such items are applicable. Typical details are not repeated in full on the plans, and are diagrammatic only, but with the intention that such details shall be incorporated in full.
- F. If any part of Specifications or Drawings appears unclear or contradictory, consult Architect and/or Engineer for interpretation and decision as early as possible during bidding period. Do not proceed with work without the Architect's and/or Engineer's decision.

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1.4 COORDINATION OF WORK

- A. The fire protection drawings show the general arrangement of equipment, piping, and appurtenances. Follow these drawings as closely as the actual construction will permit. Conform the fire protection work to the requirements shown on the drawings. Provide offsets, fittings, and accessories which may be required but not shown on the drawings. Investigate the site, structural and finish ground conditions affecting the work, and arrange the work accordingly. Provide such work and accessories as may be required to meet such conditions.
- B. Certain materials will be provided by other trades. Examine the Contract Documents to ascertain these requirements.
- C. Carefully check space requirements with other trades to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings.
- D. Transmit to other trades all information required for work to be provided under their sections, in ample time for installation.
- E. Wherever work interconnects with work specified under other Sections, coordinate those sections of work to insure that all necessary information is presented so that all the necessary connections and equipment may be properly installed. Identify all items (valves, piping, equipment, etc.) in order that access doors and panels are properly located.
- F. Furnish and set all sleeves for passage of pipes through structural masonry, concrete walls, floors, and elsewhere as required for the proper protection of pipes passing through building surfaces.
- G. Provide required supports and hangers for piping and equipment, designed so as not to exceed allowable loadings of structures.
- H. Examine and compare the contract drawings and specifications with the drawings and specifications of other disciplines, and report any discrepancies between them to the Engineer and obtain from them written instructions for changes necessary in the work of this Section. Install and coordinate the work of this Section in cooperation with installing interrelated work. Before installation, take proper provisions to avoid interferences. All changes required in the work, caused by their neglect to do so, to be made at no additional expense. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship and report any conditions which prevent performance of first class work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.
- I. Wherever the work is of sufficient complexity, prepare additional detail drawings to scale similar to that of the design drawings, prepared on tracing medium of the same size as contract drawings. With these layouts, coordinate the work with the work of the contractor. Such detailed work is to be clearly identified on the drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion, however, include a set of such drawings with each set of as-built drawings. When directed by the Engineer, submit drawings for review, clearly showing the work of this section and its relation to the work of other disciplines before commencing shop fabrication or erection in the field.

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- J. Provide required anchor bolts, sleeves, inserts, and supports designed so as not to exceed allowable loadings of structures. Locate anchors, bolts, sleeves, inserts, and supports to insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports to be paid for by the Contractor.
- K. Adjust location of pipes, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each pipe prior to fabrication.
 - 1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch, i.e., plumbing drains. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
 - 2. Make offsets, transitions and changes in direction in pipes as required to maintain proper head room and pitch on sloping lines whether or not indicated on the drawings. Furnish and install all traps, air vents, drains, etc., as required to offset, transition, and change in direction.
- L. The Contractor shall prepare full coordinated composite drawings for the mechanical, electrical, plumbing, and fire protection work. The Contractor shall overlay each discipline's work (in separate colors) on a set of shop drawings. Conflicts and potential conflicts shall be clearly identified. This shall include but not be limited to conflicts with lights, equipment, piping, ductwork and supports of other trades, as well as conflicts with architectural and structural walls, columns, ceilings and structural beams. The contractor shall have representative(s) attend a weekly job site coordination meeting in the field office. All trades shall resolve conflicts at these meetings and sign off each shop drawing indicating acceptance and satisfactory resolution to all conflicts. All conflicts that cannot be resolved shall be brought to the attention of the Engineer for resolution.

1.5 CONTRACTOR'S RESPONSIBILITY FOR EVALUATION

- A. The Engineer and Owner make no representations, regarding the character or extent of the subsoils, water levels, existing structural, mechanical, and electrical installations, above or below ground or other subsurface conditions which may be encountered during the work. The contractor must make their own evaluation of existing conditions which may affect methods or cost of performing the work, based on their own examination of the facility or other information. Failure to examine the drawings or other information shall not relieve the contractor of their responsibility for satisfactory accomplishment of the work.
- B. The locations of existing utilities are believed to be as indicated on the plans. The Contractor shall verify the location of these utilities prior to commencing any work and notify the Engineer of any discrepancies.
- C. Before starting work, visit the site and examine the site conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.
- D. Connections to existing work:

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1. Install new work and connect to existing work with minimum interference to existing facilities.
2. Provide temporary shutdowns of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities.
3. Alarm and emergency systems shall not be interrupted without alternative arrangements.
4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity required.
6. Perform service disconnections only after regular working hours.

1.6 ACCESS TO FIRE PROTECTION EQUIPMENT

- A. The Subcontractor shall not interfere with access to hydrants, fire exits, fire hose stations, fire extinguishers and fire alarm pull stations. In no case shall the Subcontractor's material or equipment be within twenty five (25) ft of a hydrant or fire alarm pull station.

1.7 EQUIPMENT AND MATERIALS

- A. If products and materials are specified or indicated on the drawings for a specific item or system, the Subcontractor shall use those products or materials. If products and materials are not listed in either of the above, use first class products and materials, in accordance with shop drawings.
- B. All products and materials shall be new, clean, free of defects, damage, and corrosion.
- C. No permanent equipment shall be used to provide services during construction.
- D. Ship and store all products and materials in a manner which will protect them from damage, weather, and entry of debris. If items are damaged, do not install, but take immediate steps to obtain replacement or repair.
- E. Make certain that all materials selected directly, or by suppliers, conform to the requirements of the contract drawings and specification. Transmittal of such specifications and drawings, information to persons manufacturing and supplying materials to the project, and rigid adherence thereto, is the Subcontractor's responsibility. Acceptance of a manufacturer's name by the Engineer does not release the Subcontractor of the responsibility for providing materials which comply in all respects with the requirements in the Contract Documents.
- F. Applicable equipment and materials to be listed by Underwriters' Laboratories (UL) and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by local authorities having jurisdiction.
- G. Fully lubricate all equipment when installed and prior to final acceptance.

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- H. Do not put systems in operation until piping has been tested and cleaned.
- I. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment.
Provide one copy of such instructions to the Engineer before installing any equipment. Provide a copy of such instructions at the equipment.

1.8 BASE BID MANUFACTURERS

- A. Base bid on materials or equipment are specified by name of manufacturer, brand or trade name and catalog reference.
- B. Where two or more manufacturers are named, the bidder will have the option to choose.
- C. Manufacturers, other than specified, will only be considered if at the time of bid, manufacturers' names and proposed substitutions are named and stated and the difference in base bid is indicated including changes in the cost of all affected work.
- D. Submission of equipment of manufacturers other than specified shall detail equality and difference item by item. Delay in ordering of equipment will not be considered a valid cause for substitution.

1.9 SUBSTITUTIONS

- A. Substitution limitations:
 - 1. Products specified by Reference Standards or by description only: Use any product meeting those standards or description.
 - 2. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer or model not named.
 - 3. Products specified by naming one manufacture's model number:
No substitutions accepted after procurement.
- B. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.

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6. Agrees to reimburse Owner and design team for review or redesign services associated with re-approval by authorities.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
 2. Savings to Owner for accepting substitution.
 3. Change to Contract Time due to accepting substitution.
- D. Substitution Procedures During Procurement
1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
 2. Owner and Engineer will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.
- E. Substitution Procedures During Construction
1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
 2. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
 3. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
- F. Resolution
1. Engineer may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
 2. Engineer will notify Contractor in writing of decision to accept or reject substitution request. Engineer's decision following review of proposed substitution will be noted on the submitted form.

1.10 QUALITY ASSURANCE

- A. Codes, Standards and Fees
1. Codes and Standards:

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- a. Comply with all current governing codes, ordinances and regulations, UL and all other applicable codes.
 - b. Comply with the requirements of the New York State Building Code, and other agencies or authorities having jurisdiction over any part of the Work and secure all necessary permits.
 - c. Where codes or standards are listed herein, the applicable portions apply.
 - d. Plans, specifications, codes and standards are all minimum requirements. Where requirements differ, apply the more stringent.
 - e. Should any change in plans or specifications be required to comply with governing regulations, the Subcontractor is to notify the Engineer at the pre-bid meeting.
 - f. The codes and standards listed in the Specifications can be obtained from the organizations listed as follows:
 - 1) OSHA-Occupational Safety and Health Act
 - 2) ANSI-American National Standard Institute, Inc.
 - 3) ASME-American Society of Mechanical Engineers
 - 4) ASTM-American Society for Testing and Materials
 - 5) AWWA-American Water Works Association
 - 6) UL-Underwriters Laboratories, Inc.
 - 7) ASHRAE-American Society of Heating, Refrigerating and Air Conditioning Engineers
 - 8) NEMA-National Electrical Manufacturers Association
 - 9) AIA-American Insurance Association
 - 10) AWS-American Welding Society
 - 11) ASA-American Standards Association
 - 12) IEEE-Institute of Electrical and Electronics Engineers
 - 13) NEC-National Electrical Code
 - g. The particular specification will be identified by appropriate prefix and number only with the latest revision being applicable unless otherwise noted.
2. Fees
- a. Pay all required fees.

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- b. Pay royalties or fees required in connection with the use of patented devices and systems.
- B. Furnish all materials and equipment new, free from defects and with listings or labels of Underwriter's Laboratories, Inc. or other nationally approved testing laboratory.
- C. All items of a given type shall be the product of the same manufacturer.
- D. All materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.

1.11 SHOP DRAWINGS

- A. Prepare and submit detailed shop drawings for piping work and other distribution services, including locations and sizes of all openings in floor, walls, and roofs.
- B. The work described in any shop drawing submission shall be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. Each submitted shop drawing shall include a certification that all related job conditions have been checked and that no conflict exists.
- C. All drawings shall be submitted sufficiently in advance of field requirements to allow (15) days for checking. All submittals shall be complete and contain all required and detailed information. Shop drawings with multiple parts shall be submitted as a package.
- D. If submittals differ from the Contract Document requirements, make specific mention of such difference in a letter of transmittal, with request for substitution, together with reasons for same.
- E. Review of any submitted data or shop drawings for material, equipment apparatus, devices, arrangement and layout shall not relieve the Contractor of responsibility to furnish same of proper dimensions and weight, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Work. Such review shall not relieve the Subcontractor from responsibility for errors, omissions or inadequacies of any sort on submitted data or shop drawings.
- F. Each shop drawing shall contain the job title, the names and phone numbers of the General Contractor and the Subcontractor, references to the applicable design drawing or specification article, date and scale.
- G. All fire sprinkler shop drawings and associated hydraulic calculations, and any subsequent revisions shall be prepared under the responsible charge of a Professional Engineer licensed in the state where the Project is located. Each drawing and calculation sheet shall be signed, dated, and sealed by that Professional Engineer prior to submission.
- H. Within fifteen (15) days after award of Contract, submit for review, a list of all material and equipment manufacturers whose products are proposed, as well as names of all Subcontractors whom the General Contractor proposes to employ.

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- I. Within three (3) weeks after award of Contract, submit a list of all shop drawings which will be submitted in the course of the project. List shall show disposition of each item, including date of submission, review, and the like. List shall be kept up-to-date throughout entire construction period.

- J. Submit shop drawings and manufacturer's data for the following items in accordance with the Contract Documents:
 - 1. Coordinated, detailed shop layout drawings of all mechanical rooms, services and distribution systems, including plans, profiles and sections.
 - 2. Details of piping supports, elbows, anchors and miscellaneous appurtenances.
 - 3. Hangers, supports, inserts, anchors, guides and foundations.
 - 4. Valves.
 - 5. Pressure gauges.
 - 6. Corrosion protective coatings.
 - 7. Equipment and piping layouts at 3/8 in. scale for the building.
 - 8. Location and size of sleeves for openings in floors and walls.
 - 9. Schedule of pipe and fittings, materials and application, valves, escutcheons, air vents, valve tags and schedules, and water specialties.
 - 10. Building automation systems including descriptions, instruments, and alarms.
 - 11. Equipment identification and certificates.
 - 12. Other shop drawings and submittals as requested within the specification.

1.12 ACCESS DOORS

- A. Furnish access doors as required for operation and maintenance of concealed equipment, clean-outs, valves, shock absorbers, controls, etc., and coordinate their delivery with the installing trade.
- B. Coordinate and prepare a location, size and function schedule of access doors required and deliver to the General Contractor and the Architect for review.
- C. Doors shall be of a size required for operating and repacking valves, and shall be as manufactured by Karp Associates, Nystrom Inc., or Mifab.
- D. Unless otherwise indicated, minimum size to be 18" x 18".
- E. Furnish color coded buttons or tabs to indicate location of valves or other equipment located above removable type ceilings where access doors are not required.

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- F. Access doors shall have a fire rating compatible with the wall construction in which they are located.

1.13 PRODUCT, DELIVERY, HANDLING AND STORAGE

- A. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- B. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and the weather until installation. Replace equipment damaged in the course of handling without additional charge.
- C. Arrange for and provide storage space or area at the job site for all materials and equipment to be received and/or installed for this project.
- D. Protect from damage, water, dust, etc., materials, equipment and apparatus provided under this trade, both in storage and installed.

1.14 ACCESSIBILITY

- A. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.
- B. Group concealed valves, expansion joints, controls, dampers, and equipment requiring access, so as to be freely accessible through access doors.

1.15 CUTTING AND PATCHING

- A. Provide all cutting and patching required for proper installation of materials and equipment specified. Do not cut or drill structural members without review and written approval by Architect and Structural Engineer.

1.16 GUARANTEE

- A. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date of actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

1.17 PERMITS AND FEES

- A. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for,

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and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

1.18 PAINTING

A. General:

1. Provide labor, materials, and equipment necessary for field prime painting. Protect flooring and equipment with drop cloths and store paint and materials in a location where directed. Wire brush and remove all oil, dirt, rust and grease before applying paint.
2. Apply zinc chromate primer for black steel piping, cast iron piping (except underground), steel and iron work and steel tanks before insulation.
3. Dip in zinc chromate primer, uncoated hangers, supports, rods and inserts.

B. Coordinate color of painting to be provided under General Construction Work.

C. Supply and deliver, in original sealed containers, paint of the best grade for its purpose of colors, as selected, and apply in accordance with manufacturer's instructions.

D. Finish painting:

1. Provide finish painting for piping continuously painted in all exposed areas consisting of two finished coats of high gloss medium or long alkyd paint over prime coat of a color shade as accepted after submittal.
2. Place unlisted piping, ductwork or equipment in one of the following classifications and color coded shades as accepted. This corresponds to colors of ANSI A13.1, (Scheme for identification of piping systems).
 - a. Red for fire-protection materials.
3. Shades shall be consistent throughout the project.
4. Coat valve, strainer or other appurtenances operating at over 220 o F where bare metal is exposed with Silicone Alkyd Aluminum, 71S30.

1.19 POST-INSTALLED ANCHORS

A. Quality Assurance:

1. Use Post-Installed Anchors that have been designed and tested in accordance with:
 - a. NYS: ACI 318, as amended by NYSBC Section 1905.
 - b. Current ICC-ES reports considered evidence of successful testing.
2. Acceptable Manufacturers:
 - a. Hilti, Inc: www.us.hilti.com.

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- b. Simpson Strong-Tie Company, Inc.: www.strongtie.com
- c. DeWalt Anchors and Fasteners: www.anchors.dewalt.com/anchors.

B. Provide Post-Installed Anchors as follows:

1. Anchor shall have a current ICC-ES report for the base material.
2. Select and install anchor based on concrete strength indicated by core tests. Otherwise, assume 2,000 psi concrete.
3. Provide AISI 316 Stainless Steel Post-Installed Anchors in corrosive environments.
4. All anchors installed on underside of concrete slab shall be approved for use in cracked concrete.
5. Spacing and edge distance of anchors shall conform to the requirements of the structural engineer or anchor manufacture.
6. Use a safety factor of 4 to the proof tensile load of the anchor when determining the allowable design tensile load.

C. Installation Requirements:

1. Comply with post-installed anchor manufacturer's recommendations for adhesive storage temperature and conditions for adhesive anchors before, during and after installation.
2. Only store solvent-cured materials in ventilated areas.
3. Follow OSHA requirements when performing any drilling that can result in silica dust.
4. Post-installed adhesive anchors installed overhead shall be installed by persons certified by ACI to perform such installations.
5. All post-installed anchors shall be installed in accordance with manufacturer's installation instructions and current ICC-ES reports.

D. Inspection of Post-Installed Anchors:

1. Method of inspection shall be at the discretion of the Special Inspector.
2. Contractor shall provide all required information, drawings, equipment documentation, etc. requested by the Special Inspector a minimum of 10 working days in advance of the inspection.
3. Periodic Inspection: Mechanical and screw anchors installed in any orientation are subject to periodic inspection. Frequency of inspections shall be at the Special Inspector's discretion.

1.20 FIRESTOPPING

A. Quality Assurance:

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1. Use firestopping systems that have been tested in accordance with ASTM E814 or UL 1479. Listing by UL (DIR), UL (FDR), FM (AG), or ITS (DIR) in their certification directories will be considered evidence of successful testing.
 2. Manufacturer Qualifications: Company specializing in manufacturing the products for use in fire rated assemblies with minimum three years documented experience.
 - a. 3M Fire Protection Products: www.3m.com/firestop.
 - b. Hilti, Inc: www.us.hilti.com.
 - c. Specified Technologies Inc: www.stifirestop.com.
- B. Firestopping Assembly Requirements
1. For membrane and through penetrations, provide firestopping materials to create a listed system, for the assembly being penetrated and field conditions, that have the following properties, except as otherwise permitted by the Building Code:
 - a. Fire Resistance: Provide systems that have been tested to show F-Rating equal to required fire rating of penetrated assembly.
 - b. Temperature Rise: Provide systems that have been tested to show T-Rating equal to or greater than the F-Rating.
 - c. Air Leakage: Provide systems that have been tested to show L-Rating is equal to or greater than the L-Rating of joints in assembly being penetrated.
 - d. Watertightness: Provide systems that have been tested to meet a Class 1 W-Rating for floor penetrations.
- C. Field Conditions
1. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
 2. Provide ventilation in areas where solvent-cured materials are being installed.
- D. Inspection of Firestopping Systems
1. Method of inspection shall be at the discretion of the Special Inspector. Contractor shall provide all required information, coordinate with Special Inspector at least 10 days in advance of fire stop installation, and arrange site access. Contractor shall completely remove and restore all firestopping that has undergone destructive testing. No claims for additional cost or time will be allowed.
 2. Visual Inspection: Special Inspector shall be onsite during installation and randomly witness a minimum of 10% of each type of fire stop being installed.

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3. Destructive Testing: Verification of firestopping after installation has taken place. A minimum of 2%, but not less than one, of each type of fire stop shall be inspected per floor or each area of a floor when a floor area is larger than 10,000 sq. ft.

1.21 FIELD QUALITY CONTROL

- A. Perform tests as noted, and in the presence of the Architect and/or Engineer in accordance with authorities having jurisdiction.
- B. Provide required labor, materials, equipment, and connections necessary for tests and submit for review.
- C. Repair or replace defective work, as directed and pay for restoring or replacing damaged work of others, due to tests, as directed.

1.22 CLEANING

- A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.
- B. Clean and repair painted exposed work, soiled or damaged, to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of material and equipment.

1.23 OPERATING & MAINTENANCE INSTRUCTION

- A. Prepare operating and maintenance instructions manual including operating instructions, maintenance instructions, manufacturer's data, specific equipment data.
- B. Provide an alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
- C. Provide operating instructions for complete system, including:
 1. Normal starting, operating, and shut-down
 2. Emergency procedures for fire or failure of major equipment
 3. Summer and winter special procedures
 4. Day and night special procedures
- D. Provide maintenance instructions, including:
 1. Valve tag list and equipment tag list
 2. Proper lubricants and lubricating instructions for each piece of equipment, and date when lubricated
 3. Required cleaning, replacement and/or adjustment schedule

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- E. Provide manufacturer's data on each piece of equipment, including:
1. Installation instructions.
 2. Drawings and specifications.
 3. Parts list, including recommended items to be stocked.
 4. Complete wiring and temperature control diagrams.
 5. Marked or revised prints locating all concealed parts and all variations from the original system design.
 6. Test and inspection certificates.
- F. Provide specific equipment data including, but not limited to, the following:
1. For Fire Suppression Systems:
 - a. Valves.
 - b. Piping.
 - c. Accessories.
- G. Provide instruction of operating personnel.
1. Instruct Owner's operating personnel in proper starting sequences, operation, shutdown, and maintenance procedures, including normal and emergency procedures.
 2. Instruction to be by personnel skilled in operation of equipment. Instructions for major equipment to be by equipment manufacturers' representatives.
 3. Make arrangements to give instructions by system and not by building areas.
 4. Provide five (5) instruction sessions not to exceed six (6) hours each.
 5. Instructions on automatic controls to be by manufacturer's representative.
- H. Submittals
1. Shop Drawings: Submit three copies for review prior to final issuance.
 2. Provide six (6) copies of each operation and maintenance manual.
 - a. Manuals to be 8-1/2" x 11 size in hard-back, 3-ring loose leaf binders. Use more than one volume if required. Do not overfill binders.
 - b. Manuals to be completed and delivered to the Engineer for approval at least 20 days prior to instruction of operating personnel.
 3. Prepare separate manuals for the Fire Suppression system.

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1.24 TOOLS FOR OPERATION, ADJUSTMENT AND MAINTENANCE

- A. Deliver to Owner's representative all special tools needed for proper operation, adjustment and maintenance of equipment.

PART 2 - PRODUCTS

2.1 NOT USED.

PART 3 - EXECUTION

3.1 NOT USED.

END OF SECTION

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COMMON WORK RESULTS FOR FIRE SUPPRESSION

**SECTION 210500
COMMON WORK RESULTS FOR FIRE SUPPRESSION**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Above ground piping.
- B. Escutcheons.
- C. Pipe sleeves.
- D. Pressure gauges.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 099123 - Interior Painting: Preparation and painting of interior fire protection piping systems.
- C. Section 211300 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information. Indicate valve data and ratings.
- C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, and floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.4 QUALITY ASSURANCE

- A. Comply with FM (AG) and UL (DIR) requirements.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Sprinkler-based System:
 - 1. Comply with NFPA 13.
 - 2. See Section 211300.

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- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- C. Provide system pipes, fittings, sleeves, escutcheons, seals, and other related accessories.

2.2 ABOVE GROUND PIPING

- A. Steel Pipe: ASTM A795 Schedule 40, black.
 - 1. Steel Fittings: ASME B16.5 steel flanges and fittings.
 - 2. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.
 - 3. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

2.3 PIPE SLEEVES

- A. Vertical Piping:
 - 1. Sleeve Length: 1 inch above finished floor.
 - 2. Provide sealant for watertight joint.
 - 3. Provide firestopping when penetrating an existing floor slab.

2.4 ESCUTCHEONS

- A. Material:
 - 1. Metals and Finish: Comply with ASME A112.18.1.
- B. Construction:
 - 1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
 - 2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

2.5 PRESSURE GAUGES

- A. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Steel with brass bourdon tube.
 - 2. Diameter: 4-1/2 inch.
 - 3. Scale: Display in psi.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space, to not interfere with use of space and other work.
- D. Coordinate the installation of piping with all existing ceiling types and existing elements above the ceiling.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Pipe Hangers and Supports:
 - 1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 2. Place hangers within 12 inches of each horizontal elbow.
 - 3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- I. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- J. Do not penetrate building structural members unless indicated.
- K. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- L. Escutcheons:
 - 1. Install and firmly attach escutcheons at piping penetrations into finished spaces.

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2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
 3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.
- M. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.

END OF SECTION

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FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING
SECTION 211100

FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Water pipe.
- B. Valves.

1.2 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
 - 2. Provide manufacturer's catalog information.
 - 3. Indicate valve data and ratings.
 - 4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.

1.3 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

PART 2 PRODUCTS

2.1 WATER PIPE

- A. Steel Pipe: ASTM A53/A53M, Grade B, Type F. Provide standard weight, zinc-coated, and listed piping.
 - 1. Fittings: Comply with ASME B16.3 Class 150, zinc-coated, threaded or ASME B16.4 Class 125, zinc-coated.
 - 2. Mechanically Factory Applied Protective Materials:
 - a. Clean by wire brushing and solvent cleaning.
 - b. Apply one coat of coal-tar primer and two coats of coal-tar enamel complying with AWWA C203.

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- c. Protect threaded pipe ends and fittings prior to coating.

