

HALDANE CENTRAL SCHOOL DISTRICT
MECHANICAL UPGRADES AND RELATED WORK
BID ADDENDUM NO. 1

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OWNER: HALDANE CENTRAL SCHOOL DISTRICT
15 CRAIGSIDE DRIVE
COLD SPRING, NY 10516

PROJECT FOR: HALDANE CENTRAL SCHOOL DISTRICT
MECHANICAL UPGRADES & RELATED WORK – PACKAGE NO.2
SED #: 48-04-01-01-04-0-001-023 MAIN BUILDING

The items set forth herein, whether of omission, addition, substitution or clarification are to be included in and form a part of the proposal submitted. This Addendum is hereby included in and made a part of the Contract Documents, dated September 13, 2021, whether or not attached thereto. All requirements of the original project specifications and drawings shall remain in force except as amended by this addendum.

DATE: September 29, 2021

Addendum consists of one page (1) plus specification sections 22 0500 and 23 0500.

THE FOLLOWING ARE MODIFICATIONS, CLARIFICATIONS, DELETIONS OR ADDITIONS TO THE SPECIFICATIONS:

SECTION 22 0500 – COMMON WORK RESULTS FOR PLUMBING
ADD specification section attached to this addendum.

SECTION 23 0500 – COMMON WORK RESULTS FOR HVAC
ADD specification section attached to this addendum.

END OF BID ADDENDUM NO.1

The following attachments are being provided for informational purposes:
Pre-Bid walkthrough Minutes of Meeting, Sign-in Sheet and List of Bidders.

The District's Controls vendor is TBS – Marshal White (518) 338-5312.

Bidder RFI Responses (In the event of a discrepancy between these responses and the contract documents, the contract documents shall prevail unless modified by addendum.)

Bid RFI-#001 dated 9/14/2021 (1 page).

Bid RFI-#002 dated 9/14/2021 (1 page).

Bid RFI-#003 dated 9/14/2021 (1 page).

**SECTION 22 0500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the general requirements that apply to the Plumbing and Plumbing Controls.
- B. The following work is specified under other Divisions, unless otherwise noted or specified hereinafter:
 - 1. Painting except as herein specified, Division 09.
 - 2. Electrical Power, Division 26.
 - 3. Installation of starters, contractors, thermal overload switches and remote push buttons, Division 26.

1.3 INTENT

- A. Requirements specified herein shall govern applicable portions of Plumbing whether so stated therein or not.
- B. It is the intent of this specification and accompanying drawings to describe and indicate the general manufacture, erection and installation of the equipment and connection to same specified herein and shown on the drawings. It is not intended that the specifications and drawings describe and indicate each piece of equipment required for installation, for where items are intended or required for satisfactory installation and are the accepted practice of the trade, they shall be considered to be both specified and indicated. Drawings are diagrammatic in nature; for piping systems; water piping is tapped off the bottom of the pipe and steam and steam condensate piping is tapped off the top of the pipe; provide all tees, elbows and swing joints as required for hookup to coils or branch piping as required for this work whether they are indicated on the drawings or not.
- C. It shall be understood that the Contractor as hereinafter mentioned shall be the Plumbing Contractor unless specifically noted otherwise.
- D. The Contractor shall furnish all plant, labor and material necessary for the complete and satisfactory installation of all Plumbing work for this contract.
- E. The Contractor shall assume the entire responsibility for the materials, workmanship and satisfactory operation of the various mechanical systems, and other work as specified herein and/or as shown on the drawings.
- F. The Contractor shall schedule and coordinate all work in close cooperation with all trades working on this project.
- G. All drawings and portions of the drawings, all floor plans, risers, details, schematics, and specifications indicated shall apply and are part of the plumbing contract.
- H. Any discrepancy or conflict noted between or within the above referenced documents shall be brought to the attention of the Architect/Engineer, in writing, a minimum of three (3) days prior to submittal of bids. The Architect/Engineer shall resolve issues prior to bid submittal.

- I. This Contractor shall carefully read the above-mentioned documents and study the drawings of all trades. He shall be responsible for neglect to read, or attend to, any paragraph or items contained therein. Failure to bring any conflicts or discrepancies to the attention of the Architect/Engineer, in writing, prior to bid submittal shall not constitute grounds for extras and/or change orders. Costs resultant from this failure shall be borne by this Contractor.

1.4 DEFINITIONS

- A. Following definition of terms and expressions used in this section are in addition to listing given in Supplementary Conditions:
1. "Provide" shall mean "furnish and install" unless otherwise indicated.
 2. "Herein" shall mean the contents of a particular section where this term appears.
 3. "Indicated" shall mean "Indicated on contract drawings".
 4. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
 5. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
 6. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 7. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
 8. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
 9. The following are industry abbreviations for plastic materials:
 - a. ABS: Acrylonitrile-butadiene-styrene plastic
 - b. CPVC: Chlorinated polyvinyl chloride plastic
 - c. NP: Nylon plastic
 - d. PE: Polyethylene Plastic
 - e. PVC: Polyvinyl chloride plastic
 10. The following are industry abbreviations for rubber materials:
 - a. CR: Chlorosulfonated polyethylene synthetic rubber
 - b. EPDM: Ethylene propylene diene terpolymer rubber
 11. For additional abbreviations see the Abbreviations and Symbols Drawings.

1.5 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for establishing grades and elevations, and checking of all interferences, and shall verify all dimensions and locations in the field.
- B. Contract drawings for mechanical work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, ducts, piping and approximate sizes and locations of equipment outlets. Mechanical trades shall follow these drawings in layout of their work, consult general construction, structural and electrical drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed.
- C. The Contractor shall verify with the A/E before bidding any item of piping or piping arrangement which may be incomplete, incorrect, or indefinite. After contract is let, the A/E's decision shall be final.

- D. All trades shall cooperate and confer with each other as to locations of their materials and equipment before erecting work, to avoid interference as much as possible, and in such a manner that will in no way retard progress of construction. In instances where interferences develop, the contractor shall relocate the work as required by the A/E regardless of which work was installed first.
- E. Where job conditions require reasonable changes to indicated locations and arrangement, make such changes without extra cost to Owner. This is not to be construed to permit redesigning of the various systems.
- F. Additional and supplementary drawings may, from time to time, be furnished, and the same, when made, are to