2.2 VALVES

A. General:

1. Manufacturer's name and pressure rating marked on valve body.
2. Minimum Compliance: UL (DIR) listed and labeled.
3. Maximum Inlet Pressure: 400 psi.
4. Maximum Service Temperature: 180 degrees F.
5. Valve Coatings:
 - a. Internally: 4 mils, 0.004 inch epoxy, minimum.
 - b. Externally: Epoxy base then fire red enamel paint or heat-fused red epoxy paint.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.2 INSTALLATION

A. General Requirements:

1. Location of Water Lines:
2. Sleeving:
 - a. Sleeve water piping where piping is required to be installed within 3 feet of existing structures.
 - b. Provide ductile iron or Schedule 40 steel sleeves.
 - c. Fill annular space between pipe and sleeves with mastic.
 - d. Install water pipe and sleeve without damaging structures or causing settlement or movement of foundations or footings.
3. Pipe Laying and Jointing:
 - a. Remove fins and burrs from pipe and fittings.
 - b. Prior to placing in position, clean pipe, fittings, valves, and accessories, and maintain in clean condition.
 - c. Provide proper facilities for lowering pipe sections into trenches.

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FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

- d. Dropping or dumping of piping, fittings, valves, or any other water line material into trenches is not permitted.
 - e. Cut pipe in a neat, workmanlike manner accurately to length established at the site and work into place without forcing or springing.
 - f. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
 - g. Wedging or blocking between bells and spigots will not be permitted.
 - h. Install bell-and-spigot pipe with the bell end pointing in the direction of laying.
 - i. Grade the pipeline in straight lines avoiding the formation of dips and low points.
 - j. Support piping at proper elevation and grade.
 - k. Secure firm, uniform support.
 - l. Wood support blocking will not be permitted.
 - m. Install pipe so that the full length of each pipe section and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
 - n. Provide anchors and supports where indicated and necessary for fastening work into place.
 - o. Provide proper provisions for expansion and contraction of pipelines.
 - p. Keep trenches free of water until joints have been properly made.
 - q. Close open ends of piping temporarily with wood blocks or bulkheads at the end of each workday.
 - r. Do not install pipe during unacceptable trench conditions or inclement weather.
 - s. Minimum Depth of Pipe Cover: Not less than 2-1/2 feet.
4. Connections to Existing Water Lines:
- a. Ensure minimal interruption of service on the existing line. Contractor shall notify the school 72 hours in advance of any required shutdowns or draining of the system.
 - b. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.
5. Penetrations:
- a. Provide ductile-iron or Schedule 40 steel for pipes passing through walls of valve pits and structures.

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FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

- b. Fill annular space between sleeves and walls with rich cement mortar.
- c. Fill annular space between pipe and sleeves with mastic.

B. Special Requirements:

1. Steel Piping:

a. Jointing:

b. Allowable Offsets:

c. Pipe Anchorage:

- 1) Provide concrete thrust blocks (reaction backing) for pipe anchorage, except where metal harness is indicated.
- 2) Thrust blocks to be in accordance with the recommendations for thrust restraint in AWWA M11, except that size and positioning of thrust blocks are to be as indicated.
- 3) Use ASTM C94/C94M concrete having a minimum compressive strength of 2500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.
- 4) Metal Harness:
 - (a) Provide in accordance with the recommendations for joint harnesses in AWWA M11, except as otherwise indicated.
 - (b) Fabricated by the pipe manufacturer and furnished with the pipe.

C. Valves:

- 1. Set valves on solid bearing.
- 2. Center and plumb valve box over valve.
- 3. Set box cover flush with finished grade.

3.3 SERVICE CONNECTIONS

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

- 1. See Section 014000 - Quality Requirements for additional requirements.
- 2. See Section 014533 - Code Required Special Inspections and Procedures for additional inspection requirements.

3. Provide all labor, equipment, and incidentals required for field testing, except that water and electric power needed for field tests will be furnished as set forth in Section 015100 - Temporary Utilities.
4. Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently and at least 5 days after placing of concrete.
5. Fill pipeline 24 hours before testing and apply test pressure to stabilize system, using only potable water.
6. Pressure test piping to 200 psi.
7. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
8. Prepare reports of testing activities.

3.5 CLOSEOUT ACTIVITIES

END OF SECTION

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FIRE-SUPPRESSION SPRINKLER SYSTEMS

SECTION 211300
FIRE-SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
 - 1. Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation and devices. Shop drawings should be fully coordinated with all existing conditions.
 - 2. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components, and accessories.
- D. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements for additional provisions.
 - 2. Extra Sprinklers: Type and size matching those installed in quantity required by referenced NFPA design and installation standard.
 - 3. Sprinkler Wrenches: For each sprinkler type.

PART 2 PRODUCTS

2.1 SPRINKLER SYSTEM

- A. Sprinkler System: Provide coverage for building areas noted.
- B. Occupancy: Light hazard; comply with NFPA 13.
- C. Water Supply: Determine volume and pressure from water flow test data.
- D. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve in cellar mechanical room.

2.2 SPRINKLERS

- A. See sprinkler head schedule on plans.
 - 1. Response Type: Quick.
 - 2. Coverage Type: Standard.
 - 3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with referenced NFPA design and installation standard.
- B. Install equipment in accordance with manufacturer's instructions.
- C. Place pipe runs to minimize obstruction to other work.
- D. Place piping in concealed spaces above finished ceilings.
- E. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- F. Flush entire piping system of foreign matter.
- G. Hydrostatically test entire system.
- H. Require test be witnessed by Fire Marshal.

END OF SECTION

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GENERAL PROVISIONS FOR PLUMBING WORK
SECTION 220000
GENERAL PROVISIONS FOR PLUMBING WORK

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 DEFINITIONS

- A. "Provide": to furnish, install, and make complete, safe, and operable, the particular work referred to unless specifically indicated otherwise.
- B. "Furnish" or "supply": to purchase, procure, acquire, and deliver complete with related accessories.
- C. "Install": to erect, mount, and make complete with related accessories.
- D. "Work": includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation for fully functioning and operational systems.
- E. "Piping": includes pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related accessories.
- F. "Wiring": includes wire, raceway, fittings, boxes, and related accessories.
- G. "Concealed": not in view, installed in masonry or other construction, within furred spaces, double partitions, hung ceilings, trenches, crawl spaces, or enclosures.
- H. "Exposed": in view, not installed underground or "concealed" as defined above.
- I. "Indicated," "shown," or "noted": as indicated, shown, or noted on drawings or specifications.
- J. "Similar" or "equal": to base bid manufacturer, equal in quality, materials, weight, size, performance, design and efficiency of specified product, conforming with "Base Bid Manufacturers" as determined and approved by Engineer.
- K. "Approved": satisfactory as reviewed.
- L. "Accepted As Noted": accepted with comments.
- M. "Revise and Resubmit": resubmit with revisions.
- N. "Disapproved": not approved.
- O. "Submit Specified Item": provide specified item directed by Engineer.
- P. "Reviewed": assessed for reference only final approval by others.

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- Q. "Substitutions": Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

1.2 WORK INCLUDED

- A. The work covered by this section includes the construction described in the Contract Documents, labor necessary to perform and complete such construction, materials and equipment incorporated or to be incorporated in such construction, and services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Related Work not Included in this Division but Specified Elsewhere
1. Requirements of GENERAL CONDITIONS and Division No. 1.
 2. Finish painting, except for prefinished equipment or as otherwise specified.
 3. Concrete work, except equipment inertia and floating bases.
 4. Base flashing for piping and drains.
 5. Waterproofing.
 6. Power wiring for motors and motor controllers.
 7. Installation of access doors and frames.
 8. Cutting and patching.
 9. Excavating and backfilling.

1.3 DESCRIPTION OF BID DOCUMENTS

- A. Specifications describe quality and character of materials and equipment.
- B. Drawings are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation. Provide additional offsets, fittings, hangers, supports, valves, drains as required for construction and coordination with work of other trades.
- C. Scaled and indicated dimensions are approximate and are for estimate purposes only. Before proceeding with work, check and verify dimensions and field conditions.
- D. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
- E. Typical details, where shown on the drawings, apply to each item of the project where such items are applicable. Typical details are not repeated in full on the plans, and are diagrammatic only, but with the intention that such details shall be incorporated in full.
- F. If any part of Specifications or Drawings appears unclear or contradictory, consult Architect and/or Engineer for interpretation and decision as early as possible during bidding period. Do

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not proceed with work without the Architect's and/or Engineer's decision. All request shall be made in writing to the owner.

1.4 COORDINATION OF WORK

- A. The drawings show the general arrangement of equipment, piping, and appurtenances. Follow these drawings as closely as the actual construction will permit. Conform the work to the requirements shown on the drawings. Provide offsets, fittings, and accessories which may be required but not shown on the drawings. Investigate the site, structural and finish ground conditions affecting the work, and arrange the work accordingly. Provide such work and accessories as may be required to meet such conditions.
- B. Certain materials will be provided under other Sections of work. Examine the Contract Documents to ascertain these requirements.
- C. Carefully check space requirements with other Sections to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings.
- D. Transmit to other Sections all information required for work to be provided under those Sections, in ample time for installation.
- E. Wherever work interconnects with work specified under other Sections, coordinate those sections of work to insure that all necessary information is presented so that all the necessary connections and equipment may be properly installed. Identify all items (valves, piping, equipment, etc.) in order that access doors and panels are properly located.
- F. Furnish and set all sleeves for passage of pipes through structural masonry, concrete walls, floors, and elsewhere as required for the proper protection of pipes passing through building surfaces.
- G. Provide required supports and hangers for piping and equipment, designed so as not to exceed allowable loadings of structures.
- H. Examine and compare the contract drawings and specifications with the drawings and specifications of other disciplines, and report any discrepancies between them to the Engineer and obtain from them written instructions for changes necessary in the work of this Section. Install and coordinate the work of this Section in cooperation with installing interrelated work. Before installation, take proper provisions to avoid interferences. All changes required in the work, caused by their neglect to do so, to be made at no additional expense. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship and report any conditions which prevent performance of first class work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.
- I. Wherever the work is of sufficient complexity, prepare additional detail drawings. Such detailed work is to be clearly identified on the drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion, however, include a set of such drawings with each set of as-built drawings. When directed by the Engineer, submit drawings for review,

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clearly showing the work of this Section and its relation to the work of other disciplines before commencing shop fabrication or erection in the field.

- J. Provide required anchor bolts, sleeves, inserts, and supports designed so as not to exceed allowable loadings of structures. Locate anchors, bolts, sleeves, inserts, and supports to insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports to be paid for by the Contractor.
- K. Adjust location of pipes, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each pipe prior to fabrication.
 - 1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch, i.e., plumbing drains. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
 - 2. Make offsets, transitions and changes in direction in pipes as required to maintain proper head room and pitch on sloping lines whether or not indicated on the drawings. Furnish and install all traps, air vents, drains, etc., as required to offset, transition, and change in direction.
- L. Install all plumbing work to permit the removal (without damage to other parts) of water heaters and all other equipment requiring periodic replacement or maintenance. Arrange pipes and equipment to permit access to valves, cocks, starters, motors, and control components, and to clear the openings of swinging doors and access panels.
- M. Coordinated Composite Drawings
 - 1. The Contractor shall prepare full coordinated composite drawings for the mechanical, electrical, plumbing, and fire protection work. The Contractor shall overlay each discipline's work (in separate colors) on a set of shop drawings. Conflicts and potential conflicts shall be clearly identified. This shall include but not be limited to conflicts with lights, equipment, piping, ductwork and supports of other trades, as well as conflicts with architectural and structural walls, columns, ceilings and structural beams. The contractor shall have representative(s) attend a weekly job site coordination meeting in the field office. All trades shall resolve conflicts at these meetings and sign off each shop drawing indicating acceptance and satisfactory resolution to all conflicts. All conflicts that cannot be resolved shall be brought to the attention of the Engineer for resolution.

1.5 CONTRACTOR'S RESPONSIBILITY FOR EVALUATION

- A. The Contractor shall review all available data on the location and types of underground utilities. The Contractor shall not operate equipment over the utilities and shall take care not to damage them or otherwise impair their use. The Contractor shall make investigation to verify the location of these utilities before proceeding with construction and/or operations in their vicinity.
- B. The Engineer and Owner make no representations, regarding the character or extent of the subsoils, water levels, existing structural, mechanical, and electrical installations, above or below ground or other subsurface conditions which may be encountered during the work. The

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contractor must make their own evaluation of existing conditions which may affect methods or cost of performing the work, based on their own examination of the facility or other information. Failure to examine the drawings or other information shall not relieve the contractor of their responsibility for satisfactory accomplishment of the work.

- C. The locations of existing utilities are believed to be as indicated on the plans. The Contractor shall verify the location of these utilities prior to commencing any work and notify the Engineer of any discrepancies.
- D. Inspection of Site Conditions.
 - 1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.
- E. Connections to existing work:
 - 1. Install new work and connect to existing work with minimum interference to existing facilities.
 - 2. Provide temporary shutdowns of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities.
 - 3. Alarm and emergency systems shall not be interrupted without alternative arrangements.
 - 4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 - 5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity required.
 - 6. Perform service disconnections only after regular working hours.

1.6 ACCESS TO FIRE PROTECTION EQUIPMENT

- A. The Contractor shall not interfere with access to hydrants, fire exits, fire hose stations, fire extinguishers and fire alarm pull stations. In no case shall the Contractor's material or equipment be within twenty five (25) ft of a hydrant or fire alarm pull station.

1.7 EQUIPMENT AND MATERIALS

- A. If products and materials are specified or indicated on the drawings for a specific item or system, the Contractor shall use those products or materials. If products and materials are not listed in either of the above, use first class products and materials, in accordance with shop drawings.
- B. All products and materials shall be new, clean, free of defects, damage, and corrosion.
- C. No permanent equipment shall be used to provide services during construction.

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- D. Ship and store all products and materials in a manner which will protect them from damage, weather, and entry of debris. If items are damaged, do not install, but take immediate steps to obtain replacement or repair.
- E. Make certain that all materials selected directly, or by suppliers, conform to the requirements of the contract drawings and specification. Transmittal of such specifications and drawings, information to persons manufacturing and supplying materials to the project, and rigid adherence thereto, is the Contractor's responsibility. Acceptance of a manufacturer's name by the Engineer does not release the Contractor of the responsibility for providing materials which comply in all respects with the requirements in the Contract Documents.
- F. Applicable equipment and materials to be listed by Underwriters' Laboratories (UL) and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by local authorities having jurisdiction.
- G. Fully lubricate all equipment when installed and prior to final acceptance.
- H. Do not put systems in operation until piping has been tested and cleaned.
- I. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment. Provide one copy of such instructions to the Engineer before installing any equipment. Provide a copy of such instructions at the equipment.

1.8 QUALITY ASSURANCE

- A. Codes, Standards and Fees
 - 1. Codes and Standards:
 - a. Comply with all current governing codes, ordinances and regulations, UL and all other applicable codes.
 - b. Comply with the requirements of the New York City Building Code, and other agencies or authorities having jurisdiction over any part of the Work and secure all necessary permits.
 - c. Where codes or standards are listed herein, the applicable portions apply.
 - d. Plans, specifications, codes and standards are all minimum requirements. Where requirements differ, apply the more stringent.
 - e. Should any change in plans or specifications be required to comply with governing regulations, the Contractor is to notify the Engineer at the pre-bid meeting.
 - f. The codes and standards listed in the Specifications can be obtained from the organizations listed as follows:
 - 1) OSHA-Occupational Safety and Health Act
 - 2) ANSI-American National Standard Institute, Inc.

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- 3) ASME-American Society of Mechanical Engineers
- 4) ASTM-American Society for Testing and Materials
- 5) AWWA-American Water Works Association
- 6) UL-Underwriters Laboratories, Inc.
- 7) ASHRAE-American Society of Heating, Refrigerating and Air Conditioning Engineers
- 8) NEMA-National Electrical Manufacturers Association
- 9) AIA-American Insurance Association
- 10) AWS-American Welding Society
- 11) ASA-American Standards Association
- 12) IEEE-Institute of Electrical and Electronics Engineers
- 13) NEC-National Electrical Code

g. The particular specification will be identified by appropriate prefix and number only with the latest revision being applicable unless otherwise noted.

2. Fees

- a. Pay all required fees.
- b. Pay royalties or fees required in connection with the use of patented devices and systems.

- B. Furnish all materials and equipment new, free from defects and with listings or labels of Underwriter's Laboratories, Inc. or other nationally approved testing laboratory.
- C. All items of a given type shall be the product of the same manufacturer.
- D. All materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.

1.9 CLEARANCE FROM ELECTRICAL EQUIPMENT

- A. Piping and ductwork is prohibited in electric and telephone rooms and closets, elevator machine rooms, and for installations over or within 5 ft of transformers, substations, switchboards, motor control centers, standby power plants, and motors.
- B. Branch piping to equipment is acceptable when installed over or within 5 ft of motors.
- C. Provide drip pans under all water and drainage piping when installation over or within 5 ft of electrical apparatus is unavoidable or in rooms containing electrical equipment. Pan shall be

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reinforced, properly supported and made watertight. Provide enclosed type for pressure piping. Extend 1-1/4 in. drain pipe from pan to spill over nearest floor drain or as indicated on drawings.

1. Construction shall be 18 gauge galvanized sheet steel.

1.10 SHOP DRAWINGS

- A. Prepare and submit detailed shop drawings for piping work and other distribution services, including locations and sizes of all openings in floor walls and roofs.
- B. The work described in any shop drawing submission to be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. Each submitted shop drawing to include a certification that all related job conditions have been checked and that no conflict exists.
- C. All drawings to be submitted sufficiently in advance of field requirements to allow (15) days for checking. All submittals to be complete and contain all required and detailed information. Shop drawings with multiple parts to be submitted as a package.
- D. If submittals differ from the Contract Document requirements, make specific mention of such difference in a letter of transmittal, with request for substitution, together with reasons for same.
- E. Review of any submitted data or shop drawings for material, equipment apparatus, devices, arrangement and layout shall not relieve the Contractor from responsibility of furnishing same of proper dimensions and weight, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Work. Such review shall not relieve the Contractor from responsibility for errors, omissions or inadequacies of any sort on submitted data or shop drawings.
- F. Each shop drawing is to contain the job title, the name and phone numbers of the Contractor, references to the applicable design drawing or specification article, date and scale.
- G. Within three (3) weeks after award of Contract, submit a list of all shop drawings which will be submitted in the course of the project. List to show disposition of each item, including date of submission, review, and the like. List to be kept up-to-date throughout entire construction period.
- H. Submit shop drawings and manufacturer's data for the following items in accordance with the Contract Documents:
 1. Coordinated, detailed shop layout drawings of all mechanical rooms, services and distribution systems, including plans, profiles and Sections.
 2. Details of piping supports, elbows, anchors and miscellaneous appurtenances.
 3. Hangers, supports, inserts, anchors, guides and foundations.
 4. Valves.
 5. Pressure gauges and thermometers.

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6. Corrosion protective coatings.
7. Equipment and piping layouts at 3/8 in. scale for the building.
8. Location and size of sleeves for openings in floors and walls.
9. Certified equipment performance curves for pumps.
10. Schedule of pipe and fittings, materials and application, valves, escutcheons, air vents, valve tags and schedules, strainers, and water specialties.
11. Flashing.
12. Equipment identification and certificates.
13. Water heaters and accessories.
14. Plumbing fixture and trim.
15. UL listed and tested fire stopping systems with location and type of penetration indicated.
16. Other shop drawings and submittals as requested within the specification.

1.11 START-UP

- A. Check and clean all pipes of dirt and debris, including strainers.
- B. Prepare each piece of equipment in accordance with manufacturer's installation instructions and have a copy at the equipment.
- C. Fill and vent all water systems.

1.12 ACCESS DOORS IN FINISHED CONSTRUCTION

- A. Furnish access doors as required for operation and maintenance of concealed equipment, clean-outs, valves, shock absorbers, controls, etc., and coordinate their delivery with the installing trade.
- B. Coordinate and prepare a location, size and function schedule of access doors required and deliver to the installing Contractor and the Architect for review.
- C. Doors shall be of a size required for operating and repacking valves, and shall be as manufactured by Karp Associates, Nystrom Inc., or Mifab.
- D. Unless otherwise indicated, minimum size to be 18" x 18".
- E. Furnish color coded buttons or tabs to indicate location of valves or other equipment located above removable type ceilings where access doors are not required.
- F. Access doors shall have a fire rating compatible with the wall construction in which they are located and be installed in accordance with a UL system listing requirements.

1.13 PRODUCT, DELIVERY, HANDLING AND STORAGE

- A. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- B. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and the weather until installation. Replace equipment damaged in the course of handling without additional charge.
- C. Arrange for and provide storage space or area at the job site for all materials and equipment to be received and/or installed in this project.
- D. Protect from damage, water, dust, etc., materials, equipment and apparatus provided under this trade, both in storage and installed.

1.14 ACCESSIBILITY

- A. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.
- B. Group concealed valves, expansion joints, controls, dampers, and equipment requiring access, so as to be freely accessible through access doors.

1.15 CUTTING AND PATCHING

- A. Provide all cutting and patching required for proper installation of materials and equipment specified. Do not cut or drill structural members without review and written approval by Architect and Structural Engineer.

1.16 GUARANTEE

- A. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date of actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

1.17 PERMITS AND FEES

- A. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for, and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

1.18 CLEANING

- A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.
- B. Clean and repair painted exposed work, soiled or damaged, to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of material and equipment.

1.19 OPERATING & MAINTENANCE INSTRUCTION

- A. Prepare operating and maintenance instructions manual including operating instructions, maintenance instructions, manufacturer's data, specific equipment data.
- B. Provide an alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
- C. Provide operating instructions for complete system, including:
 - 1. Normal starting, operating, and shut-down
 - 2. Emergency procedures for fire or failure of major equipment
- D. Provide maintenance instructions, including:
 - 1. Valve tag list and equipment tag list
 - 2. Proper lubricants and lubricating instructions for each piece of equipment, and date when lubricated
 - 3. Required cleaning, replacement and/or adjustment schedule
- E. Provide manufacturer's data on each piece of equipment, including:
 - 1. Installation instructions.
 - 2. Drawings and specifications.
 - 3. Parts list, including recommended items to be stocked.
 - 4. Complete wiring and temperature control diagrams.
 - 5. Marked or revised prints locating all concealed parts and all variations from the original system design.
 - 6. Test and inspection certificates.
- F. Provide specific equipment data including, but not limited to, the following:
 - 1. For Plumbing Systems:
 - a. Valves.

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- b. Piping.
 - c. Accessories.
 - d. Water heaters.
 - e. Water meters.
 - f. Toilet fixtures and supports.
 - g. Toilet fixture trim.
 - h. Flow measuring devices.
 - i. Electric wiring.
- G. Provide instruction of operating personnel.
- 1. Instruct Owner's operating personnel in proper starting sequences, operation, shutdown, and maintenance procedures, including normal and emergency procedures.
 - 2. Instruction to be by personnel skilled in operation of equipment. Instructions for major equipment to be by equipment manufacturers' representatives.
 - 3. Make arrangements to give instructions by system and not by building areas.
 - 4. Provide five (5) instruction sessions not to exceed six (6) hours each.
 - 5. Instructions on automatic controls to be by manufacturer's representative.
- H. Submittals
- 1. Shop Drawings: Submit three copies for review prior to final issuance.
 - 2. Provide six (6) copies of each operation and maintenance manual.
 - a. Manuals to be 8-1/2" x 11 size in hard-back, 3-ring loose leaf binders. Use more than one volume if required. Do not overfill binders.
 - b. Manuals to be completed and delivered to the Engineer for approval at least 20 days prior to instruction of operating personnel.
 - 3. Prepare separate manuals for the Plumbing system.

1.20 TOOLS FOR OPERATION, ADJUSTMENT AND MAINTENANCE

- A. Deliver to Owner's representative all special tools needed for proper operation, adjustment and maintenance of equipment.

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PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 NOT USED.

END OF SECTION

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SECTION 230000

GENERAL PROVISIONS FOR HEATING, VENTILATING AND AIR CONDITIONING WORK

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 DEFINITIONS

- A. "Provide": to furnish, install, and make complete, safe, and operable, the particular work referred to unless specifically indicated otherwise.
- B. "Furnish" or "supply": to purchase, procure, acquire, and deliver complete with related accessories.
- C. "Install": to erect, mount, and make complete with related accessories.
- D. "Work": includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation for fully functioning and operational systems.
- E. "Piping": includes pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related accessories.
- F. "Wiring": includes wire, raceway, fittings, boxes, and related accessories.
- G. "Concealed": not in view, installed in masonry or other construction, within furred spaces, double partitions, hung ceilings, trenches, crawl spaces, or enclosures.
- H. "Exposed": in view, not installed underground or "concealed" as defined above.
- I. "Indicated," "shown," or "noted": as indicated, shown or noted on drawings or specifications.
- J. "Similar" or "equal": to base bid manufacturer, equal in quality, materials, weight, size, performance, design and efficiency of specified product, conforming with "Base Bid Manufacturers" as determined and approved by Engineer.
- K. "Approved": satisfactory as reviewed.
- L. "Accepted As Noted": accepted with comments.
- M. "Revise and Resubmit": resubmit with revisions.
- N. "Disapproved": not approved.
- O. "Submit Specified Item": provide specified item directed by Engineer.
- P. "Reviewed": assessed for reference only final approval by others.

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Q. "Substitutions": Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

1.2 WORK INCLUDED

- A. The work covered by this section includes the construction described in the Contract Documents, labor necessary to perform and complete such construction, materials and equipment incorporated or to be incorporated in such construction, and services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Related Work not Included in this Division but Specified Elsewhere:
 - 1. Requirements of GENERAL CONDITIONS and Division No. 1.
 - 2. Finish painting, except for prefinished equipment or as otherwise specified.
 - 3. Base flashing for piping, ductwork, etc.
 - 4. Waterproofing.
 - 5. Power wiring for motors and motor controllers.
 - 6. Cutting and patching.

1.3 DESCRIPTION OF BID DOCUMENTS

- A. Specifications describe quality and character of materials and equipment.
- B. Drawings are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation. Provide additional offsets, fittings, hangers, supports, valves, drains as required for construction and coordination with work of other trades.
- C. Scaled and indicated dimensions are approximate and are for estimate purposes only. Before proceeding with work, check and verify dimensions and field conditions.
- D. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
- E. Typical details, where shown on the drawings, apply to each item of the project where such items are applicable. Typical details are not repeated in full on the plans, and are diagrammatic only, but with the intention that such details shall be incorporated in full.
- F. If any part of Specifications or Drawings appears unclear or contradictory, consult Architect and/or Engineer for interpretation and decision as early as possible during bidding period. Do not proceed with work without the Architect's and/or Engineer's decision.

1.4 COORDINATION OF WORK

- A. The drawings show the general arrangement of equipment, piping, ductwork, and appurtenances. Follow these drawings as closely as the actual construction will permit.

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Conform the work to the requirements shown on the drawings. Provide offsets, fittings, and accessories which may be required but not shown on the drawings. Investigate the site, structural and finish ground conditions affecting the work, and arrange the work accordingly. Provide such work and accessories as may be required to meet such conditions.

- B. Certain materials will be provided under other Sections of work. Examine the Contract Documents to ascertain these requirements.
- C. Carefully check space requirements with other Sections to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings.
- D. Transmit to other Sections all information required for work to be provided under those Sections, in ample time for installation.
- E. Wherever work interconnects with work specified under other Sections, coordinate those sections of work to insure that all necessary information is presented so that all the necessary connections and equipment may be properly installed. Identify all items (valves, piping, equipment, etc.) in order that access doors and panels can be properly located.
- F. Furnish and set all sleeves for passage of pipes through structural masonry, concrete walls, floors, and elsewhere as required for the proper protection of pipes passing through building surfaces.
- G. Provide required supports and hangers for piping and equipment, designed so as not to exceed allowable loadings of structures.
- H. Examine and compare the contract drawings and specifications with the drawings and specifications of other disciplines, and report any discrepancies between them to the Engineer and obtain from them written instructions for changes necessary in the work of this Section. Install and coordinate the work of this Section in cooperation with installing interrelated work. Before installation, take proper provisions to avoid interferences. All changes required in the work, caused by their neglect to do so, to be made at no additional expense. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship and report any conditions which prevent performance of first class work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.
- I. Wherever the work is of sufficient complexity, prepare additional detail drawings. Such detailed work is to be clearly identified on the drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion, however, include a set of such drawings with each set of as-built drawings. When directed by the Engineer, submit drawings for review, clearly showing the work of this Section and its relation to the work of other disciplines before commencing shop fabrication or erection in the field.
- J. Provide required anchor bolts, sleeves, inserts, and supports designed so as not to exceed allowable loadings of structures. Locate anchors, bolts, sleeves, inserts, and supports to insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports to be paid for by the Contractor.

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- K. Adjust location of pipes, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each pipe prior to fabrication.
1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch, i.e., plumbing drains. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
 2. Make offsets, transitions and changes in direction in pipes as required to maintain proper head room and pitch on sloping lines whether or not indicated on the drawings. Furnish and install all traps, air vents, drains, etc., as required to offset, transition, and change in direction.
- L. Install all mechanical work to permit the removal (without damage to other parts) of equipment requiring periodic replacement or maintenance. Arrange ducts, pipes, and equipment to permit access to valves, cocks, starters, motors, and control components, and to clear the openings of swinging doors and access panels.
- M. Coordinated Composite Drawings
1. The Contractor shall prepare full coordinated composite drawings for the mechanical, electrical, plumbing, and fire protection work. The Contractor shall overlay each discipline's work (in separate colors) on a set of shop drawings. Conflicts and potential conflicts shall be clearly identified. This shall include but not be limited to conflicts with lights, equipment, piping, ductwork and supports of other trades, as well as conflicts with architectural and structural walls, columns, ceilings and structural beams. The contractor shall have representative(s) attend a weekly job site coordination meeting in the field office. All trades shall resolve conflicts at these meetings and sign off each shop drawing indicating acceptance and satisfactory resolution to all conflicts. All conflicts that cannot be resolved shall be brought to the attention of the Engineer for resolution.

1.5 CONTRACTOR'S RESPONSIBILITY FOR EVALUATION

- A. The Contractor shall review all available data on the location and types of underground utilities. The Contractor shall not operate equipment over the utilities and shall take care not to damage them or otherwise impair their use. The Contractor shall make investigation to verify the location of these utilities before proceeding with construction and/or operations in their vicinity.
- B. The Engineer and Owner make no representations, regarding the character or extent of the subsoils, water levels, existing structural, mechanical, and electrical installations, above or below ground or other subsurface conditions which may be encountered during the work. The contractor must make their own evaluation of existing conditions which may affect methods or cost of performing the work, based on their own examination of the facility or other information. Failure to examine the drawings or other information shall not relieve the contractor of their responsibility for satisfactory accomplishment of the work.
- C. The locations of existing utilities are believed to be as indicated on the plans. The Contractor shall verify the location of these utilities prior to commencing any work and notify the Engineer of any discrepancies.

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D. Inspection of Site Conditions.

1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.

E. Connections to existing work:

1. Install new work and connect to existing work with minimum interference to existing facilities.
2. Provide temporary shutdowns of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities.
3. Alarm and emergency systems shall not be interrupted without alternative arrangements.
4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity required.
6. Perform service disconnections only after regular working hours.

1.6 ACCESS TO FIRE PROTECTION EQUIPMENT

- A. The Contractor shall not interfere with access to hydrants, fire exits, fire hose stations, fire extinguishers and fire alarm pull stations. In no case shall the Contractor's material or equipment be within twenty five (25) ft of a hydrant or fire alarm pull station.

1.7 EQUIPMENT AND MATERIALS

- A. If products and materials are specified or indicated on the drawings for a specific item or system, the Contractor shall use those products or materials. If products and materials are not listed in either of the above, use first class products and materials, in accordance with shop drawings.
- B. All products and materials shall be new, clean, free of defects, damage, and corrosion.
- C. No permanent equipment shall be used to provide services during construction.
- D. Ship and store all products and materials in a manner which will protect them from damage, weather, and entry of debris. If items are damaged, do not install, but take immediate steps to obtain replacement or repair.
- E. Make certain that all materials selected directly, or by suppliers, conform to the requirements of the contract drawings and specification. Transmittal of such specifications and drawings, information to persons manufacturing and supplying materials to the project, and rigid adherence thereto, is the Contractor's responsibility. Acceptance of a manufacturer's name by the Engineer does not release the Contractor of the responsibility for providing materials which comply in all respects with the requirements in the Contract Documents.

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- F. Applicable equipment and materials to be listed by Underwriters' Laboratories (UL) and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by local authorities having jurisdiction.
- G. Fully lubricate all equipment when installed and prior to final acceptance.
- H. Do not put systems in operation until piping and ductwork has been tested and cleaned.
- I. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment. Provide one copy of such instructions to the Engineer before installing any equipment. Provide a copy of such instructions at the equipment.

1.8 SUBSTITUTIONS

- A. Substitution limitations:
 - 1. Products specified by Reference Standards or by description only: Use any product meeting those standards or description.
 - 2. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer or model not named.
 - 3. Products specified by naming one manufacture's model number:
No substitutions accepted after procurement.
- B. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and design team for review or redesign services associated with re-approval by authorities.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
 - 2. Savings to Owner for accepting substitution.

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3. Change to Contract Time due to accepting substitution.
- D. Substitution Procedures During Procurement
1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
 2. Owner and Engineer will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.
- E. Substitution Procedures During Construction
1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
 2. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
 3. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
- F. Resolution
1. Engineer may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
 2. Engineer will notify Contractor in writing of decision to accept or reject substitution request. Engineer's decision following review of proposed substitution will be noted on the submitted form.

1.9 QUALITY ASSURANCE

- A. All equipment and accessories shall be the product of manufacturers regularly engaged in their manufacture. All items of a given type shall be the products of the same manufacturer.
- B. Furnish all equipment and accessories new and free from defects.
- C. All electrical equipment shall be listed by Underwriters' Laboratories, Inc. (UL) or bear UL labels.
- D. Supply all equipment and accessories in complete compliance with and in accordance with the applicable standards listed in reference standards of this Section and with all applicable national, state and local codes.

1.10 JOB CONDITIONS

- A. Inspection of Site Conditions:

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1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.
- B. Connections to existing work:
1. Install new work and connect to existing work with minimum interference to existing facilities.
 2. Provide temporary shutdown of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities.
 3. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 4. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition.
- C. Removal and relocation of existing work.
1. Disconnect, remove, or relocate mechanical material, equipment, and other work noted and required by alterations, modifications, or changes in existing construction.
 2. Provide new material and equipment required for relocated equipment.
 3. Plug or cap active piping or ductwork behind or below finish.
 4. Dispose of removed mechanical equipment as directed.

1.11 CLEARANCE FROM ELECTRICAL EQUIPMENT

- A. Piping and ductwork is prohibited in electric and telephone rooms and closets, elevator machine rooms, and for installations over or within 5 ft of transformers, substations, switchboards, motor control centers, standby power plants, and motors.
- B. Branch piping to equipment is acceptable when installed over or within 5 ft of motors.
- C. Provide drip pans under all water and drainage piping when installation over or within 5 ft of electrical apparatus is unavoidable or in rooms containing electrical equipment. Pan shall be reinforced, properly supported and made watertight. Provide enclosed type for pressure piping. Extend 1-1/4 in. drain pipe from pan to spill over nearest floor drain or as indicated on drawings.
 1. Construction shall be 18 gauge galvanized sheet steel.

1.12 SHOP DRAWINGS

- A. Prepare and submit detailed shop drawings for piping work and other distribution services, including locations and sizes of all openings in floor walls and roofs.

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- B. The work described in any shop drawing submission to be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. Each submitted shop drawing to include a certification that all related job conditions have been checked and that no conflict exists.
- C. All drawings to be submitted sufficiently in advance of field requirements to allow (15) days for checking. All submittals to be complete and contain all required and detailed information. Shop drawings with multiple parts to be submitted as a package.
- D. If submittals differ from the Contract Document requirements, make specific mention of such difference in a letter of transmittal, with request for substitution, together with reasons for same.
- E. Review of any submitted data or shop drawings for material, equipment apparatus, devices, arrangement and layout shall not relieve the Contractor from responsibility of furnishing same of proper dimensions and weight, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Work. Such review shall not relieve the Contractor from responsibility for errors, omissions or inadequacies of any sort on submitted data or shop drawings.
- F. Each shop drawing is to contain the job title, the name and phone numbers of the Contractor, references to the applicable design drawing or specification article, date and scale.
- G. Within three (3) weeks after award of Contract, submit a list of all shop drawings which will be submitted in the course of the project. List to show disposition of each item, including date of submission, review, and the like. List to be kept up-to-date throughout entire construction period.
- H. Submit shop drawings and manufacturer's data for the following items in accordance with the Contract Documents:
 - 1. Coordinated, detailed shop layout drawings of all mechanical rooms, services and distribution systems, including plans, profiles and Sections.
 - 2. Details of piping supports, elbows, anchors and miscellaneous appurtenances.
 - 3. Hangers, supports, inserts, anchors, guides and foundations.
 - 4. Equipment and piping layouts at 3/8 in. scale for the building.
 - 5. Location and size of sleeves for openings in floors and walls.
 - 6. Schedule of pipe and fittings, materials and application, valves, escutcheons, air vents, valve tags and schedules, strainers, and water specialties.
 - 7. Building automation systems including descriptions, instruments, and alarms.
 - 8. Flashing.
 - 9. Equipment identification and certificates.

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10. UL listed and tested fire stopping systems with location and type of penetration indicated.
11. Other shop drawings and submittals as requested within the specification.

1.13 START-UP

- A. Properly lubricate all pieces of equipment.
- B. Check and clean all pipes of dirt and debris, including strainers.
- C. Prepare each piece of equipment in accordance with manufacturer's installation instructions and have a copy at the equipment.
- D. Fill and vent all water systems.
- E. Check rotation on each motor.
- F. Have representatives of each manufacturer present when hereinafter specified, so that equipment will be started up by manufacturer.

1.14 PRODUCT, DELIVERY, HANDLING AND STORAGE

- A. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- B. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and the weather until installation. Replace equipment damaged in the course of handling without additional charge.
- C. Arrange for and provide storage space or area at the job site for all materials and equipment to be received and/or installed in this project.
- D. Protect from damage, water, dust, etc., materials, equipment and apparatus provided under this trade, both in storage and installed.

1.15 ACCESSIBILITY

- A. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.
- B. Group concealed valves, expansion joints, controls, dampers, and equipment requiring access, so as to be freely accessible through access doors.

1.16 CUTTING AND PATCHING

- A. Provide all cutting and patching required for proper installation of materials and equipment specified. Do not cut or drill structural members without review and written approval by Architect and Structural Engineer.

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1.17 GUARANTEE

- A. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date of actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

1.18 PERMITS AND FEES

- A. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for, and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

1.19 POST-INSTALLED ANCHORS

- A. Quality Assurance:
1. Use Post-Installed Anchors that have been designed and tested in accordance with:
 - a. NYS: ACI 318, as amended by NYSBC Section 1905.
 - b. Current ICC-ES reports considered evidence of successful testing.
 2. Acceptable Manufacturers:
 - a. Hilti, Inc: www.us.hilti.com.
 - b. Simpson Strong-Tie Company, Inc.: www.strongtie.com
 - c. DeWalt Anchors and Fasteners: www.anchors.dewalt.com/anchors.
- B. Provide Post-Installed Anchors as follows:
1. Anchor shall have a current ICC-ES report for the base material.
 2. Select and install anchor based on concrete strength indicated by core tests. Otherwise, assume 2,000 psi concrete.
 3. Provide AISI 316 Stainless Steel Post-Installed Anchors in corrosive environments.
 4. All anchors installed on underside of concrete slab shall be approved for use in cracked concrete.

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5. Spacing and edge distance of anchors shall conform to the requirements of the structural engineer or anchor manufacture.
 6. Use a safety factor of 4 to the proof tensile load of the anchor when determining the allowable design tensile load.
- C. Installation Requirements:
1. Comply with post-installed anchor manufacturer's recommendations for adhesive storage temperature and conditions for adhesive anchors before, during and after installation.
 2. Only store solvent-cured materials in ventilated areas.
 3. Follow OSHA requirements when performing any drilling that can result in silica dust.
 4. Post-installed adhesive anchors installed overhead shall be installed by persons certified by ACI to perform such installations.
 5. All post-installed anchors shall be installed in accordance with manufacturer's installation instructions and current ICC-ES reports.
- D. Inspection of Post-Installed Anchors:
1. Method of inspection shall be at the discretion of the Special Inspector.
 2. Contractor shall provide all required information, drawings, equipment documentation, etc. requested by the Special Inspector a minimum of 10 working days in advance of the inspection.
 3. Periodic Inspection: Mechanical and screw anchors installed in any orientation are subject to periodic inspection. Frequency of inspections shall be at the Special Inspector's discretion.

1.20 FIRESTOPPING

- A. Refer to specifications section 078400 for additional requirements..
- B. Quality Assurance:
1. Use firestopping systems that have been tested in accordance with ASTM E814 or UL 1479. Listing by UL (DIR), UL (FDR), FM (AG), or ITS (DIR) in their certification directories will be considered evidence of successful testing.
 2. Manufacturer Qualifications: Company specializing in manufacturing the products for use in fire rated assemblies with minimum three years documented experience.
 - a. 3M Fire Protection Products: www.3m.com/firestop.
 - b. Hilti, Inc: www.us.hilti.com.
 - c. Specified Technologies Inc: www.stifirestop.com.

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C. Firestopping Assembly Requirements

1. For membrane and through penetrations, provide firestopping materials to create a listed system, for the assembly being penetrated and field conditions, that have the following properties, except as otherwise permitted by the Building Code:
 - a. Fire Resistance: Provide systems that have been tested to show F-Rating equal to required fire rating of penetrated assembly.
 - b. Temperature Rise: Provide systems that have been tested to show T-Rating equal to or greater than the F-Rating.
 - c. Air Leakage: Provide systems that have been tested to show L-Rating is equal to or greater than the L-Rating of joints in assembly being penetrated.
 - d. Watertightness: Provide systems that have been tested to meet a Class 1 W-Rating for floor penetrations.

D. Field Conditions

1. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
2. Provide ventilation in areas where solvent-cured materials are being installed.

E. Inspection of Firestopping Systems

1. Method of inspection shall be at the discretion of the Special Inspector. Contractor shall provide all required information, coordinate with Special Inspector at least 10 days in advance of fire stop installation, and arrange site access. Contractor shall completely remove and restore all firestopping that has undergone destructive testing. No claims for additional cost or time will be allowed.
2. Visual Inspection: Special Inspector shall be onsite during installation and randomly witness a minimum of 10% of each type of fire stop being installed.
3. Destructive Testing: Verification of firestopping after installation has taken place. A minimum of 2%, but not less than one, of each type of fire stop shall be inspected per floor or each area of a floor when a floor area is larger than 10,000 sq. ft.

1.21 OPERATING & MAINTENANCE INSTRUCTION

- A. Prepare operating and maintenance instructions manual including operating instructions, maintenance instructions, manufacturer's data, specific equipment data.
- B. Provide an alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
- C. Provide operating instructions for complete system, including:

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1. Normal starting, operating, and shut-down
 2. Emergency procedures for fire or failure of major equipment
 3. Summer and winter special procedures
 4. Day and night special procedures
- D. Provide maintenance instructions, including:
1. Valve tag list and equipment tag list
 2. Proper lubricants and lubricating instructions for each piece of equipment, and date when lubricated
 3. Required cleaning, replacement and/or adjustment schedule
- E. Provide manufacturer's data on each piece of equipment, including:
1. Installation instructions.
 2. Drawings and specifications.
 3. Parts list, including recommended items to be stocked.
 4. Complete wiring and temperature control diagrams.
 5. Marked or revised prints locating all concealed parts and all variations from the original system design.
 6. Test and inspection certificates.
- F. Provide specific equipment data including, but not limited to, the following:
1. For Plumbing Systems:
 - a. Piping.
 - b. Accessories.
 - c. Electric wiring.
 2. For Automatic Control System:
 - a. Drawings and description of system controlled.
 - b. Sequence of operation for each system.
 - c. Data on components.
 - d. Wiring and piping, schematic any layout, for panels and panelboards.
 - e. System operating manual, including set points.

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G. Provide instruction of operating personnel.

1. Instruct Owner's operating personnel in proper starting sequences, operation, shutdown, and maintenance procedures, including normal and emergency procedures.
2. Instruction to be by personnel skilled in operation of equipment. Instructions for major equipment to be by equipment manufacturers' representatives.
3. Make arrangements to give instructions by system and not by building areas.
4. Provide five (5) instruction sessions not to exceed six (6) hours each.
5. Instructions on automatic controls to be by manufacturer's representative.

H. Submittals

1. Shop Drawings: Submit three copies for review prior to final issuance.
2. Provide six (6) copies of each operation and maintenance manual.
 - a. Manuals to be 8-1/2" x 11 size in hard-back, 3-ring loose leaf binders. Use more than one volume if required. Do not overfill binders.
 - b. Manuals to be completed and delivered to the Engineer for approval at least 20 days prior to instruction of operating personnel.
3. Prepare separate manuals for the Plumbing system.

1.22 TOOLS FOR OPERATION, ADJUSTMENT AND MAINTENANCE

- A. Deliver to Owner's representative all special tools needed for proper operation, adjustment and maintenance of equipment.

1.23 BASE BID MANUFACTURERS

- A. Base bid materials or equipment are specified by name of manufacturer, brand or trade name and catalog reference.
- B. The choice will be optional with bidder where two or more manufacturers are named.
- C. Manufacturers, other than specified, will only be considered if at the time of bid, manufacturers' names and proposed substitutions are named and stated and the difference in base bid is indicated including changes in the cost of all affected work. Detail equality and difference, item by item, for submission of manufacturers' equipment other than specified.
- D. The following are base bid manufacturers for items under this Section:
1. Inserts: F and S Mfg Co., Fee and Mason and Grinnell.
 2. Hangers and supports: I.T.T. Grinnell, Carpenter and Patterson, Inc., and Fee & Mason.

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1.24 EXPANSION ANCHORS

- A. Provide smooth wall, non-self-drilling internal plug expansion type anchors constructed of AISC 12L14 steel and zinc plated in accordance with Fed. Spec. QQ-A-325 Type 1, Class 3.
- B. Do not exceed 1/4 of average values for a specific anchor size using 2000 psig (13,800 kpa) concrete only, for maximum working load.
- C. Provide spacing and install anchors in accordance with manufacturer's recommendations.

1.25 FIELD QUALITY CONTROL

- A. Perform tests as noted, and as required by governing authority having jurisdiction in the presence of Architect and/or Engineer and authorities having jurisdiction.
- B. Provide all required labor, material, equipment, and connections necessary for tests and submit results for review.
- C. Repair or replace defective work and pay for restoring or replacing damaged work due to tests, and retest to the satisfaction of the Architect/Engineer and governing authorities having jurisdiction.
- D. Pay for following required services:
 - 1. Controlled Inspection services as required by the Authority having jurisdiction.

1.26 CLEANING

- A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.
- B. Clean and repair painted exposed work, soiled or damaged, to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of material and equipment.

END OF SECTION

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SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

SECTION 230517

SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

A. SECTION INCLUDES

1. Pipe sleeves.
2. Pipe-sleeve seals.

B. REFERENCE STANDARDS

C. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2022a.

D. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.

E. FM (AG) - FM Approval Guide; Current Edition.

F. UL (DIR) - Online Certifications Directory; Current Edition.

G. SUBMITTALS

1. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

H. QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
2. Installer Qualifications: Company specializing in performing work of the type specified this section.
 - a. Minimum three years experience.
 - b. Approved by manufacturer.
3. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

I. DELIVERY, STORAGE, AND HANDLING

1. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

J. WARRANTY

1. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 PIPE SLEEVES

A. Manufacturers:

1. Flexicraft Industries; Pipe Wall Sleeve: www.flexicraft.com/#sle.

2.2 PIPE-SLEEVE SEALS

A. Manufacturers:

1. Flexicraft Industries; PipeSeal: www.flexicraft.com/#sle.

B. Modular Mechanical Sleeve-Seal:

1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
3. Size and select seal component materials in accordance with service requirements.
4. Glass-reinforced plastic pressure end plates.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 1. Aboveground Piping:
 - a. Pack solid using mineral fiber in compliance with ASTM C592.
 - b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
 2. All Rated Openings: Caulk tight with fire stopping material in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

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- E. Manufactured Sleeve-Seal Systems:
1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
 2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
 3. Locate piping in center of sleeve or penetration.
 4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
 5. Tighten bolting for a water-tight seal.
 6. Install in accordance with manufacturer's recommendations.
- F. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

END OF SECTION

SECTION 230523
GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Ball valves.
- B. Check valves.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 230553 - Identification for HVAC Piping and Equipment.
- C. Section 230719 - HVAC Piping Insulation.
- D. Section 232113 - Hydronic Piping.

1.3 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.
- J. WSP: Working steam pressure.

1.4 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- B. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves; 2022, with Errata (2023).

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- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- D. ASME B31.9 - Building Services Piping; 2020.
- E. MSS SP-45 - Drain and Bypass Connections; 2020.
- F. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves; 2019.
- G. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.6 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Obtain valves for each valve type from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
 - 2. Protect valve parts exposed to piped medium against rust and corrosion.
 - 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
 - 4. Secure check valves in either the closed position or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 - 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors in dry environment.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- B. Provide the following valves for the applications if not indicated on drawings:
 - 1. Isolation (Shutoff): Ball.
- C. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.
- D. Required Valve End Connections for Non-Wafer Types:
 - 1. Copper Tube:
 - a. Size 2 inch and Smaller: Threaded ends, except solder-joint valve-ends.

2.2 GENERAL REQUIREMENTS

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
 - 1. Hand Lever: Quarter-turn valves 1.5 inch and smaller.
- D. Valves in Insulated Piping: Provide 2 inch stem extensions and the following features:
 - 1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- E. Valve-End Connections:
 - 1. Threaded End Valves: ASME B1.20.1.
 - 2. Solder Joint Connections: ASME B16.18.
- F. General ASME Compliance:
 - 1. Building Services Piping Valves: ASME B31.9.
- G. Valve Bypass and Drain Connections: MSS SP-45.
- H. Source Limitations: Obtain each valve type from a single manufacturer.

2.3 BRASS, BALL VALVES

- A. One Piece, Full Port with Brass Trim and Push-to-fit or Threaded Connections:

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1. Comply with MSS SP-110.
2. CWP Rating: 200 psi.
3. Body: Forged brass.
4. Ends: Threaded.
5. Seats: PTFE or TFE.
6. Stem: Brass.
7. Ball: Chrome-plated brass.

2.4 BRASS, HORIZONTAL SWING CHECK VALVES

- A. Threaded End-Connections:
 1. Class 125: CWP Rating: 200 psi.
 2. Body: Forged brass.
 3. Disc: Forged brass.
 4. Hinge-Pin, Screw, and Cap: Forged brass.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges, are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

END OF SECTION

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HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
SECTION 230529
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PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Support and attachment components.

1.2 RELATED REQUIREMENTS

- A. Section 230548 - Vibration and Seismic Controls for HVAC.

1.3 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2023.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- K. FM (AG) - FM Approval Guide; Current Edition.

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- L. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- M. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL (DIR) - Online Certifications Directory; Current Edition.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for post-installed concrete and masonry anchors and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
 - 1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Hanger Rods:
 - 1. Threaded zinc-plated steel unless otherwise indicated.
 - 2. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Piping up to 1 inch: 1/4 inch diameter.

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- c. Trapeze Support for Multiple Pipes: 3/8 inch diameter.

C. Thermal Insulated Pipe Supports:

1. General Requirements:

- a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
- c. Pipe supports to be provided for nominally sized, 1/2 to 30 inch iron pipes.
- d. Insulation inserts to consist of rigid polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.

2. PVC Jacket:

- a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
- b. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
- c. Thickness: 60 mil.

D. Beam Clamps:

1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

E. Pipe Hangers:

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1. Split Ring Hangers:
 - a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
 - b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
 - c. Provide hanger rod and nuts of the same type and material for a given pipe run.
 - d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
2. Clevis Hangers, Adjustable:
 - a. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
 - b. Felt-Lined: MSS SP-58 Type 1, zinc-plated, silicone-free carbon steel.
 - c. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
- F. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- G. Pipe Shields for Insulated Piping:
 1. General Construction and Requirements:
 - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
 - b. Shields Material: UV-resistant polypropylene with glass fill.
 - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
 - d. Minimum Service Temperature: Minus 40 degrees F.
 - e. Maximum Service Temperature: 178 degrees F.
 - f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- H. Anchors and Fasteners:
 1. Manufacturers - Mechanical Anchors:
 - a. Hilti, Inc: www.us.hilti.com/#sle.
 - b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
 - c. Powers Fasteners, Inc: www.powers.com/#sle.
 2. Manufacturers - Powder-Actuated Fastening Systems:
 - a. Hilti, Inc: www.us.hilti.com/#sle.

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b. Powers Fasteners, Inc: www.powers.com/#sle.

3. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. Equipment Support and Attachment:
 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

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3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

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SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.
- E. Ceiling tacks.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- F. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Automatic Controls: Tags. Key to control schematic.
- C. Control Panels: Nameplates.

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- D. Major Control Components: Nameplates.
- E. Piping: Pipe markers.
- F. Thermostats: Nameplates.
- G. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com/#sle.
 - 2. Brimar Industries, Inc: www.pipemarker.com/#sle.
 - 3. Seton Identification Products, a Tricor Direct Company: www.seton.com/#sle.
 - 4. Letter Color: White.
 - 5. Letter Height: 1/4 inch.
 - 6. Background Color: Black.
 - 7. Plastic: Comply with ASTM D709.

2.3 TAGS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com/#sle.
 - 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products, a Tricor Company: www.seton.com/#sle.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- C. Metal Tags: Aluminum with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- D. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 STENCILS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com/#sle.
 - 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products, a Tricor Company: www.seton.com/#sle.

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4. Substitutions: See Section 016000 - Product Requirements.
- B. Stencils: With clean cut symbols and letters of following size:
 1. Ductwork and Equipment: 2-1/2 inch high letters.
- C. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.

2.5 PIPE MARKERS

- A. Manufacturers:
 1. Brady Corporation: www.bradycorp.com/#sle.
 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 3. Seton Identification Products, a Tricor Company: www.seton.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Color: Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

2.6 CEILING TACKS

- A. Manufacturers:
 1. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
- B. Description: Steel with 3/4 inch diameter color coded head.
- C. Color code as follows:
 1. HVAC Equipment: Yellow.
 2. Fire Dampers and Smoke Dampers: Red.
 3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

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3.2 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Apply stencil painting in accordance with Section 099123.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- F. Use tags on piping 3/4 inch diameter and smaller.
 - 1. Identify service, flow direction, and pressure.
 - 2. Install in clear view and align with axis of piping.
 - 3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- G. Install ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- H. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

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TESTING, ADJUSTING, AND BALANCING FOR HVAC
SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.

1.2 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).
- C. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; 2019.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2023.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Submit to Engineer.
 - 2. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - d. Final test report forms to be used.
 - e. Details of how TOTAL flow will be determined; for example:

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- 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
 - f. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 5. Units of Measure: Report data in I-P (inch-pound) units only.
 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Engineer.
 - g. Project Contractor.
 - h. Report date.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

4.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 1. AABC (NSTSB), AABC National Standards for Total System Balance.

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2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 3. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Having minimum of three years documented experience.
 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
 - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

4.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

4.3 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

4.4 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
1. Running log of events and issues.

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2. Discrepancies, deficient or uncompleted work by others.
 3. Contract interpretation requests.
 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

4.5 AIR SYSTEM PROCEDURE

- A. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- B. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- C. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

4.6 MINIMUM DATA TO BE REPORTED

- A. Air Cooled Condensers:
1. Identification/number.
 2. Location.
 3. Manufacturer.
 4. Model number.
 5. Serial number.
 6. Number of compressors.
- B. Air Moving Equipment:
1. Location.
 2. Manufacturer.
 3. Model number.

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4. Serial number.

END OF SECTION

**SECTION 230719
HVAC PIPING INSULATION**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 232113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
- C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).
- D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- E. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).
- F. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- G. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
- H. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- I. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2022.
- J. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

- K. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber; 2020.
- L. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- N. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER, RIGID

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Johns Manville Corporation: www.jm.com/#sle.

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HVAC PIPING INSULATION

3. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ:
www.ocbuildingspec.com/#sle.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 2. Maximum Service Temperature: 850 degrees F.
 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 2. Maximum Service Temperature: 650 degrees F.
 3. Maximum Moisture Absorption: 0.2 percent by volume.
- D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- F. Vapor Barrier Lap Adhesive: Compatible with insulation.
- G. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- H. Fibrous Glass Fabric:
 1. Cloth: Untreated; 9 oz/sq yd weight.
 2. Blanket: 1.0 pcf density.
 3. Weave: 5 by 5.
- I. Indoor Vapor Barrier Finish:
 1. Cloth: Untreated; 9 oz/sq yd weight.
 2. Vinyl emulsion type acrylic, compatible with insulation, black color.
- J. Insulating Cement: ASTM C449.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- F. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.
- G. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

3.3 SCHEDULE

- A. Cooling Systems:
 - 1. Condensate Drains from Cooling Coils:
 - 2. Refrigerant Suction:
 - 3. Refrigerant Hot Gas:

END OF SECTION

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INFRASTRUCTURE UPGRADE PHASE I
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
SECTION 230913
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Thermostats:
 - 1. Electric thermostats.

1.2 RELATED REQUIREMENTS

- A. Section 230519 - Meters and Gauges for HVAC Piping: Thermometer sockets and gauge taps.
- B. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- C. Section 262726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B. NEMA BS 31032 - Residential Controls–Electrical Wall-Mounted Room Thermostats; 2025.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- B. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- C. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- D. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

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- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements for additional provisions.
 - 2. Extra Thermostats and Other Exposed Sensors: One of each type.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience approved by manufacturer.

1.7 WARRANTY

- A. Correct defective work within a five year period after Substantial Completion.
- B. Provide one year manufacturer's warranty for controls from date of final acceptance by Engineer.

PART 2 PRODUCTS

2.1 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.2 WALL-, SURFACE-, AND DUCT-MOUNT SENSORS

2.3 THERMOSTATS

- A. Electric Thermostats:
 - 1. Type: NEMA BS 31032, 24 volts, with setback/setup temperature control.
 - 2. Service: Cooling only.
 - 3. Covers: Locking with setpoint indication, with thermometer.
- B. Room-Mounted Thermostat Accessories:
 - 1. Thermostat Covers: plastic.
 - 2. Insulating Bases: For thermostats located on exterior walls.
 - 3. Thermostat Guards: Locking transparent plastic mounted on separate base.

4. Adjusting Key: As required for device.
5. Aspirating Boxes: Where indicated for thermostats requiring flush installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- F. Ensure installation of components is complementary to installation of similar components.
- G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats; see Section 262726.
- C. Mount freeze protection thermostats using flanges and element holders.
- D. Provide separable sockets for liquids and flanges for air bulb elements.
- E. Provide thermostats in aspirating boxes in front entrances.
- F. Provide guards on thermostats in entrances, public areas, and where indicated.
- G. Provide valves with position indicators and with pilot positioners where sequenced with other controls.
- H. Provide isolation (two-position) dampers of parallel blade construction.
- I. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- J. Mount control panels adjacent to associated equipment on vibration free walls or free-standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.

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- K. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- L. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.3 MAINTENANCE

- A. Provide a separate maintenance contract for specified maintenance service.
- B. Provide service and maintenance of control system for one year from Date of Substantial Completion.
- C. Provide complete service of controls systems, including call backs, and submit written report of each service call.
- D. In addition to normal service calls, make minimum of three complete normal inspections of approximately 2 hours duration to inspect, calibrate, and adjust controls.

END OF SECTION

**SECTION 232300
REFRIGERANT PIPING**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Flexible connections.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 230719 - HVAC Piping Insulation.
- C. Section 23 8129 - Variable Refrigerant Volume Systems.
- D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. AHRI 495 - Performance Rating of Refrigerant Liquid Receivers; 2005.
- B. AHRI 730 (I-P) - Flow Capacity Rating of Suction Line Filters and Suction Line Filter Driers; 2013 (Reapproved 2014).
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).
- D. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2022, with Errata (2024).
- E. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.
- F. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
- G. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- H. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
- I. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2022.

- J. ASME B31.9 - Building Services Piping; 2020.
- K. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2023.
- L. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
- M. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- O. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.
- P. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.
- Q. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. Product Data: Provide general assembly of specialties, including manufacturer's catalogue information. Provide manufacturer's catalog data including load capacity.
- B. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.
- C. Design Data: Submit design data indicating pipe sizing. Indicate load-carrying capacity of trapeze, multiple pipe, and riser support hangers.
- D. Test Reports: Indicate results of leak test, acid test.
- E. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.
- F. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.
- G. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design piping system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Filter-Driers:
 - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

2.2 REGULATORY REQUIREMENTS

2.3 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Copper Tube to 7/8-inch OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
- C. Pipe Supports and Anchors:
 - 1. Conform to ASME B31.5, ASTM F 708, MSS SP-58, MSS SP-69, and MSS SP-89.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel split ring adjustable copper plated. adjustable swivel, split ring.
 - 3. Vertical Support: Steel riser clamp.
 - 4. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 - 5. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.4 REFRIGERANT

- A. Refrigerant: 32 as defined in ASHRAE Std 34.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain-end ferrous pipe.

- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.5.
 - 2. Support horizontal piping as indicated.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 7. Provide copper plated hangers and supports for copper piping.
- G. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
- H. Provide clearance for installation of insulation and access to valves and fittings.
- I. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 083100.
- J. Flood piping system with nitrogen when brazing.
- K. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

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REFRIGERANT PIPING

- L. Prepare unfinished pipe, fittings, supports, and accessories for finish painting. See Section 099123.
- M. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.
- N. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.
- O. Fully charge completed system with refrigerant after testing.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Test refrigeration system in accordance with ASME B31.5.
- C. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test and repair piping until no leakage.

3.4 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
 - 1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - 2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.

END OF SECTION

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VARIABLE REFRIGERANT FLOW HVAC SYSTEMS
SECTION 238129
VARIABLE REFRIGERANT FLOW HVAC SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Air-source outdoor units.
- B. Refrigerant piping.
- C. Indoor units.

1.2 RELATED REQUIREMENTS

- A. Section 221005 - Plumbing Piping: Condensate drain piping.
- B. Section 230529 - Hangers and Supports for HVAC Piping and Equipment.
- C. Section 232300 - Refrigerant Piping.
- D. Section 260583 - Wiring Connections: Power connections to equipment.

1.3 PRICE AND PAYMENT PROCEDURES

- A. Alternates: Owner requests a bid Alternate for a system designed and manufactured by a manufacturer other than that listed as the Basis of Design.
 - 1. Alternate systems will be considered only under the terms described for Substitutions within this section.
 - 2. Contractor shall include with Contractor's bid the amount to be deducted from the bid amount if the alternate is accepted by the Owner.

1.4 REFERENCE STANDARDS

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.
- B. AHRI 1230 - Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment; 2021.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

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- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.6 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Pre-Bid Submittals: For proposed substitute systems/products, as defined in PART 2, and alternate systems/products, as defined above, proposer shall submit all data described in this article, under the terms given for substitutions stated in PART 2.
- C. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:
 - 1. Outdoor Units:
 - a. Refrigerant Type and Size of Charge.
 - b. Output and Input Cooling Capacity.
 - c. Output and Input Heating Capacity.
 - d. Operating Temperature Range, Cooling and Heating.
 - e. Fan Capacity: Flow in cfm with respective fan curves.
 - f. External Static Pressure (ESP): In-wc.
 - g. Sound Pressure Level: dB(A).
 - h. Electrical Data: Complete including motor size.
 - i. Maximum number of indoor units that can be served.
 - j. Maximum refrigerant piping run from outdoor unit to indoor unit(s).

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- k. Maximum height difference between outdoor unit to Indoor unit(s), both above and below.
- 2. Indoor Units:
 - a. Output and Input Cooling Capacity: Btu/h.
 - b. Output and Input Heating Capacity: Btu/h.
 - c. Fan Capacity: Flow in cfm with respective fan curves.
 - d. External Static Pressure (ESP): In-wc.
 - e. Electrical Data: Complete including motor size.
 - f. Maximum Lift of Built-in Condensate Pump.
- 3. Control Panels: Complete data of controllers, input-output points, and zones.
- D. Operating and Maintenance Data:
 - 1. Manufacturer's complete standard instructions for each unit of equipment and control panel.
 - 2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.
 - 3. Identification of replaceable parts and local source of supply.
- E. Project Record Documents: Record the following:
 - 1. As-installed routing of refrigerant piping and condensate piping.
 - 2. Locations of access panels.
 - 3. Locations of control panels.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Company that has been manufacturing variable refrigerant volume heat pump equipment for at least 5 years.
 - 2. Company that provides system design software to installers.
- B. Installer Qualifications: Trained and approved by manufacturer of equipment.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle equipment and refrigerant piping according to manufacturer's recommendations.

1.9 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Compressors: Provide manufacturer's warranty for 6 years from date of installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Daikin: www.daikinac.com/#sle.
- B. LG Electronics U.S.A., Inc: www.lghvac.com/#sle.
- C. Basis of Design: LG Electronics U.S.A., Inc; Mitsubishi Electric Trane HVAC US, LLC:
www.lghvac.com/#sle.
- D. Substitutions: Systems manufactured by other manufacturers will not be considered.
- E. Substitutions: Systems designed and manufactured by other manufacturers will be considered by Owner under the terms described for substitutions with the following exceptions:
 - 1. Substitutions: See Section 016000 - Product Requirements.
 - 2. Substitution requests will be considered only if received at least 10 days prior to the bid date.
 - 3. Substitution requests will be considered only if submitted data meets or exceed requirements listed in this section.
 - 4. Contractor (not equipment supplier) shall certify that the use of the substitute system and equipment will not require changes to other work or re-design by Engineer.
 - 5. Contractor or HVAC subcontractor shall certify that the substitute system will achieve the performance specified.
 - 6. Do not assume substitution has been accepted until formal written notice has been issued by Engineer.

2.2 VARIABLE REFRIGERANT FLOW SYSTEM

- A. Minimum System Requirements:
 - 1. System Testing, Capacity Rating, and Performance:
 - a. AHRI 1230 when cooling capacity is equal or greater than 65,000 Btu/h.
 - b. AHRI 210/240 when cooling capacity is below 65,000 Btu/h.
 - 2. Safety Certification: Bear UL 1995 tested and ITS (DIR) listed certification label.

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3. Outdoor Units: Furnish installation and surface support hardware products in accordance with ASCE 7 for wind restraint.
4. Cooling Mode Interior Performance:
 - a. Daytime Setpoint: 68 degrees F, plus or minus 2 degrees F.
 - b. Setpoint Range: 57 degrees F to 77 degrees F.
 - c. Night Setback: 78 degrees F.
 - d. Interior Relative Humidity: 20 percent, maximum.
5. Heating Mode Interior Performance:
 - a. Setpoint: 68 degrees F, plus or minus 2 degrees F.
 - b. Setpoint Range: 59 to 80 degrees F.
 - c. Night Setback: 60 degrees F.
 - d. Minimum Interior Relative Humidity: 10 percent RH.

2.3 AIR-SOURCE OUTDOOR UNITS

- A. Manufacturers:
 1. Air Conditioner, Cooling Outdoor Units:
 2. Heat Pump, Cooling or Heating Outdoor Units:
 - a. Daikin: www.daikinac.com/#sle.
 - b. LG Electronics U.S.A., Inc: www.lghvac.com/#sle.
 - c. Mitsubishi Electric Trane HVAC US, LLC: www.metahvac.com/#sle.
- B. Air Conditioning Type:
 1. DX refrigeration unit piped to one or more compatible indoor units either directly or indirectly through one or more intermediate refrigeration branch units.
- C. Unit Cabinet:
 1. Capable of being installed with wiring and piping to the left, right, rear or bottom.
 2. Designed to allow side-by-side installation with minimum spacing and vibration isolation.
 3. Weatherproof and corrosion resistant; rust-proofed mild steel panels coated with baked enamel finish.
 4. Sound Pressure Level: 55 dB measured at 3 feet from front of unit.

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D. Heat Sink Side:

1. Condenser Fans:
 - a. Provide minimum of 2 fans for each condenser within the outdoor unit.
 - b. Minimum External Static Pressure: Factory set at 0.12 in-wc.
 - c. Fan Type: Vertical discharging, direct-driven propeller type with variable speed operation using DC-controlled ECM motors mechanically connected using permanently lubricated bearings having whole assembly protected with fan guards.
2. Condenser Coils:
 - a. Hi-X seamless copper tubes expanded into aluminum fins to form mechanical bond; waffle louver fin and rifled bore tube design to ensure high efficiency performance.

E. Refrigeration Side:

1. Factory assembled and wired with instrumentation, switches, and controller(s) to handle unit specifics with direct coordination of remote controller(s) from indoor unit(s).
2. Refrigeration Circuit: ECM driven dual scroll compressors, fans, condenser heat sink coil, expansion valves, solenoid valves, distribution headers, capillaries, filters, shutoff valves, oil separators, service ports, and refrigerant regulator.
3. Refrigerant: R-32 factory charged. Controller to alarm when charge is below capacity.
4. Variable Volume Control: Modulate compressed refrigerant capacity automatically to maintain constant suction and condensing pressures under varying refrigerant volume required to handle remote loads. Include defrost control.
5. Provide refrigerant subcooling to ensure the liquid refrigerant does not flash when supplying to use indoor units.
6. Capable of heating operation at low end of operating range as specified, without additional low ambient controls or auxiliary heat source; during heating operation, reverse cycle, oil return, or defrost is not permitted due to potential reduction in space temperature.
7. Power Failure Mode: Automatically restarts operation after power failure without loss of programmed settings.
8. Safety Devices: High pressure sensor with cut-out switch, low pressure sensor with cut-out switch, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, overcurrent protection for the inverter and antirecycling timers.
9. Oil Recovery Cycle: Automatic, occurring 2 hours after start of operation and then every 8 hours of operation; maintain continuous heating during oil return operation.

F. Local Controls:

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1. Include factory-wired instruments, sensors, switches, and safeties for unit control.
- G. Power:
1. Electrical Requirement: 208 to 230 VAC, 1-phase, 60 Hz.
 2. Outdoor Mounted: Provide fused NEMA EN 10250 Type 4X disconnect switch.

2.4 REFRIGERANT PIPING

- A. Two-Pipe Run: Provide low-pressure vapor and high-pressure vapor gas pipes for each indoor unit selected for seasonal heating or cooling service.
- B. Three-Pipe Run: Provide low-pressure vapor, high-pressure vapor gas, and liquid pipes for each indoor unit selected for off-season heating and cooling changeover service.
- C. Refrigerant Flow Balancing: Provide refrigerant piping joints and headers specifically designed to ensure proper refrigerant balance and flow for optimum system capacity and performance; T-style joints are prohibited.

2.5 INDOOR UNITS

- A. Minimum Unit Requirements:
1. DX Evaporator Coil:
 - a. Copper tubes expanded into aluminum fins to form a mechanical bond; waffle louver fin and high heat exchange, rifled bore tube design; factory tested.
 - b. 2-, 3-, or 4-row cross fin design with 14 to 17 fins per inch and flare end-connections.
 - c. Provide thermistor on liquid and gas lines wired into local controller.
 - d. Refrigerant circuits factory-charged with dehydrated air for field charging.
 2. Fan Section:
 - a. Variable or three-speed ECM fan with automatic airflow adjustment; external static pressure selectable during commissioning.
 - b. Thermally protected, direct-drive motor with statically and dynamically balanced fan blades.
 - c. Minimum-adjustable external static pressure 0.32 in-wc; provide for mounting of field-installed ducts.
 3. Local Unit Controls:
 - a. Temperature Control: Return air control using thermistor tied to computerized Proportional-Integral-Derivative (PID) control of superheat.
 - b. Temperature Zones:

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- 1) Single Indoor Unit: Set served space(s) as the local temperature zone.
 - 2) Multiple Indoor Units: For large zones, group and coordinate related indoor units with served spaces as the local temperature zone with each indoor unit as sub-zone.
4. Return Air Filter:
 5. Condensate:
 - a. Built-in condensate drain pan with PVC drain connection for drainage.
 - b. Units With Built-In Condensate Pumps: Provide condensate safety shutoff and alarm.
 - c. Units Without Built-In Condensate Pump: Provide built-in condensate float switch and wiring connections.
 6. Cabinet Insulation: Sound absorbing foamed polystyrene and polyethylene insulation.
- B. Wall Mounted, Indoor Units:
1. Manufacturers:
 - a. Daikin: www.daikinac.com/#sle.
 - b. LG Electronics U.S.A., Inc: www.lghvac.com/#sle.
 - c. Mitsubishi Electric Trane HVAC US, LLC: www.metahvac.com/#sle.
 2. DX coil, tubed drain pan, and built-in controls with thermostat remotely coordinated by outdoor air unit to maintain local air temperature setpoint.
 3. Variable or three-speed ECM cross-flow fan with automatic airflow adjustment; external static pressure selectable during commissioning.
 4. Return Air Filter: Manufacturer's standard.
 5. Provide exposed unit casing with removable front grille; foamed polystyrene and polyethylene sound insulation; wall mounting plate; polystyrene condensate drain pan.
 6. Airflow Control: Auto-swing louver that closes automatically when unit stops; five (5) steps of discharge angle, set using remote controller; upon restart, discharge angle defaults to same angle as previous operation.
 7. Sound Pressure Range: Measured at low speed at 3.3 feet below and away from unit.
 8. Condensate Pump: Built-in, concealed.
 9. Condensate Drain Connection: Back, with piping concealed in wall.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that required electrical services have been installed and are in the proper locations prior to starting installation.
- B. Verify that condensate piping has been installed and is in the proper location prior to starting installation.
- C. Notify Engineer if conditions for installation are unsatisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install refrigerant piping in accordance with equipment manufacturer's instructions.
- C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).
- D. Coordinate with installers of systems and equipment connecting to this system.

3.3 FIELD QUALITY CONTROL

3.4 SYSTEM STARTUP

- A. Provide manufacturer's field representative to perform system startup.
- B. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.
- C. Adjust equipment for proper operation within manufacturer's published tolerances.

3.5 CLEANING

- A. Clean exposed components of dirt, finger marks, and other disfigurements.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals for additional submittals.
- B. See Section 017900 - Demonstration and Training for additional requirements.
- C. Demonstrate proper operation of equipment to Owner's designated representative.
- D. Demonstration: Demonstrate operation of system to Owner's personnel.
 - 1. Use operation and maintenance data as reference during demonstration.
 - 2. Conduct walking tour of project.
 - 3. Briefly describe function, operation, and maintenance of each component.

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- E. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of one day of training.
 - 3. Instructor: Manufacturer's training personnel.
 - 4. Location: At project site.

3.7 PROTECTION

- A. Protect installed components from subsequent construction operations.
- B. Replace exposed components broken or otherwise damaged beyond repair.

3.8 MAINTENANCE

- A. Provide a separate maintenance contract for the service and maintenance for 1 years from Date of Substantial Completion.

END OF SECTION

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SECTION 260000
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PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 DEFINITIONS

- A. "Provide": to furnish, install, and make complete, safe, and operable, the particular work referred to unless specifically indicated otherwise.
- B. "Furnish" or "supply": to purchase, procure, acquire, and deliver complete with related accessories.
- C. "Install": to erect, mount, and make complete with related accessories.
- D. "Work": includes labor, materials, equipment, services, and all related accessories necessary for the proper and complete installation for fully functioning and operational systems.
- E. "Piping": includes pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related accessories.
- F. "Wiring": includes wire, raceway, fittings, boxes, and related accessories.
- G. "Concealed": not in view, installed in masonry or other construction, within furred spaces, double partitions, hung ceilings, trenches, crawl spaces, or enclosures.
- H. "Exposed": in view, not installed underground or "concealed" as defined above.
- I. "Indicated," "shown," or "noted": as indicated, shown, or noted on drawings or specifications.
- J. "Similar" or "equal": to base bid manufacturer, equal in quality, materials, weight, size, performance, design and efficiency of specified product, conforming with "Base Bid Manufacturers" as determined and approved by Engineer.
- K. "Approved": satisfactory as reviewed.
- L. "Accepted As Noted": accepted with comments.
- M. "Revise and Resubmit": resubmit with revisions.
- N. "Disapproved": not approved.
- O. "Submit Specified Item": provide specified item directed by Engineer.
- P. "Reviewed": assessed for reference only final approval by others.

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- Q. "Substitutions": Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

1.2 WORK INCLUDED

- A. The work covered by this section includes the construction described in the Contract Documents, labor necessary to perform and complete such construction, materials and equipment incorporated or to be incorporated in such construction, and services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Related Work not Included in this Division but Specified Elsewhere:
1. Requirements of GENERAL CONDITIONS and Division No. 1.
 2. Finish painting, except for prefinished equipment or as otherwise specified.
 3. Waterproofing.
 4. Installation of access doors and frames.
 5. Cutting and patching.

1.3 DESCRIPTION OF BID DOCUMENTS

- A. Specifications describe quality and character of materials and equipment.
- B. Drawings are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation. Provide additional offsets, fittings, hangers, and supports, as required for construction and coordination with work of other trades.
- C. Scaled and indicated dimensions are approximate and are for estimate purposes only. Before proceeding with work, check and verify dimensions and field conditions.
- D. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
- E. Typical details, where shown on the drawings, apply to each item of the project where such items are applicable. Typical details are not repeated in full on the plans, and are diagrammatic only, but with the intention that such details shall be incorporated in full.
- F. If any part of Specifications or Drawings appears unclear or contradictory, consult Architect and/or Engineer for interpretation and decision as early as possible during bidding period. Do not proceed with work without the Architect's and/or Engineer's consent. All requests shall be in writing to owner at least (5) days prior to bid opening.

1.4 COORDINATION OF WORK

- A. The drawings show the general arrangement of equipment, conduits, and appurtenances. Follow these drawings as closely as the actual conditions will permit. Conform the work to the requirements shown on the drawings. Provide offsets, fittings, and accessories which may be

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required but not shown on the drawings. Investigate the site, structural and finish ground conditions affecting the work, and arrange the work accordingly. Provide such work and accessories as may be required to meet such conditions.

- B. Certain materials will be provided under other Sections of work. Examine the Contract Documents to ascertain these requirements.
- C. Carefully check space requirements with other Sections to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings.
- D. Transmit to other Sections all information required for work to be provided under those Sections, in ample time for installation.
- E. Wherever work interconnects with work specified under other Sections, coordinate those sections of work to insure that all necessary information is presented so that all the necessary connections and equipment may be properly installed. Identify all items (pull boxes, splice boxes, equipment, etc.) in order that access doors and panels can be properly located.
- F. Furnish and set all sleeves for passage of conduits through structural masonry, concrete walls, floors, and elsewhere as required for the proper protection of conduits passing through building surfaces.
- G. Provide required supports and hangers for conduit and equipment, designed so as not to exceed allowable loadings of structures.
- H. Examine and compare the contract drawings and specifications with the drawings and specifications of other disciplines, and report any discrepancies between them to the Engineer and obtain from them written instructions for changes necessary in the work of this Section. Install and coordinate the work of this Section in cooperation with installing interrelated work. Before installation, take proper provisions to avoid interferences. All changes required in the work, caused by their neglect to do so, to be made at no additional expense. Before commencing work, examine all adjoining work on which this work is in any way dependent for perfect workmanship and report any conditions which prevent performance of first class work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.
- I. Wherever the work is of sufficient complexity, prepare additional detail drawings. Such detailed work is to be clearly identified on the drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion, however, include a set of such drawings with each set of as-built drawings. When directed by the Engineer, submit drawings for review, clearly showing the work of this Section and its relation to the work of other disciplines before commencing shop fabrication or erection in the field.
- J. Provide required anchor bolts, sleeves, inserts, and supports designed so as not to exceed allowable loadings of structures. Locate anchors, bolts, sleeves, inserts, and supports to insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports to be paid for by the Contractor.

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- K. Adjust location of conduits, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each pipe prior to fabrication.

1.5 CONTRACTOR'S RESPONSIBILITY FOR EVALUATION

- A. The Engineer and Owner make no representations, regarding the character or extent of the subsoils, water levels, existing structural, mechanical, and electrical installations, above or below ground or other subsurface conditions which may be encountered during the work. The contractor must make their own evaluation of existing conditions which may affect methods or cost of performing the work, based on their own examination of the facility or other information. Failure to examine the drawings or other information shall not relieve the contractor of their responsibility for satisfactory accomplishment of the work.
- B. Prior to Bid, visit the site and examine the site conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.
- C. The contractor shall be held to have examined the site for the proposed work to determine the conditions affecting his work prior to Bid. No extra compensation will be allowed to the contractor because of his failure to inform himself as to the conditions affecting his work.
- D. Connections to existing work:
 - 1. Install new work and connect to existing work with minimum interference to existing facilities.
 - 2. Provide temporary shutdowns of existing services at no additional charges and only with written consent of Owner. Schedule shutdowns not to interfere with normal operation of existing facilities. Written notice shall be provided 1 week in advance of any required shutdowns.
 - 3. Alarm and emergency systems shall not be interrupted without alternative arrangements.
 - 4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 - 5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity required.
 - 6. Perform service disconnections only after regular working hours.

1.6 ACCESS TO FIRE PROTECTION EQUIPMENT

- A. The Contractor shall not interfere with access to hydrants, fire exits, fire hose stations, fire extinguishers and fire alarm pull stations. In no case shall the Contractor's material or equipment be within twenty five (25) ft of a hydrant or fire alarm pull station.

1.7 EQUIPMENT AND MATERIALS

- A. If products and materials are specified or indicated on the drawings for a specific item or system, the Contractor shall use those products or materials. If products and materials are not

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listed in either of the above, use first class products and materials, in accordance with approved shop drawings.

- B. All products and materials shall be new, clean, free of defects, damage, and corrosion.
- C. No permanent equipment shall be used to provide services during construction.
- D. Ship and store all products and materials in a manner which will protect them from damage, weather, and entry of debris. If items are damaged, do not install, but take immediate steps to obtain replacement or repair.
- E. Make certain that all materials selected directly, or by suppliers, conform to the requirements of the contract drawings and specification. Transmittal of such specifications and drawings, information to persons manufacturing and supplying materials to the project, and rigid adherence thereto, is the Contractor's responsibility. Acceptance of a manufacturer's name by the Engineer does not release the Contractor of the responsibility for providing materials which comply in all respects with the requirements in the Contract Documents.
- F. Applicable equipment and materials to be listed by Underwriters' Laboratories (UL) and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by local authorities having jurisdiction.
- G. Fully lubricate all equipment when installed and prior to final acceptance.
- H. Do not put systems in operation until systems have been tested.
- I. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment. Provide one copy of such instructions to the Engineer before installing any equipment. Provide a copy of such instructions at the equipment.

1.8 SUBSTITUTIONS

- A. Substitution limitations
 - 1. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
 - 2. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer or model not named.
- B. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.

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4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 6. Agrees to reimburse Owner for Engineer's review or redesign services associated with re-approval by authorities.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Engineer's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
 - 8) Description of how proposed substitution affects other parts of work.
 - c. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.

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E. Substitution Procedures During Construction

1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
2. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
3. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.

F. Resolution

1. Engineer may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
2. Engineer will notify Contractor in writing of decision to accept or reject request. Engineer's decision following review of proposed substitution will be noted on the submitted form.

1.9 QUALITY ASSURANCE

- A. All work shall comply with National Electrical Code and applicable local codes.
- B. Furnish materials and equipment new, free from defects and with listings or labels of Underwriter's Laboratories, Inc. or other nationally approved testing laboratory.
- C. All items of a given type shall be the product of the same manufacturer.
- D. Materials and equipment shall be the product of manufacturers engaged in their manufacture for at least 5 years.
- E. Current characteristics:
 1. Provide the following distribution:
 - a. 120/208 volt, 3 phase, 4 wire, 60 Hz with ground.
 - b. 277/480 volt, 3 phase, 4 wire, 60 Hz with ground.
- F. Equipment ampere ratings shall be for continuous operation in 104 degrees F (40 degrees C) ambient temperature unless otherwise indicated.

1.10 SHOP DRAWINGS

- A. Prepare and submit detailed shop drawings for conduit work and other distribution services, including locations and sizes of all openings in floor, walls, and roofs.

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- B. The work described in any shop drawing submission shall be carefully checked for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. Each submitted shop drawing shall include a certification that all related job conditions have been checked and that no conflict exists.
- C. All drawings shall be submitted in advance of field requirements to allow (15) days for engineer/architect review. All submittals shall be complete and contain all required and detailed information. Shop drawings with multiple parts shall be submitted as a package.
- D. If submittals differ from the Contract Document requirements, make specific mention of such difference in a letter of transmittal, with request for substitution, together with reasons for same.
- E. Review of any submitted data or shop drawings for material, equipment apparatus, devices, arrangement and layout shall not relieve the Contractor of responsibility to furnish same of proper dimensions and weight, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Work. Such review shall not relieve the Contractor from responsibility for errors, omissions or inadequacies of any sort on submitted data or shop drawings.
- F. Each shop drawing shall contain the job title, the name and phone numbers of the Contractor, references to the applicable design drawing or specification article, date and scale.
- G. Within three (3) weeks after award of Contract, submit a list of all shop drawings which will be submitted in the course of the project. List shall show disposition of each item, including date of submission, review, and the like. List shall be kept up-to-date throughout entire construction period.
- H. Submit shop drawings and manufacturer's data for the following items in accordance with the Contract Documents:
 - 1. Coordinated, detailed shop layout drawings of all electrical rooms, services and distribution systems, including plans, profiles and sections.
 - 2. Hangers, supports, inserts, anchors, guides and foundations.
 - 3. Wire and cable.
 - 4. Disconnect Switches.
 - 5. Circuit breakers.
 - 6. Raceways/Conduit.
 - 7. Light fixtures and lighting control devices.
 - 8. Equipment and conduit layouts at 3/8 in. scale for the building.
 - 9. Equipment identification and certificates.
 - 10. UL listed and tested fire stopping systems with location and type of penetration indicated.

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11. Other shop drawings and submittals as requested within the specification.

1.11 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- B. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and the weather until installation. Replace equipment damaged in the course of handling without additional charge.
- C. Arrange for and provide storage space or area at the job site for all materials and equipment to be received and/or installed for this project.
- D. Protect from damage, water, dust, etc. all material, equipment and apparatus provided under this trade both in storage and installed.

1.12 ACCESSIBILITY

- A. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.
- B. Install equipment requiring access so as to be freely accessible through access doors.

1.13 CUTTING AND PATCHING:

- A. Provide all carpentry, cutting and patching required for proper installation of material and equipment specified. Do not cut or drill structural members without consent of architect and structural engineer.

1.14 GUARANTEE

- A. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date of actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

1.15 PERMITS AND FEES

- A. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for, and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

1.16 BASE BID MANUFACTURERS

- A. Base bid on materials or equipment are specified by name of manufacturer, brand or trade name and catalog reference.
- B. Where two or more manufacturers are named, the bidders will have the option to choose.
- C. Submission of equipment of manufacturers other than specified shall detail equality and difference item by item. Delay in ordering of equipment will not be considered a valid cause for substitution.

1.17 EXCAVATION AND BACKFILL

- A. Excavation:
 - 1. If rock is encountered, excavate to 6 inches below bottom of piping and refill with well tamped sand and gravel.
 - 2. Bank excavated materials adjacent to trench and properly support with sheet-pile and brace.
 - 3. Install and maintain guards and keep excavation free of water with attended pumping equipment.
 - 4. No extra compensation will be provided for quicksand, hardpan, or other material encountered in excavating, except rock on unit price basis.
 - 5. Grade bottom of trenches accurately to provide uniform bearing and support the work on undisturbed soil at every point along its entire length.
 - 6. Immediately after piping is installed, inspected, tested, and accepted, remove sheet piping with special care to solidly fill voids without damage to piping. Backfill in a manner to prevent future settlement with only good clean loam, clay, sand, or gravel that is free from frozen materials, lumps of clay, rocks, boulders, cinders, slag ashes, vegetable or organic materials, or building or other debris, or refuse.
 - a. Thoroughly machine tamp backfill to a compaction level of at least 95% to standard proctor density or 75% relative density or as specified by the Architect.
 - b. Hand fill in 4 inch layers up to 2 ft above pipe and remainder, fill in with 1 ft layers.
 - c. Tamp and puddle each layer before placing next layer.
 - d. Allow no stones larger than 2 in. diameter in fill up to 2 ft above piping and allow no stones larger than 4 in. diameter in fill over 2 ft above piping.
 - 7. Restore surfaces, sidewalks, pavements, curbing, lawns, and shrubs that are disturbed or damaged.
 - 8. Dispose of acceptable surplus excavation on site and remove surplus and unsuitable excavated materials from site as directed.

1.18 POST-INSTALLED ANCHORS

A. Quality Assurance:

1. Use Post-Installed Anchors that have been designed and tested in accordance with:
 - a. NYS: ACI 318, as amended by NYSBC Section 1905.
 - b. Current ICC-ES reports considered evidence of successful testing.
2. Acceptable Manufacturers:
 - a. Hilti, Inc: www.us.hilti.com.
 - b. Simpson Strong-Tie Company, Inc.: www.strongtie.com
 - c. DeWalt Anchors and Fasteners: www.anchors.dewalt.com/anchors.

B. Provide Post-Installed Anchors as follows:

1. Anchor shall have a current ICC-ES report for the base material.
2. Select and install anchor based on concrete strength indicated by core tests. Otherwise, assume 2,000 psi concrete.
3. Provide AISI 316 Stainless Steel Post-Installed Anchors in corrosive environments.
4. All anchors installed on underside of concrete slab shall be approved for use in cracked concrete.
5. Spacing and edge distance of anchors shall conform to the requirements of the structural engineer or anchor manufacture.
6. Use a safety factor of 4 to the proof tensile load of the anchor when determining the allowable design tensile load.

C. Installation Requirements:

1. Comply with post-installed anchor manufacturer's recommendations for adhesive storage temperature and conditions for adhesive anchors before, during and after installation.
2. Only store solvent-cured materials in ventilated areas.
3. Follow OSHA requirements when performing any drilling that can result in silica dust.
4. Post-installed adhesive anchors installed overhead shall be installed by persons certified by ACI to perform such installations.
5. All post-installed anchors shall be installed in accordance with manufacturer's installation instructions and current ICC-ES reports.

D. Inspection of Post-Installed Anchors:

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1. Method of inspection shall be at the discretion of the Special Inspector.
2. Contractor shall provide all required information, drawings, equipment documentation, etc. requested by the Special Inspector a minimum of 10 working days in advance of the inspection.
3. (NYC) Continuous Inspection: Adhesive anchors installed in the horizontal or upwardly inclined positions are subject to continuous special inspection.
4. Periodic Inspection: Mechanical and screw anchors installed in any orientation are subject to periodic inspection. Frequency of inspections shall be at the Special Inspector's discretion.

1.19 FIELD QUALITY CONTROL

- A. Perform tests as noted, and in the presence of the Architect and/or Engineer in accordance with authorities having jurisdiction.
- B. Provide required labor, materials, equipment, and connections necessary for tests and submit for review.
- C. Repair or replace defective work, as directed and pay for restoring or replacing damaged work of others, due to tests, as directed.

1.20 CLEANING

- A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.
- B. Clean and repair painted exposed work, soiled or damaged, to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of materials and equipment.

1.21 OPERATING & MAINTENANCE INSTRUCTION

- A. Prepare operating and maintenance instructions manual including operating instructions, maintenance instructions, manufacturer's data, specific equipment data.
- B. Provide an alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
- C. Provide operating instructions for complete system, including:
 1. Normal starting, operating, and shut-down
 2. Emergency procedures for fire or failure of major equipment
 3. Summer and winter special procedures
 4. Day and night special procedures

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- D. Provide manufacturer's data on each piece of equipment, including:
1. Installation instructions.
 2. Drawings and specifications.
 3. Parts list, including recommended items to be stocked.
 4. Complete wiring diagrams.
 5. Marked or revised prints locating all concealed parts and all variations from the original system design.
 6. Test and inspection certificates.

1.22 TOOLS FOR OPERATION, ADJUSTMENT AND MAINTENANCE

- A. Deliver to Owner's representative all special tools needed for proper operation, adjustment and maintenance of equipment.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 NOT USED.

END OF SECTION

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LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Oxide inhibiting compound.
- G. Wire pulling lubricant.
- H. Cable ties.
- I. Firestop sleeves.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).

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- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- H. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
- I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- J. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- M. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- N. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.
- O. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- P. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- Q. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- R. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- S. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

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1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Engineer and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Armored cable is not permitted.
- E. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- 1) Maximum Length: 6 feet.
- b. Where concealed in hollow stud walls and above accessible ceilings for branch circuits up to 20 A.
 - 1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.
2. In addition to other applicable restrictions, may not be used:
 - a. Where not approved for use by the authority having jurisdiction.
 - b. Where exposed to view.
 - c. Where exposed to damage.
 - d. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.
- F. Manufactured wiring systems are not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 260526.
- H. Conductor Material:
 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG.

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- a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- 2. Control Circuits: 14 AWG.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com
 - b. Encore Wire Corporation: www.encorewire.com

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- c. General Cable Technologies Corporation: www.generalcable.com
 - d. Service Wire Co: www.servicewire.com/#sle.
 - e. Southwire Company: www.southwire.com
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
- 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
- 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.4 METAL-CLAD CABLE

- A. Manufacturers:
- 1. AFC Cable Systems Inc: www.afcweb.com
 - 2. Encore Wire Corporation: www.encorewire.com
 - 3. Service Wire Co: www.servicewire.com
 - 4. Southwire Company: www.southwire.com
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
- 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Provide dedicated neutral conductor for each phase conductor.
- G. Grounding: Full-size integral equipment grounding conductor.

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- H. Armor: Steel, interlocked tape.
- I. Provide PVC jacket applied over cable armor.

2.5 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 - 3. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 - 4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- F. Push-in Wire Connectors: Rated 600 V, 221 degrees F.
- G. Mechanical Connectors: Provide bolted type or set-screw type.
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.6 ACCESSORIES

- A. Electrical Tape:

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1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
 5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
 6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- D. Wire Pulling Lubricant:
1. Listed and labeled as complying with UL 267.
 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 3. Suitable for use at installation temperature.
- E. Cable Ties: Material and tensile strength rating suitable for application.
- F. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.

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- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 - 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 - 6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install metal-clad cable (Type MC) in accordance with NECA 120.
- E. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.

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3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- G. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- H. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.
- I. Install conductors with a minimum of 12 inches of slack at each outlet.
- J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.

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5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
 3. Wet Locations: Use heat shrink tubing.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- Q. Identify conductors and cables in accordance with Section 260553.
- R. Install firestopping to preserve fire resistance rating of partitions and other elements.
- S. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

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- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

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GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Grounding and bonding components.

1.2 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

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- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience with service facilities within 100 miles of Project.
- C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 - 1. Use insulated copper conductors unless otherwise indicated.
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 - 2. Unless otherwise indicated, use mechanical connectors or compression connectors for accessible connections.

2.3 CONNECTORS AND ACCESSORIES

- A. Mechanical Connectors: Bronze.
- B. Wire: Stranded copper.
- C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify existing conditions prior to beginning work.
- E. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.

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1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 4. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION

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HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

- A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- C. Section 265600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.3 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.

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2. Coordinate work to provide additional framing and materials required for installation.
 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has cured; see Section 033000.

1.5 SUBMITTALS

- A. Submit shop drawings and samples in accordance with "AIA Document 201".
- B. Product Data: Provide manufacturer's catalog data for fastening systems.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

- A. Maintain at project site one copy of each referenced document that prescribes execution requirements.
- B. Installer Qualifications for Powder-Actuated Fasteners: Certified by fastener system manufacturer with current operator's license.
- C. Installer Qualifications for Field Welding: See Section 055000.
- D. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:

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1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 5. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
 - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
1. Manufacturers:
 - a. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
- D. Metal Channel/Strut Framing Systems:
1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 2. Comply with MFMA-4.
 3. Channel/Strut Used as Raceway, Where Indicated: Listed and labeled as complying with UL 5B.
 4. Channel Material:

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- a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
- E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
- F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.

2.2 MANUFACTURERS

A. Thomas & Betts Corporation: www.tnb.com.

B. Threaded Rod Company: www.threadedrod.com.

C. SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

1. Furnish supplementary steel, channels, and supports required for proper installations, mounting, and support of electrical work.
2. Connect supplementary steel and channels firmly to building construction in an accepted manner.
3. Determine type and size of supporting channels and supplementary steel. Supplementary steel and channels shall be of sufficient strength and size to allow only a minimum deflection in conformance with manufacturers' requirements of loading.
4. Install supplementary steel and channels in a neat and workmanlike manner parallel to walls, floors, and ceiling construction.
5. All supplementary steel, channels and supports shall be submitted to the Structural Engineer for review.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.

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- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
 - 2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: See Section 260533.13 for additional requirements.
- I. Secure fasteners in accordance with manufacturer's recommended torque settings.
- J. Remove temporary supports.
- K. Identify independent electrical component support wires above accessible ceilings, where permitted, with color distinguishable from ceiling support wires in accordance with NFPA 70.

3.3 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.
- D. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner parallel to walls, floors, and ceiling construction, as specified in NECA 1.
- E. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- F. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.

- G. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Aluminum electrical metallic tubing (EMT).
- E. Conduit, fittings and conduit bodies.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- C. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- D. Section 260529 - Hangers and Supports for Electrical Systems.
- E. Section 260533.16 - Boxes for Electrical Systems.
- F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 312316 - Excavation.
- H. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.
- I. Section 312323 - Fill: Bedding and backfilling.

1.3 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.

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- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2018.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- I. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- J. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- K. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- L. UL 797A - Electrical Metallic Tubing - Aluminum and Stainless Steel; Current Edition, Including All Revisions.
- M. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- N. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 - 5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, metallic tubing, fittings, and conduit bodies.

1.6 QUALITY ASSURANCE

- A. Documents at Project Site: Maintain at project site one copy of manufacturer's instructions and shop drawings.
- B. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Concealed Within Hollow Stud Walls: Use aluminum electrical metallic tubing (EMT).
- D. Concealed Above Accessible Ceilings: Use aluminum electrical metallic tubing (EMT).
- E. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC).
- F. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, or aluminum rigid metal conduit.

- G. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
 - 1. Maximum Length: 6 feet.
- H. Flexible Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit (FMC).
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 - 3. Maximum Length: 6 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Motors.
- I. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).

2.2 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Fittings for Grounding and Bonding: See Section 260526 for additional requirements.
- C. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
 - 2. Branch Circuit Homeruns: 3/4-inch trade size.
 - 3. Flexible Connections to Luminaires: 3/8-inch trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com
 - 2. Nucor Tubular Products: www.nucortubular.com
 - 3. Western Tube, a division of Zekelman Industries: www.westerntube.com
 - 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com

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- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 - 1. Manufacturers:
 - a. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us
 - b. Bridgeport Fittings Inc: www.bptfittings.com
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com
 - 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.
- D. Description: NFPA 70, Type RMC stainless steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6A.
- E. Fittings:
 - 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6A.
 - 2. Material: Use stainless steel with corrosion resistance equivalent to conduit.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.
- F. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- G. Fittings:
 - 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.

2.4 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com
 - 2. Electri-Flex Company: www.electriflex.com
 - 3. International Metal Hose: www.metalhose.com

- B. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings, LLC: www.bptfittings.com
 - b. Emerson Electric Co; O-Z/Gedney: www.emerson.com
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
- D. Description: Interlocked steel construction.
- E. Fittings: NEMA FB 1.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com
 - 2. Electri-Flex Company: www.electriflex.com
 - 3. International Metal Hose: www.metalhose.com
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings, LLC: www.bptfittings.com
 - b. Emerson Electric Co; O-Z/Gedney: www.emerson.com
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
- D. Description: Interlocked steel construction with PVC jacket.

2.6 ALUMINUM ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT aluminum electrical metallic tubing listed and labeled as complying with UL 797A.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; listed for use with aluminum EMT.
2. Material: Use aluminum.
3. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.7 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- B. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- C. Sealing Systems for Exterior Penetrations:
 1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.
- D. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
- E. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify routing and termination locations of conduit prior to rough-in.
- E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

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- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - 5. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 6. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
 - 7. Route conduits above water and drain piping where possible.
 - 8. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 - 9. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 - 10. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
- E. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

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5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
 8. Use of wire for support of conduits is not permitted.
 9. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.
- F. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 7. Secure joints and connections to provide mechanical strength and electrical continuity.
- G. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Provide suitable sealing system where conduits penetrate exterior wall below grade.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

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7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 078400.
- H. Underground Installation:
1. Provide trenching and backfilling.
 2. Provide trenching and backfilling in accordance with Sections 312316 and 312316.
- I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where conduits are subject to earth movement by settlement or frost.
- J. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where conduits enter building from underground.
 - c. Where conduits may transport moisture to contact live parts.
 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- K. Provide grounding and bonding; see Section 260526.

3.3 FIELD QUALITY CONTROL

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.
- B. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.

3.6 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.2 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

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- I. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the work with other trades to preserve insulation integrity.
6. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
7. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, and cabinets and enclosures.
- B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- C. Project Record Documents: Record actual locations for outlet and device boxes, junction boxes, pull boxes, and cabinets and enclosures.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

- A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
4. Use cast aluminum boxes where aluminum rigid metal conduit is used.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

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10. Boxes for Supporting Luminaires: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 12. Minimum Box Size, Unless Otherwise Indicated:
 - a. Communications Systems Outlets: Comply with Section 271000.
 13. Wall Plates: Comply with Section 262726.
 14. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 - b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
 6. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com
 - b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com

- c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- F. Box Locations:
 - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 - 2. Unless dimensioned, box locations indicated are approximate.
 - 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - 4. Locate boxes so that wall plates do not span different building finishes.
 - 5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 - 6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 - 7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.

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- b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
- 8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
- 9. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
 - a. Concealed above accessible suspended ceilings.
 - b. Electrical rooms.
 - c. Mechanical equipment rooms.
- G. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
 - 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- H. Install boxes plumb and level.
- I. Flush-Mounted Boxes:
 - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- J. Install boxes as required to preserve insulation integrity.

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- K. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- L. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- M. Close unused box openings.
- N. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- O. Provide grounding and bonding in accordance with Section 260526.
- P. Identify boxes in accordance with Section 260553.
- Q. Coordinate of all outlet boxes related to electrical devices with architect.
- R. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
 - 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.

3.3 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

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IDENTIFICATION FOR ELECTRICAL SYSTEMS

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Field-painted identification of metal boxes containing Fire Alarm wiring.

1.2 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting.
- B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.3 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. Product Data: Provide catalog data for nameplates, labels, and markers.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.5 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.6 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

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- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Enclosed switches:
 - b. Time Switches:
 - 1) Identify load(s) served and associated circuits controlled. Include location.
 2. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
 3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
- C. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
- D. Identification for Devices:
1. Identification for Communications Devices: Comply with Section 271000.
 2. Wiring Device and Wallplate Finishes: Comply with Section 262726.
 3. Use identification label to identify serving branch circuit for all receptacles and data outlets..

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Manufacturers:
 - a. Brimar Industries, Inc: www.brimar.com/#sle.
 - b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com
 - c. Seton Identification Products: www.seton.com
2. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 - a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:

1. Manufacturers:
 - a. Brady Corporation: www.bradyid.com
 - b. Brother International Corporation: www.brother-usa.com
 - c. Panduit Corp: www.panduit.com
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Receptacle Identification:

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1. Minimum Size: 3/8 inch by 1.5 inches.
 2. Legend: Power source and circuit number or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 3/16 inch.
 5. Color: Black text on white background.
- D. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- E. Letter Size:
1. Use 1/8 inch letters for identifying individual equipment and loads.
 2. Use 1/4 inch letters for identifying grouped equipment and loads.
- F. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background. Use only for identification of individual wall switches and receptacles and control device stations.

2.3 WIRE AND CABLE MARKERS

- A. Manufacturers:
1. Brady Corporation: www.bradyid.com
 2. HellermannTyton: www.hellermannntyton.com
 3. Panduit Corp: www.panduit.com
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
1. Do not use handwritten text.
- F. Minimum Text Height: 1/8 inch.
- G. Color: Black text on white background unless otherwise indicated.
- H. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

2.4 VOLTAGE MARKERS

- A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- B. Minimum Size:
 - 1. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
 - 2. Markers for Junction Boxes: 1/2 by 2 1/4 inches.
- C. Legend:
 - 1. Markers for Voltage Identification: Highest voltage present.
- D. Color: Black text on orange background unless otherwise indicated.
- E. Location: Furnish markers for each conduit longer than 6 feet.
- F. Spacing: 20 feet on center.

2.5 UNDERGROUND WARNING TAPE

- A. Manufacturers:
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:
 - 1. Tape for Buried Power Lines: Black text on red background.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.

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2. Flush-Mounted Equipment: Inside of equipment door.
 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 4. Elevated Equipment: Legible from the floor or working platform.
 5. Interior Components: Legible from the point of access.
 6. Boxes: Outside face of cover.
 7. Conductors and Cables: Legible from the point of access.
 8. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

3.3 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.
- B. Install nameplates and labels parallel to equipment lines.
- C. Secure nameplates to equipment front using epoxy cement.
- D. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- E. Identify underground conduits using underground warning tape. Install one tape per trench as per NFPA 70..

END OF SECTION

**SECTION 260583
WIRING CONNECTIONS**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Electrical connections to equipment.

1.2 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 262816.16 - Enclosed Switches.

1.3 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
 - 2. Determine connection locations and requirements.
- B. Sequencing:
 - 1. Install rough-in of electrical connections before installation of equipment is required.
 - 2. Make electrical connections before required start-up of equipment.

1.5 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Disconnect Switches: As specified in Section 262816.16 and in individual equipment sections.
- B. Wiring Devices: As specified in Section 262726.
- C. Flexible Conduit: As specified in Section 260533.13.
- D. Wire and Cable: As specified in Section 260519.
- E. Boxes: As specified in Section 260533.16.

2.2 EQUIPMENT CONNECTIONS

- A. As indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

**SECTION 262816.16
ENCLOSED SWITCHES**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Enclosed safety switches.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- C. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

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1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 1. Include dimensioned plan and elevation views of enclosed switches and adjacent equipment with all required clearances indicated.
 2. Include wiring diagrams showing all factory and field connections.
 3. Identify mounting conditions required for equipment seismic qualification.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. ABB/GE: www.electrification.us.abb.com
- B. Eaton Corporation: www.eaton.com
- C. Schneider Electric; Square D Products: www.schneider-electric.us
- D. Siemens Industry, Inc: www.usa.siemens.com

2.2 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- K. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:

- a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
- L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- M. Heavy Duty Switches:
- 1. Comply with NEMA BS 31047.
 - 2. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Identify enclosed switches in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 014000.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 265600
EXTERIOR LIGHTING**

PART 1 GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SECTION INCLUDES

- A. Exterior luminaires.
- B. Exterior luminaires for in-wall mounting (waterproof)

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.

1.3 REFERENCE STANDARDS

- A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.
- B. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2019.
- C. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- H. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008 with New York City Amendments.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.

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- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, drivers, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires in accordance with NECA/IESNA 501.
- D. Provide required support and attachment in accordance with Section 260529.

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- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Install accessories furnished with each luminaire.
- G. Bond products and metal accessories to branch circuit equipment grounding conductor.
- H. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.5 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.
- B. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution.

3.6 CLEANING

- A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.

3.8 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

**SECTION 31 2316
EXCAVATION**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Excavating and backfilling for Lighting Circuits.
- B. Temporary excavation support and protection systems.
- C. Preparing subgrades for Lighting Circuits
- D. Final grading

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Record drawings at project closeout according to 01 7000 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- C. Pre excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 DEFINITIONS

- A. Excavation: Removal of material encountered above subgrade elevations.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- B. Excavation is "earth excavation" or "unclassified" and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered, pavements and other obstructions visible on ground surface, underground structures, utilities and other items indicated to be demolished and removed, together with earth and other materials, including rock.

- C. Rock Measurement: Volume of rock actually removed, measured in original position.
- D. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 4 cu. yd. for bulk excavation and 1 cu. yd. footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf ; measured according to SAE J-1179.
- E. Select Fill: Soil material to raise existing grades supporting footings, walls and slabs.
- F. Structures: footings, or other man-made stationary features constructed above or below the ground surface.
- G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- H. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.6 QUALITY ASSURANCE

- A. Section 01 3000 - Administrative Requirements for Project Meetings.
 - 1. Before commencing earthwork, meet with Owner's Representative, Construction Manager, Architect, and independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- B. Codes and Standards: Perform earthwork complying with requirements of State New York Uniform Fire and Building Code and authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Verify existing grades and notify Architect of differing conditions.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services have been provided.
 - 1. Notify Owner's Representative and Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's Representative Architect's written permission.

PART 2 PRODUCTS -

2.1 SOIL MATERIALS

- A. Excavations General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of crushed gravel
- F. Select Fill: Naturally or artificially graded mixture of natural or crushed sand free of debris and organic matter and with maximum particle size of two (2") inches and between ten (10%) and seventy (70%) percent, by weight, passing the standard No. 40 sieve size and less than ten (10%) percent passing a No. 200 sieve.
- G. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- H. Topsoil : Friable loam; local borrow.
 - 1. Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.
 - 2. Graded.
 - 3. Free of roots, rocks larger than 1/2 inch (12 mm), subsoil, debris, large weeds and foreign matter.
 - 4. Furnish a certified analysis, made by a recognized authority, of any topsoil furnished to complete the work of planting. Test reports shall match the format listed below:
 - a. PassingRetained OnPercentage
 - a) 1" screen 100%
 - b) 1" screen1/4" screen (gravel) Not more than 3%
 - c) 1/4" screen No. 100 (sand) 40% - 60%
 - d) No. 100(Very fine sand, silt and clay) 40% - 60%
- I. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a very stiff state.

PART 3 EXECUTION

3.1 TOPSOIL STRIPPING AND STOCKPILING

- A. Stripping and Stockpiling of Topsoil: Strip topsoil from areas to be excavated or filled, areas within proposed building limits and paving areas and stockpile where shown on the plans. Stockpiled topsoil shall be free of subsoil, stones, clods of hard earth, plants or their roots, sticks or other matter not conducive to plant growth. Stockpiling shall be coordinated by the Contractor.

3.2 EXAMINATION

- A. Call (Call Before You Dig) and register before beginning any excavation at least two (2) working days prior to the start of construction.
- B. Locate and identify existing underground and overhead services and utilities within the Contract Limits. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations.
- C. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.

3.3 PREPARATION

- A. Locate, identify, and protect utilities that remain and protect from damage.
- B. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- C. Protect plants, lawns, and other features to remain.
- D. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Owners Representative.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- F. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.
- G. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.4 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.
- B. Excavation support and protection systems not required to remain in place may be removed subject to approval of Westchester Community College or Westchester Community College's Representative.

1. Remove temporary shoring and bracing in a manner to avoid harmful disturbance to underlying soils and damage to buildings, structures, pavements, facilities and utilities.

3.5 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrade, and from flooding Project site, and surrounding area.
- B. Protect subgrade from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 2. Install continuous dewatering system, as required to keep subgrade dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
- C. The Contractor shall provide, maintain and operate pumps of adequate capacity required to maintain excavations, pits, trenches and depressions within the Contract Limit Lines as well as the Buildings free of water accumulated at any time and as necessary to permit the proper installation of the work required under all contracts. Disposal of pumped water shall be done with due respect to the rights of adjoining buildings. All costs in connection with the removal of water as above provided for shall be borne by the Contractor

3.6 EXCAVATING GENERAL

- A. Excavate to accommodate lighting circuits as indicated..
 1. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
 2. Hand trim excavations. Remove loose matter.
- B. Notify the Owners Representative of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Provide temporary means and methods, as required, to remove all water from excavations. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- E. Remove topsoil from work area, without mixing with foreign materials.

3.7 FILLING AND BACKFILLING

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

3.8 STABILITY OF EXCAVATIONS

- A. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace, where sloping is not possible because of space restrictions or stability of material excavated, to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.9 UNAUTHORIZED EXCAVATION

- A. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrows material and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Provide tarp or erosion control fabric on stockpile material and a silt fence around stockpiled material.
 - 3. Material stockpiled outside the contract area shall be in locations approved by the Owner. If areas are not available store material off site at contractor's expense.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 1. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 95 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Lawn or Unpaved Areas: Plus or minus 1 inch .
 2. Walks: Plus or minus 1/2 inch .
 3. Pavements: Plus or minus 1/2 inch .
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot (3-m) straightedge.

3.16 FINISH GRADING

- A. Before Finish Grading:
 1. Verify trench backfilling have been inspected.
 2. Verify subgrade has been contoured and compacted.
 3. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.

4. Where topsoil is to be placed, scarify surface to depth of 3 inches (75 mm).
5. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).

3.17 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

3.18 CLEANING

- A. Remove excavated material that is unsuitable for re-use from site.
- B. Remove excess excavated material from site.

3.19 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.
- F. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- G. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- H. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- I. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
- J. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

**SECTION 32 9220
RESTORATION OF TURF AREAS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The contractor shall supply all materials, equipment, labor, incidentals and maintenance required in order to provide an acceptable stand of turf by topsoiling and seeding of all disturbed areas including stripping topsoil, grading, placing topsoil, fertilizing and seeding, in accordance with the drawings and as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: From site stockpiles or friable loam, typical of cultivated topsoils available locally, containing at least 3 percent of decayed organic matter (humus), taken from a well-drained, arable site. Topsoil shall be reasonably free of subsoil, stones, earth, clods, sticks, roots, or other objectionable extraneous matter or debris. It shall contain no toxic materials. Only the finest, most organic topsoil shall be used. No topsoil shall be spread or delivered in a frozen or muddy condition
- B. Fertilizer: Recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.
 - 1. Manufacturers:
 - a. Profile Products; BioPrime: www.profileevs.com/#sle.
 - b. Jonathan Green "New Seeding Lawn Fertilizer.
- C. The seed used shall be fresh, re-cleaned seed of the latest crop containing a blend of those listed below and shall be harvested from one field to ensure a uniform color and texture. Percentages of each grass type are to be within the given range for that type:
 - 1. Devine Perennial Ryegrass
 - 2. America Kentucky Bluegrass
 - 3. Apollo Kentucky Bluegrass
 - 4. Limousine Kentucky Bluegrass
 - 5. Midnight Kentucky Bluegrass
 - 6. Manufacturer:
 - a. Chas. C. Hart Seed Company, Wethersfield, Ct. 1-800-326-HART

- D. Mulch: Mulch shall be approved salt hay or weed free straw and stabilized with a binder.

PART 3 - CONSTRUCTION

3.1 SEEDBED PREPARATION

- A. Seasonal and weather limitations - All operations including seedbed preparation shall be performed only when the soil is in proper condition to permit satisfactory work. Continuation of work at other than specified times or conditions shall proceed only with consent of the Architect.
- B. Leveling - Any undulations or irregularities in the surface resulting from fertilization, tillage or any other causes shall be leveled prior to seeding. Flooded, washed out, or otherwise damaged areas shall be reconstructed and all grades reestablished in conformance with the drawings and specifications.
- C. Cleanup - Prior to seeding, the surface shall be cleared of all trash, debris and stone larger than 1-1/2 diameter and of all roots, brush, wire, grade stakes and other objects that could be a hindrance to maintenance operations and use.
- D. Fertilizing - After final seedbed preparation, apply fertilizer at the manufacturer's recommended rate indicated on the bag. Fertilizer shall be distributed evenly over all areas to be seeded by machine, or as otherwise approved by the Architect, and shall be worked lightly into the top 1 inch of the rootzone mixture.

3.2 SEEDING

- A. The contractor shall furnish and place all materials required for seeding in all top soiled areas.
- B. All areas to be seeded shall be thoroughly disked or otherwise loosened to a depth of 4 inches and shall be raked to true lines free from all unsightly variations, bumps, ridges, or depressions. All sticks, stones, roots or other objectionable material which might interfere with the formation of a finely pulverized seed bed shall be removed from the soil. Ground limestone and commercial fertilizer shall be applied as specified above.
- C. The soil shall then be raked to a smooth, even draining surface and compacted with an approved roller as directed by the Architect. Any depressions which occur shall be regraded and rerolled until a satisfactory grade is obtained.
- D. The rate of seeding shall be 10 lbs. per 1000 sq. ft. of area. Grass seed shall be sown by approved machine in such manner that a uniform stand will result and as indicated on the drawings for the upper field.
- E. Grass seed shall be sown preferably in the fall between August 25 and October 1, in the spring between March 15 and May 1, or at such other times as are approved by the Architect. All seeding is to be done in dry or moderately dry soil and at times when the wind does not exceed a velocity of 5 miles per hour.

3.3 MULCHING

- A. All seeded areas shall be mulched not later than three (3) days following seeding. Ground surfaces shall be completely covered at a rate of at least two (2) tons per acre.
- B. Mulch shall be anchored using jute or other approved netting properly fastened in place.

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- C. Subsequent watering - Seed shall be watered as required to maintain adequate moisture in the soil. In the absence of rainfall, seed shall be watered at frequencies dictated by need.

3.4 ACCEPTANCE

- A. Inspection of the work of seeding to determine provisional acceptance will be made by the Architect upon written notice requesting such inspection submitted by the contractor at least seven (7) days prior to the anticipated date of inspection. Request may be made subsequent to the second mowing of the turf.
- B. After inspection the contractor will be notified in writing by the Owners Representative of provisional acceptance of all work, or if there are any deficiencies of the requirements for completion of the work.
- C. All seeded areas shall be guaranteed for one (1) growing season commencing with the date of provisional acceptance.

END OF SECTION

APPENDIX

- FLOW REPORT

Annual Water-Based Fire Protection Systems Inspection

181 North Road - Suite 3
Highland, NY 12528



Inspector: Shaun Bauer

Inspection date: 08/02/2023

Inspection Location

Westchester Community College - Main Campus WE0315-4B

75 Grasslands Road

Valhalla, NY

Phone:

Customer

Westchester Community College WE0315-4

75 Grasslands Road

Valhalla, NY 10595

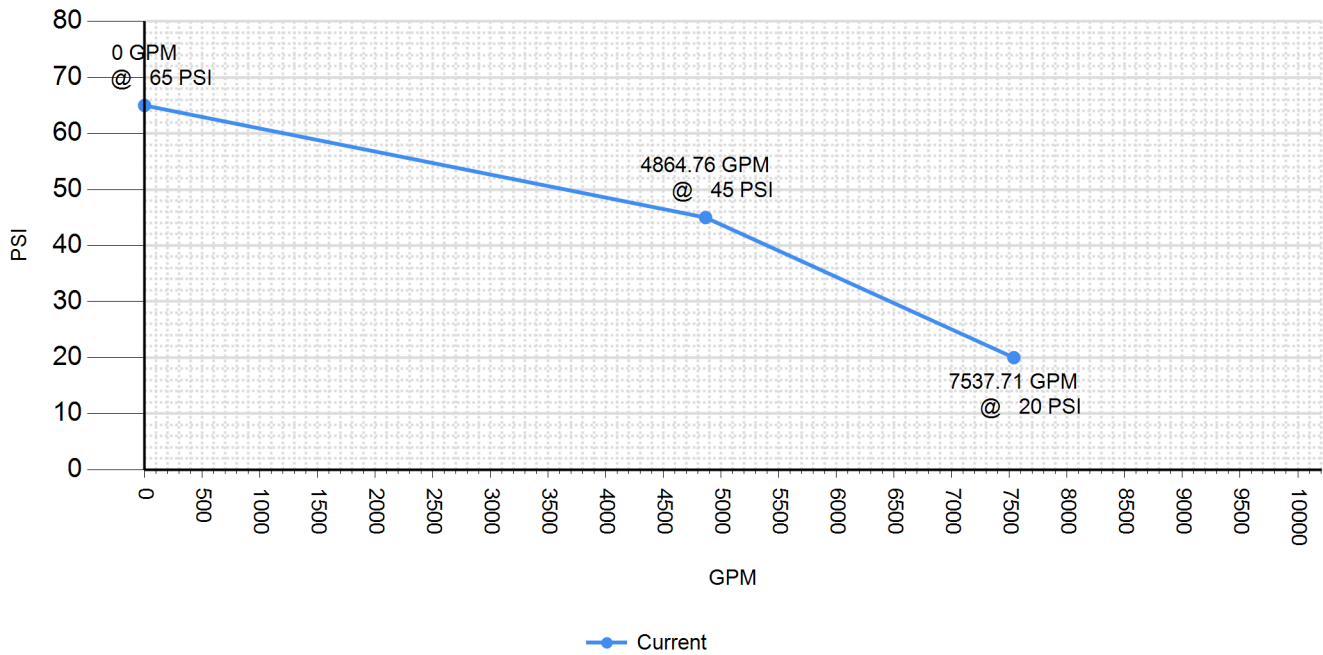
Phone:

*Inspection performed in accordance with
NFPA 25 Standard for the Inspection, Testing, and Maintenance
of Water-Based Fire Protection Systems, 2017 edition.*

| System Summary | Number of Systems at Site |
|---------------------------|---------------------------|
| Items | Total Systems |
| Fire Service Mains | 18 |

| Fire Service Mains | |
|--|--------------------|
| Hydrant - Dry Barrel/Wall | |
| #1 Admin | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Hydrant Piping Flow Test | |
| #1 Admin | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 65 |
| Residual psi (residual hydrant) | 45 |
| Pitot pressure (flow hydrant) | 840 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#2 Children's center

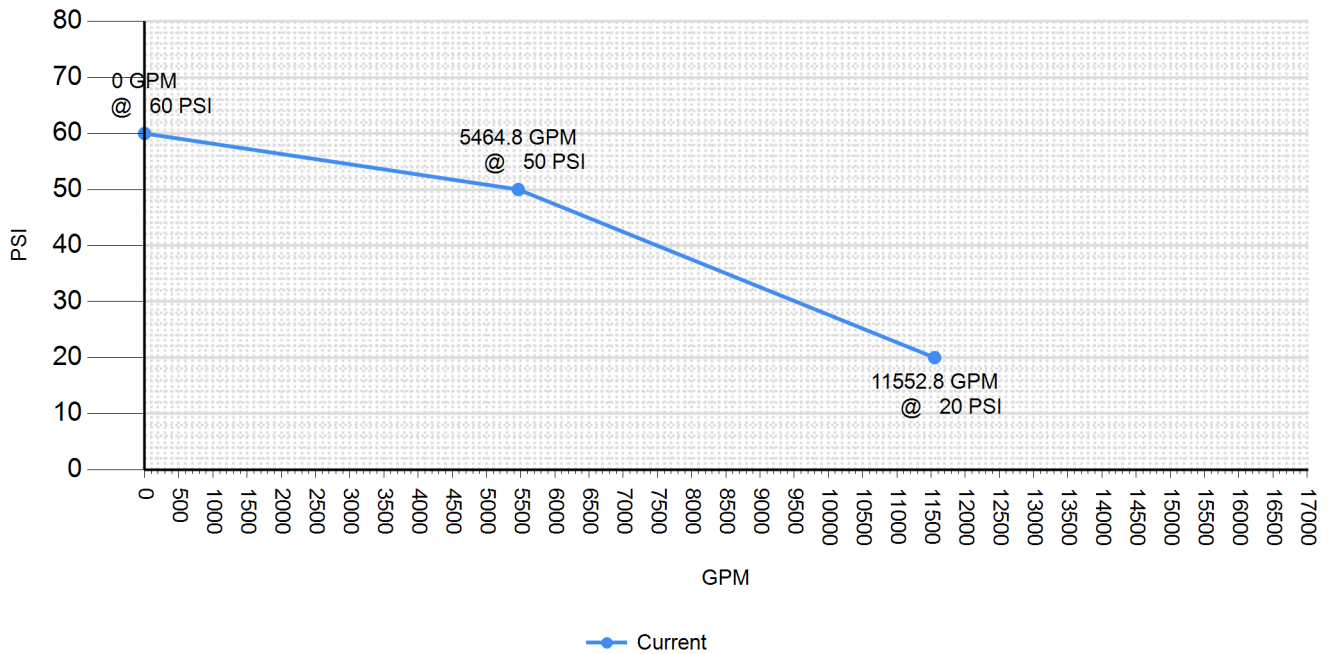
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

Hydrant Piping Flow Test

#2 Children's Center

| | |
|--|--------------------|
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 60 |
| Residual psi (residual hydrant) | 50 |
| Pitot pressure (flow hydrant) | 1060 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#3 Classroom south

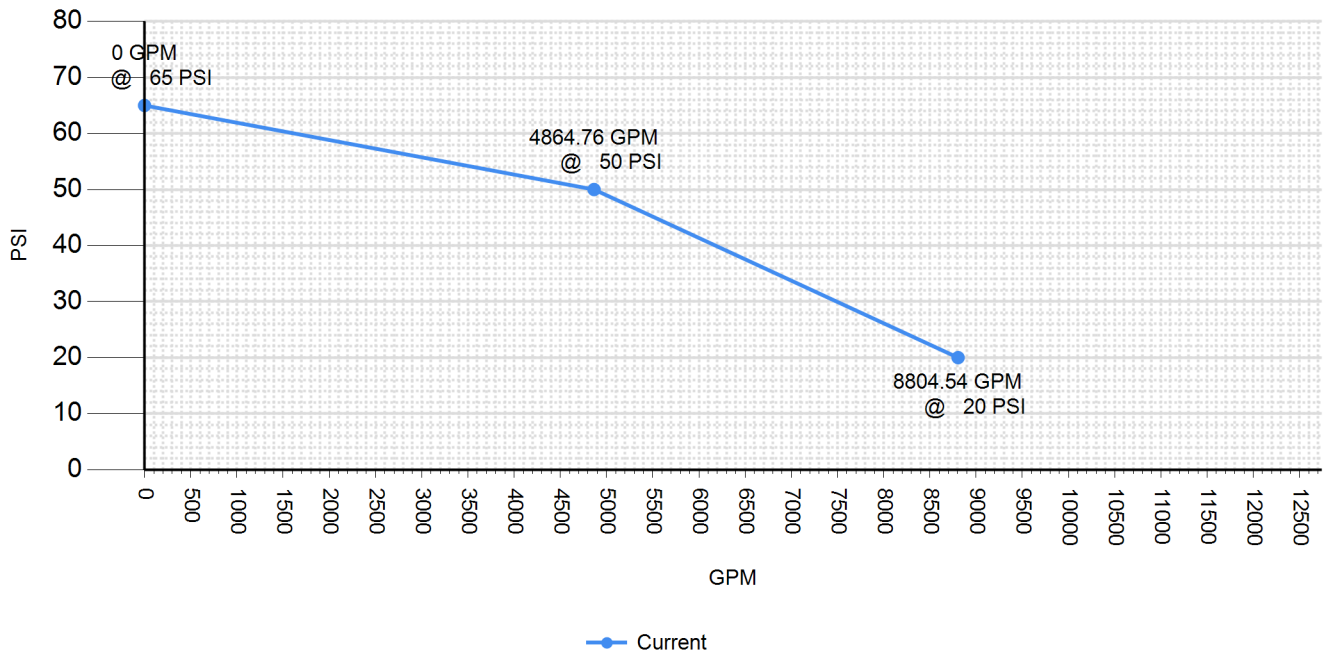
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

Hydrant Piping Flow Test

#3 Classroom South

| | |
|--|--------------------|
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 65 |
| Residual psi (residual hydrant) | 50 |
| Pitot pressure (flow hydrant) | 840 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#4 Classroom west

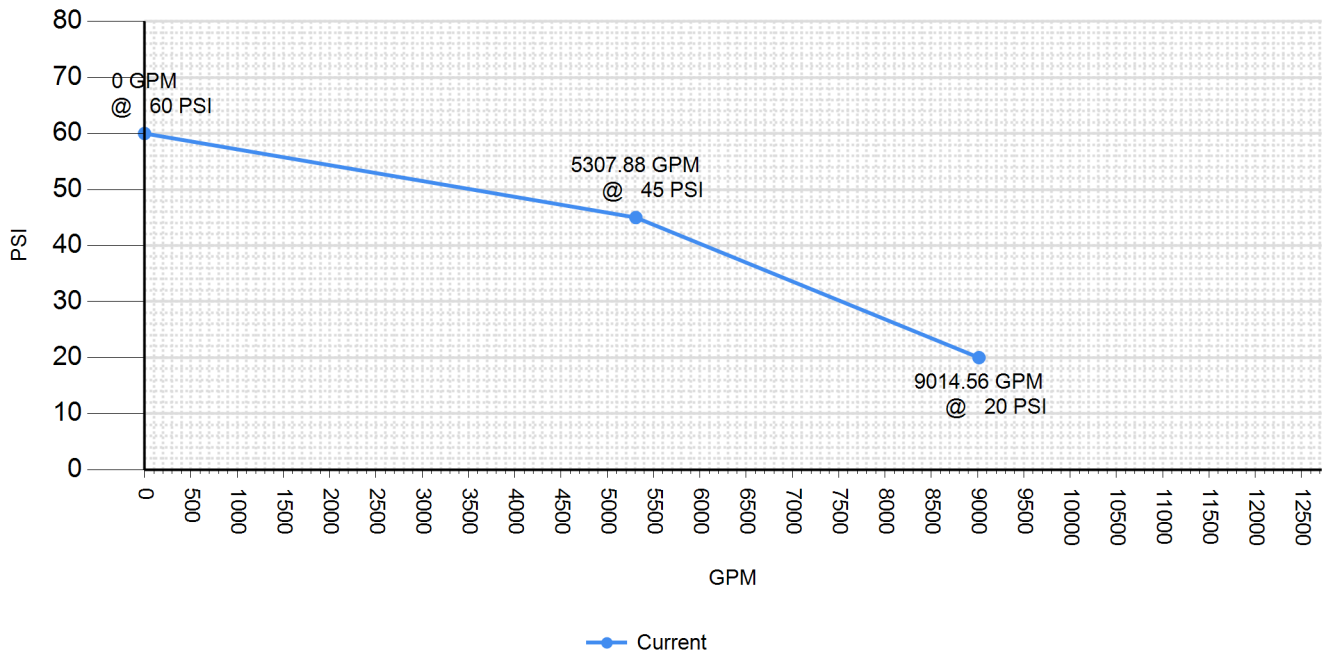
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

Hydrant Piping Flow Test

#4 Classroom West

| | |
|--|--------------------|
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 60 |
| Residual psi (residual hydrant) | 45 |
| Pitot pressure (flow hydrant) | 1000 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#5 Hartford circle

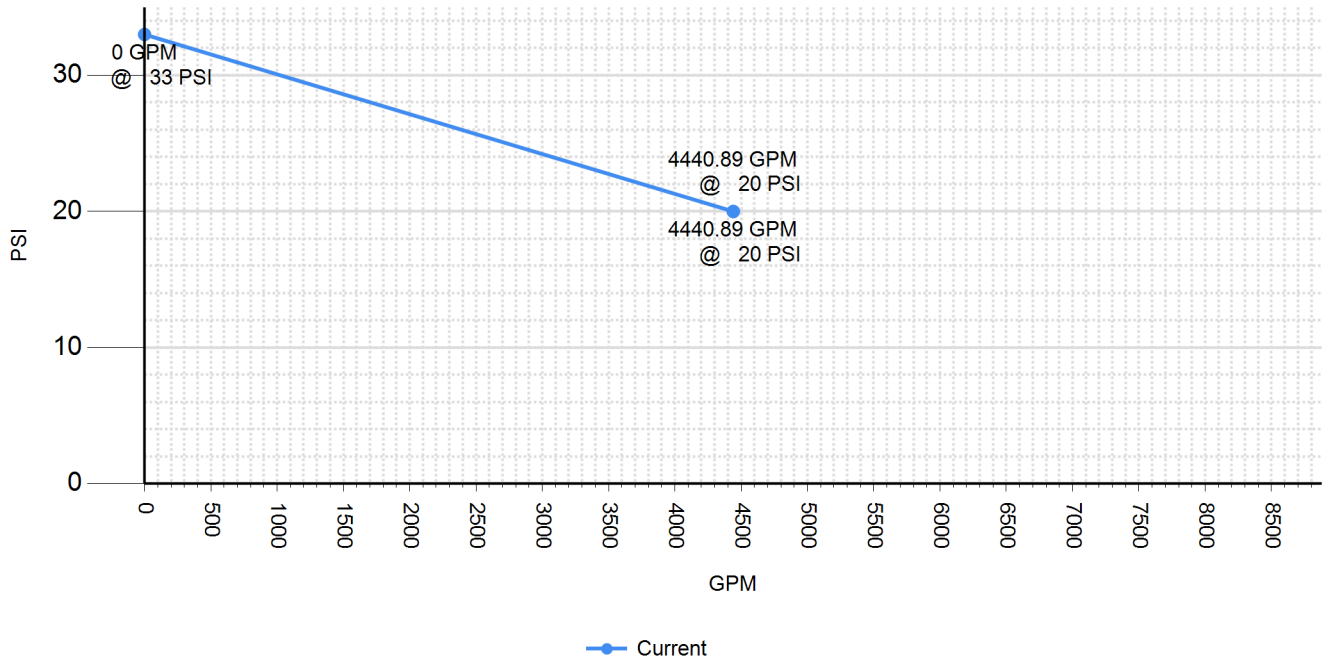
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

Hydrant Piping Flow Test

#5 Hartford Circle

| | |
|--|--------------------|
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 33 |
| Residual psi (residual hydrant) | 20 |
| Pitot pressure (flow hydrant) | 700 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#6 Hartford hall west

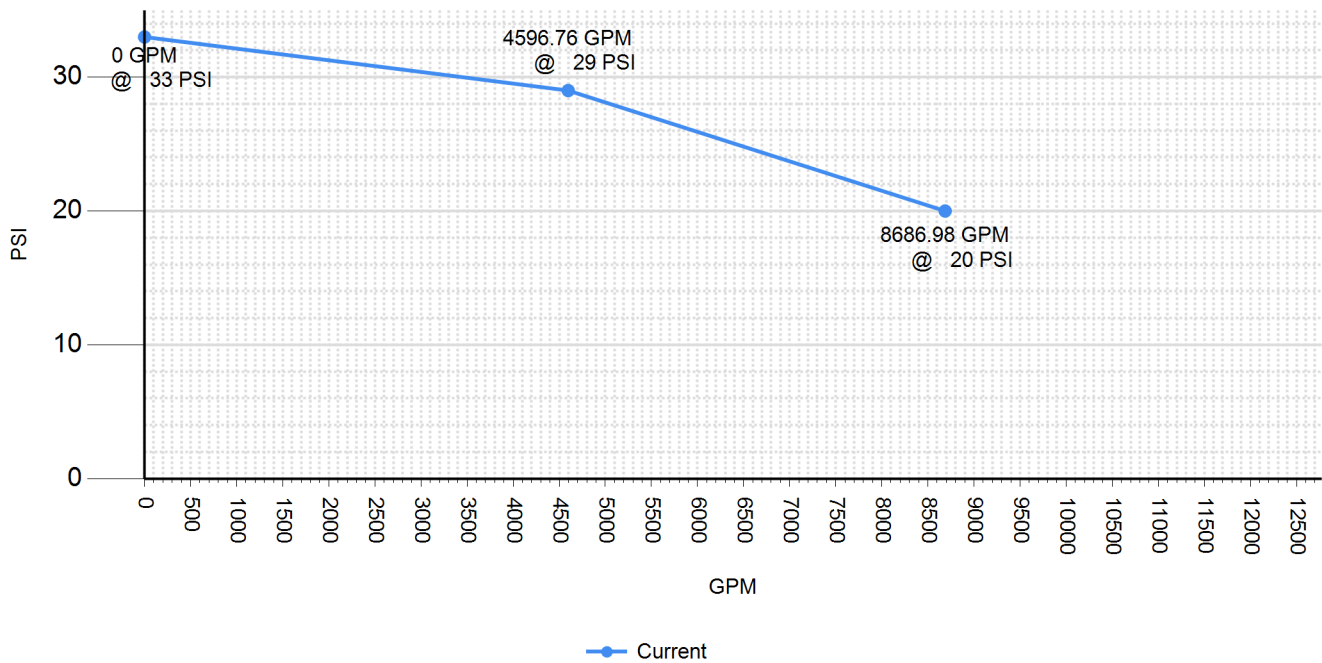
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

Hydrant Piping Flow Test

#6 Hartford Hall West

| | |
|--|--------------------|
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 33 |
| Residual psi (residual hydrant) | 29 |
| Pitot pressure (flow hydrant) | 750 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Fire Service Mains

Hydrant - Dry Barrel/Wall

#7 Health Science

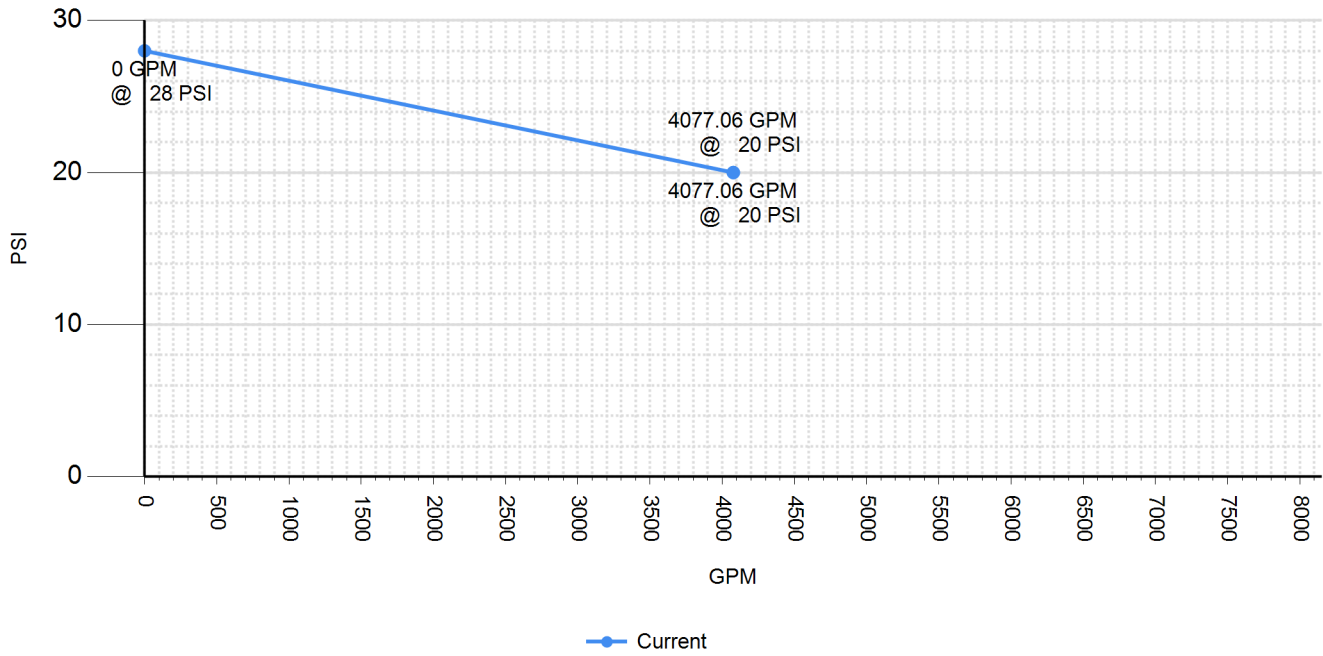
| | |
|--|------|
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

| Fire Service Mains | |
|--|------|
| Hydrant - Dry Barrel/Wall | |
| #8 Knollwood center | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #9 Library Rear | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #10 Maintenance front | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #11 Maintenance west | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #12 Phys Ed north | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #13 Phys Ed South | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

| Fire Service Mains | |
|--|------|
| Hydrant - Dry Barrel/Wall | |
| #14 Science Front | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #15 Student Center | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #16 Technology south | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #17 Technology West | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Pass |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |
| Fire Service Mains | |
| Hydrant - Dry Barrel/Wall | |
| #18 West gate roadway | |
| Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4) | Fail |
| Outlet caps tight, outlet threads and hydrant operating nut not worn and operating wrench available. (7.2.2.4) | Pass |
| Hydrant opened fully and water flowed until all foreign material has cleared and proper drainage observed. (7.3.2.1 & 7.3.2.3) | Pass |
| Hydrant barrel free of cracks and without ice or water present. (7.2.2.4) | Pass |

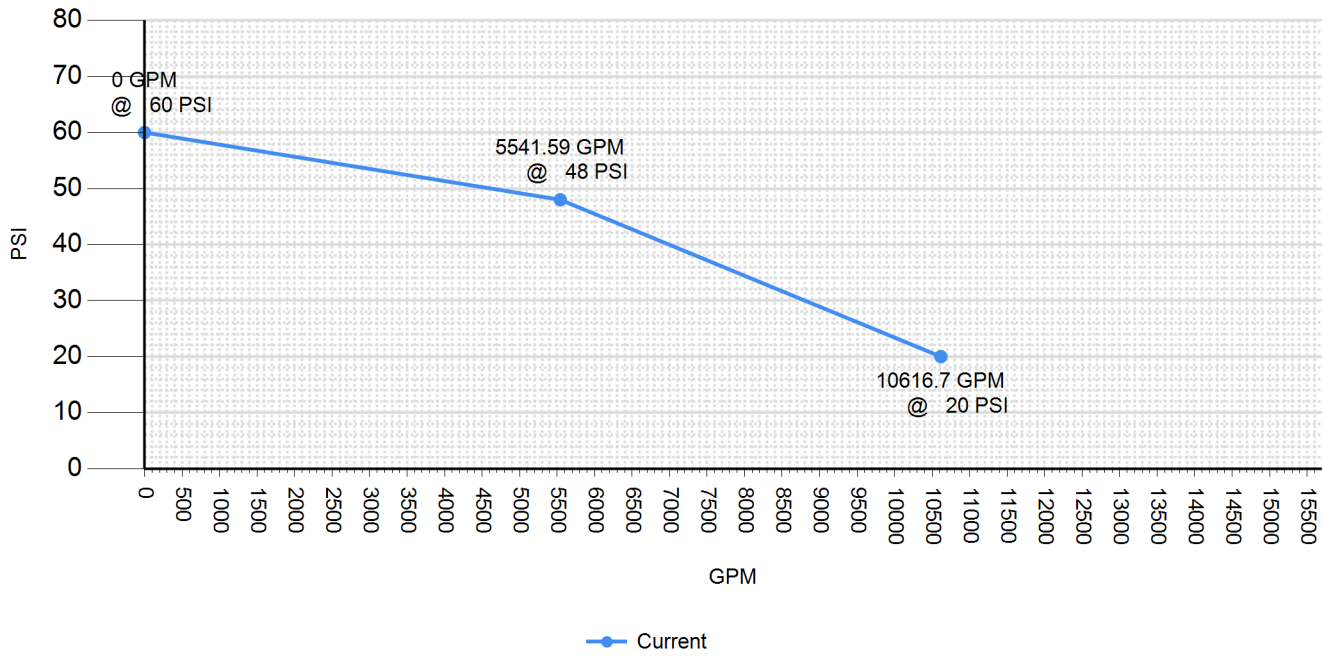
| Hydrant Piping Flow Test | |
|--|--------------------|
| 7 Health Sciences | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 28 |
| Residual psi (residual hydrant) | 20 |
| Pitot pressure (flow hydrant) | 590 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



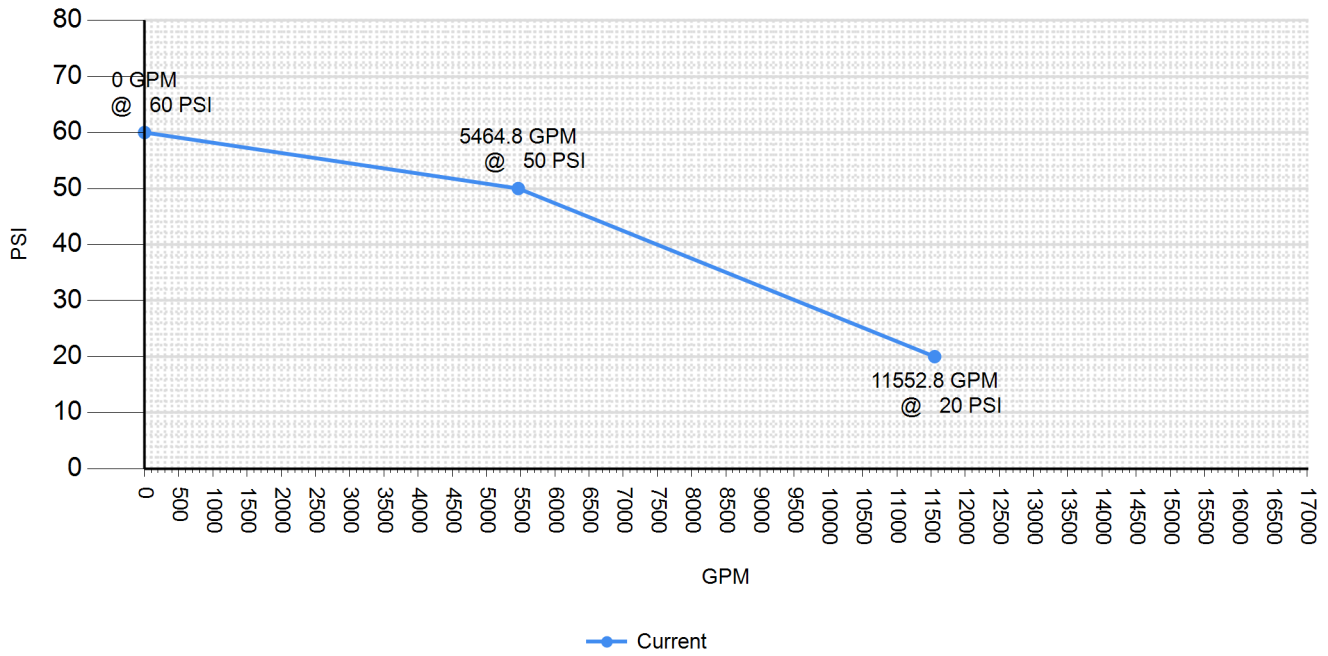
| Hydrant Piping Flow Test | |
|--|--------------------|
| 8 Knollwood center | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 60 |
| Residual psi (residual hydrant) | 48 |
| Pitot pressure (flow hydrant) | 1090 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



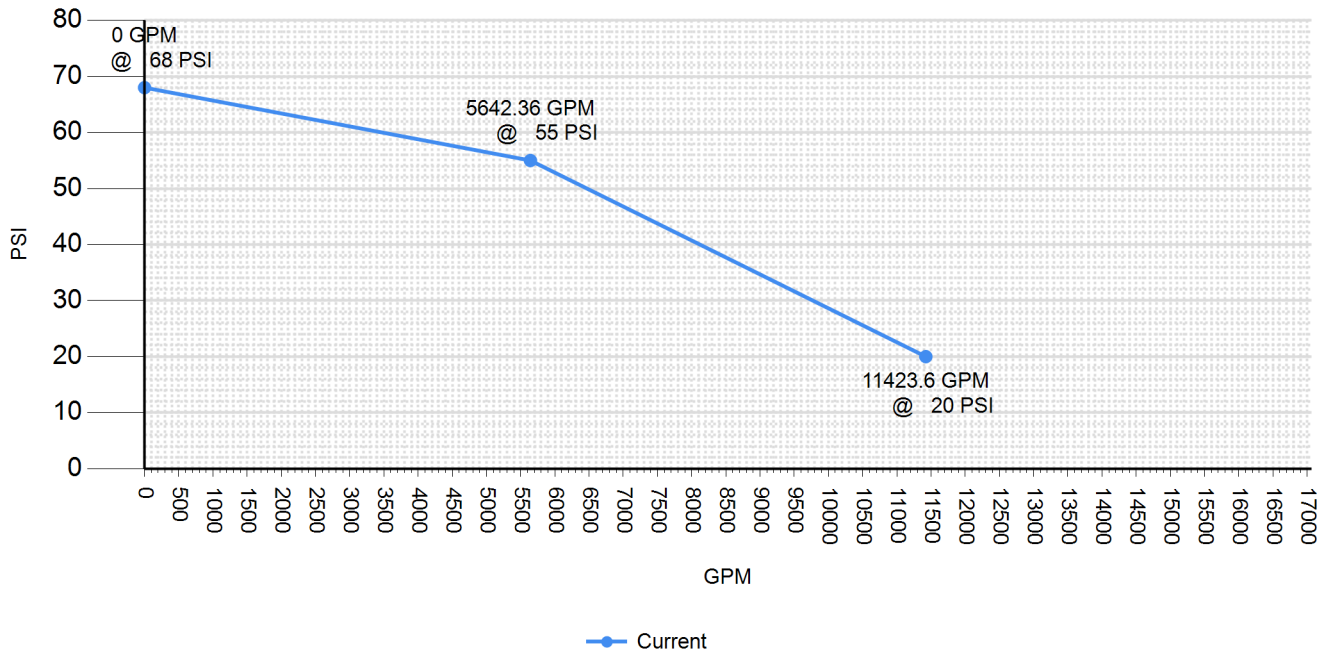
| Hydrant Piping Flow Test | |
|--|--------------------|
| 9 Library | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 60 |
| Residual psi (residual hydrant) | 50 |
| Pitot pressure (flow hydrant) | 1060 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



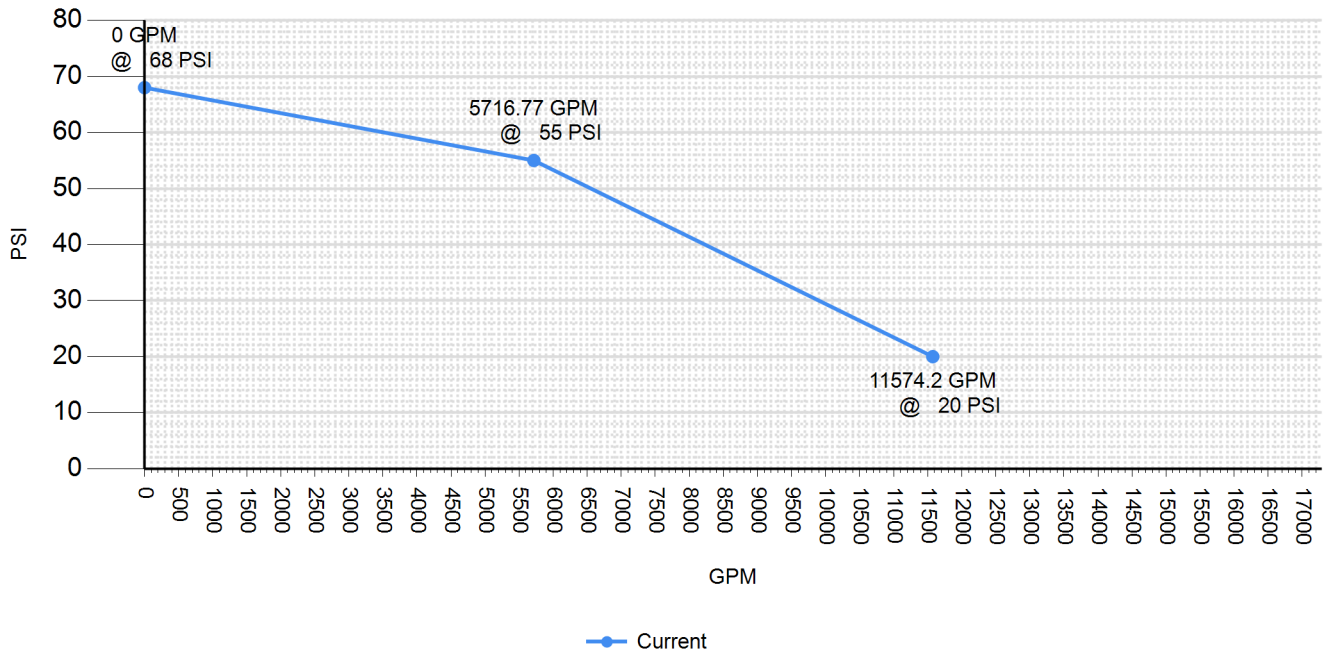
| Hydrant Piping Flow Test | |
|--|--------------------|
| 10 Maintenance front | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 68 |
| Residual psi (residual hydrant) | 55 |
| Pitot pressure (flow hydrant) | 1130 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



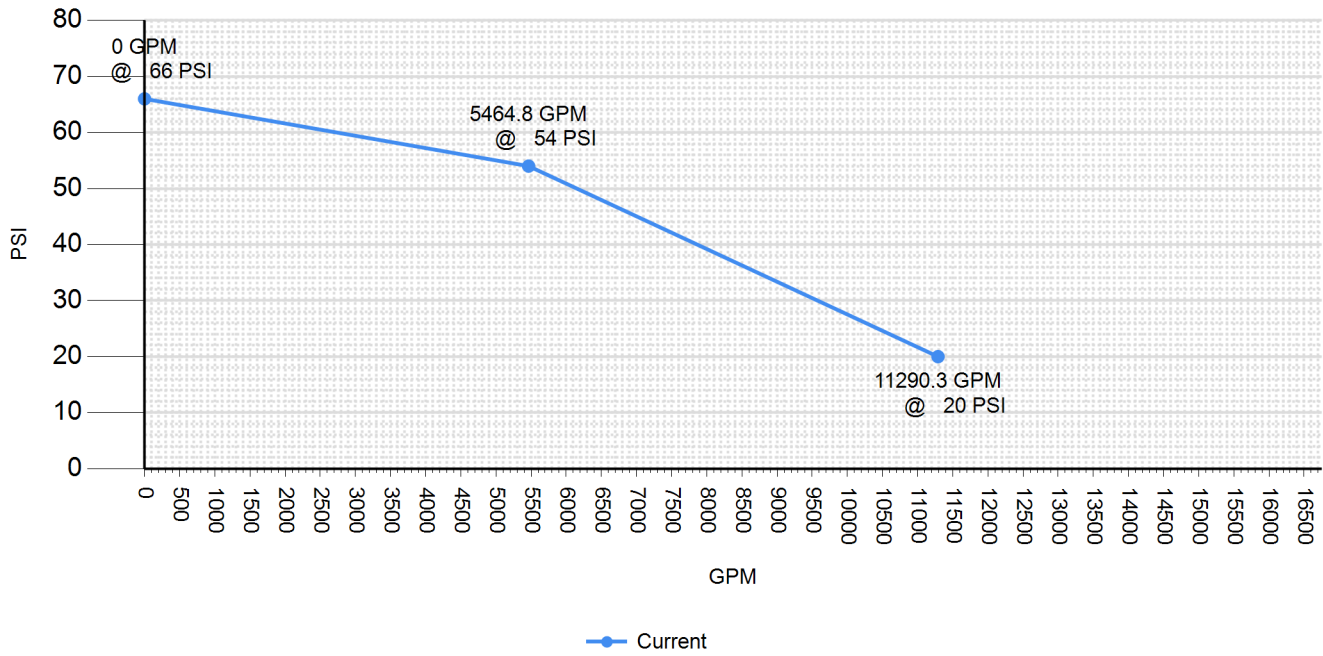
| Hydrant Piping Flow Test | |
|--|--------------------|
| 11 Maintenance west | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 68 |
| Residual psi (residual hydrant) | 55 |
| Pitot pressure (flow hydrant) | 1160 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



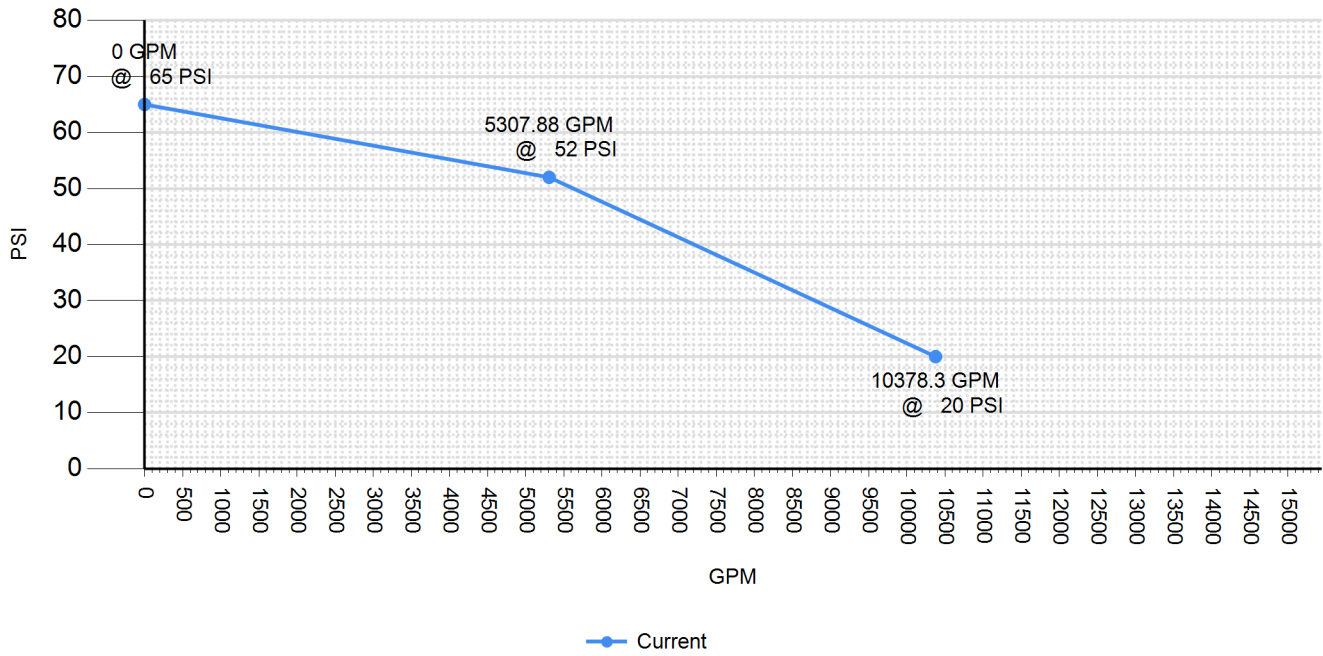
| Hydrant Piping Flow Test | |
|--|--------------------|
| 12 Phys Ed north | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 66 |
| Residual psi (residual hydrant) | 54 |
| Pitot pressure (flow hydrant) | 1060 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



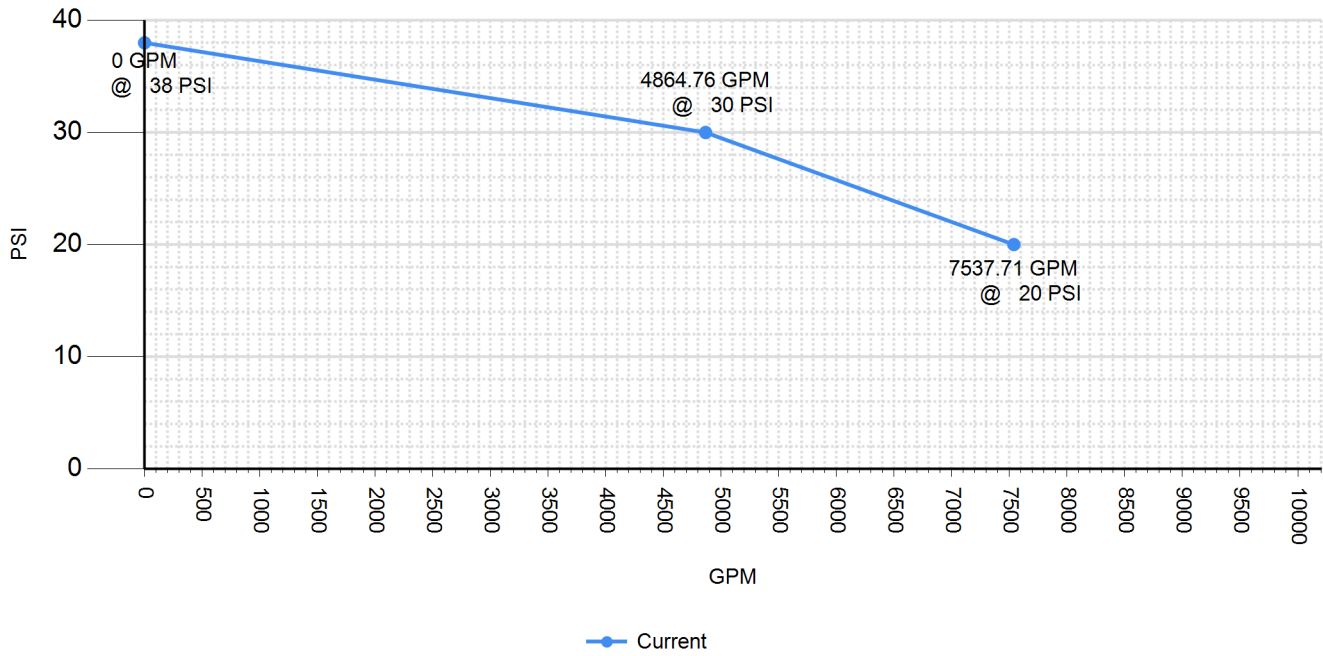
| Hydrant Piping Flow Test | |
|--|--------------------|
| 13 Phys Ed South | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 65 |
| Residual psi (residual hydrant) | 52 |
| Pitot pressure (flow hydrant) | 1000 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



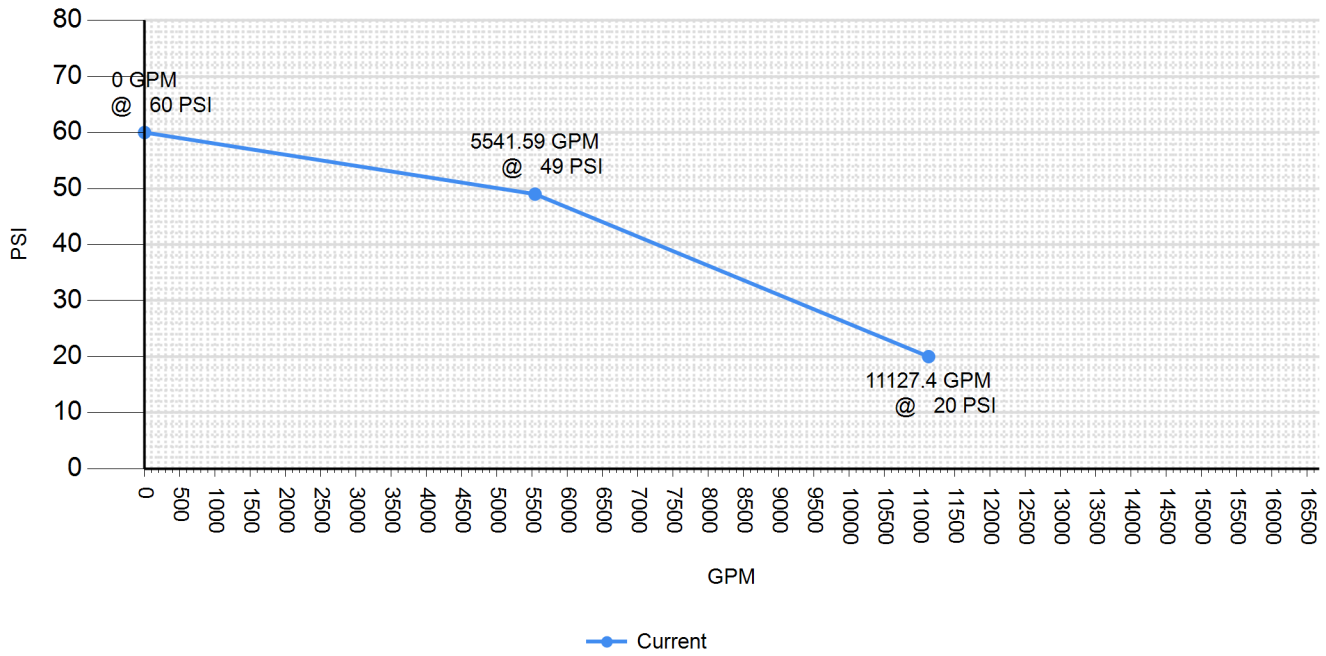
| Hydrant Piping Flow Test | |
|--|--------------------|
| 14 Science Front | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 38 |
| Residual psi (residual hydrant) | 30 |
| Pitot pressure (flow hydrant) | 840 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



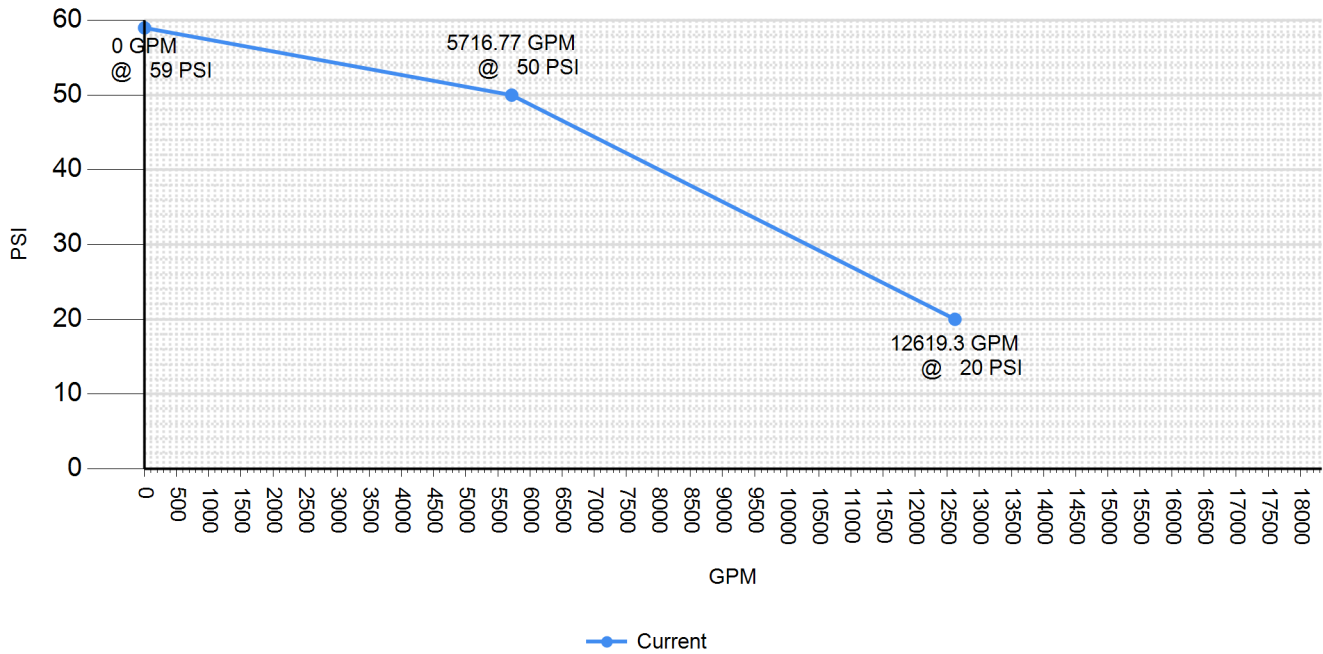
| Hydrant Piping Flow Test | |
|--|--------------------|
| 15 Student center | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 60 |
| Residual psi (residual hydrant) | 49 |
| Pitot pressure (flow hydrant) | 1090 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



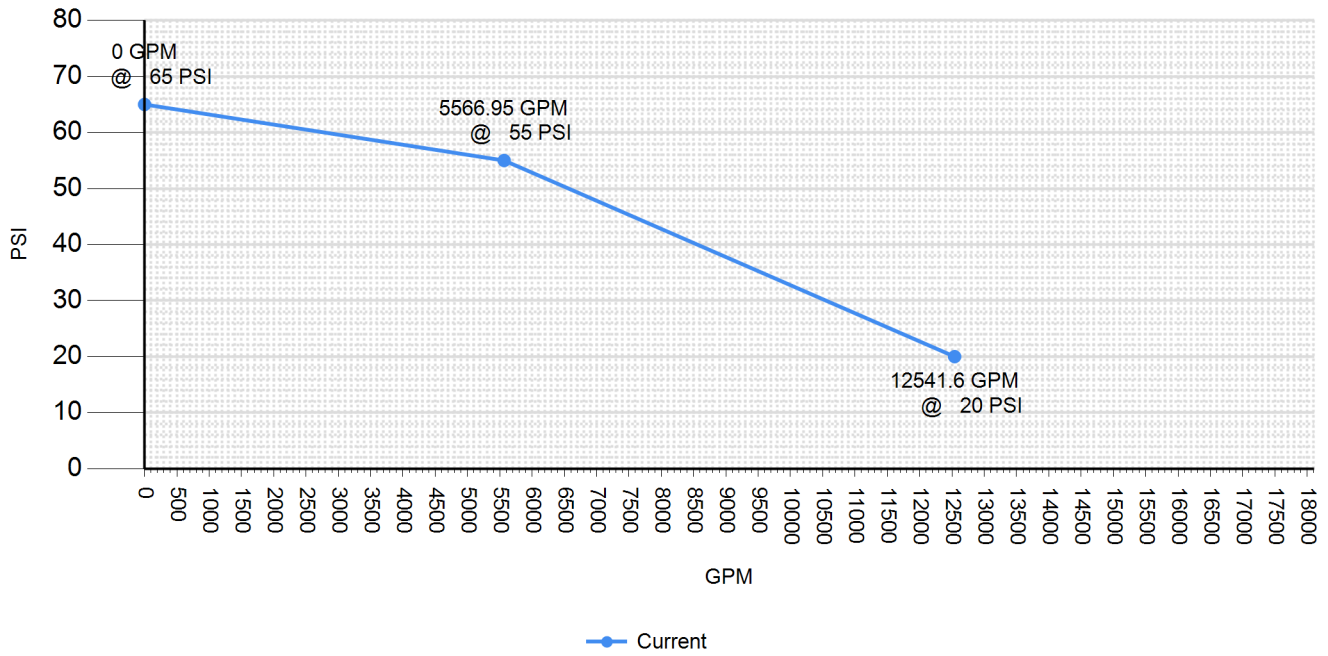
| Hydrant Piping Flow Test | |
|--|--------------------|
| 16 Tech south | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 59 |
| Residual psi (residual hydrant) | 50 |
| Pitot pressure (flow hydrant) | 1160 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



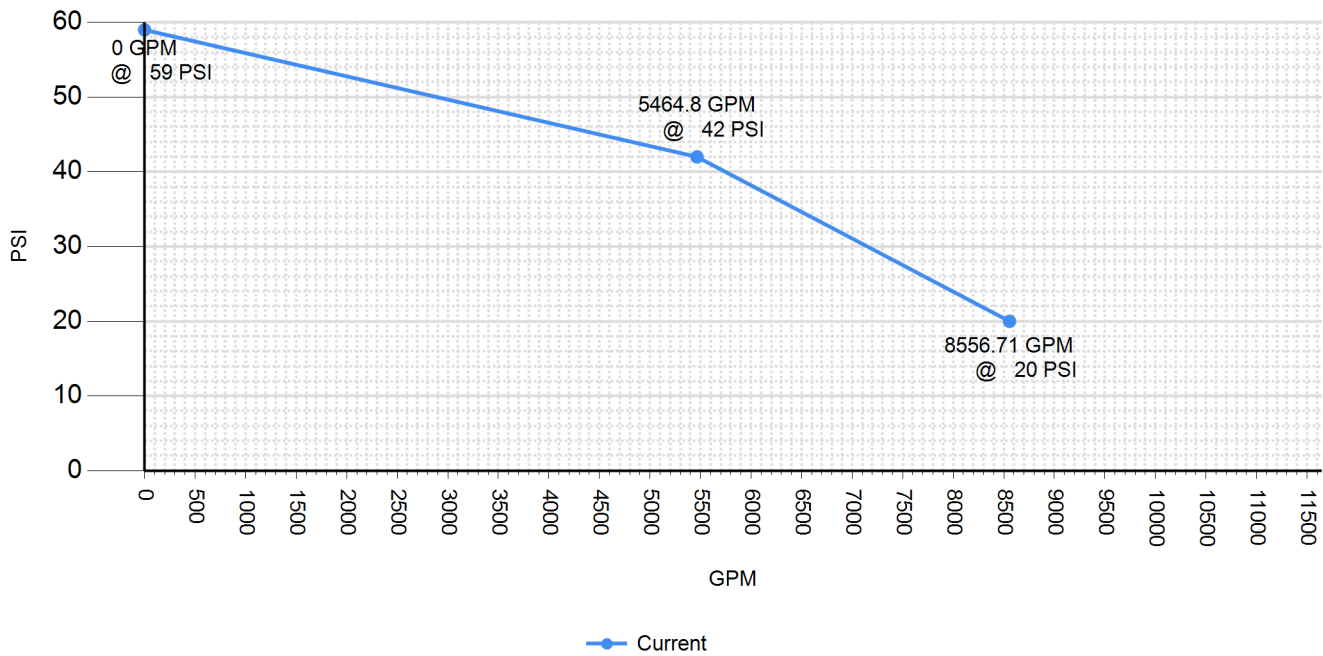
| Hydrant Piping Flow Test | |
|--|--------------------|
| 17 Tech west | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 65 |
| Residual psi (residual hydrant) | 55 |
| Pitot pressure (flow hydrant) | 1100 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



| Hydrant Piping Flow Test | |
|--|--------------------|
| 18 West gate roadway | |
| Hydrant outlet size (flow hydrant) | 2.5" |
| Type of hydrant outlet | Smooth and Rounded |
| Discharge coefficient (flow hydrant) | .9 |
| Static psi (residual hydrant) | 59 |
| Residual psi (residual hydrant) | 42 |
| Pitot pressure (flow hydrant) | 1060 |
| Flow test results show piping free of pipe degradation that would affect system performance. (7.3.1.1) | Pass |

Hydrant Flow Test Results



Deficiencies

*PAR response indicated "Pass After Repair". Technician notes a deficiency of a device, and repairs the deficiency during inspection.

Hydrant - Dry Barrel/Wall

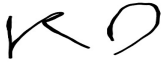
#18 West gate roadway

Ques: Hydrant accessible, free of leaks in outlets and hydrant top. (7.2.2.4)

Technician Response: Leaking bonnet- 1975 Eddy 5 1/4 barrel

Liability Release Statement:

The owner and/or designated representative acknowledges the responsibility of the operating condition of the component parts at the time of this inspection. It is agreed that the inspection service provided by the contractor as prescribed herein is limited to performing a visual inspection and/or routine testing, and any investigation or unscheduled testing, modification, maintenance, repair, etc., of the component parts is not included as part of the inspection work performed. It is further understood that all information contained herein is provided to the best of the knowledge of the party providing such information.



8/8/23



8/8/23

Customer: Richard Deliberto

Tech: Shaun Bauer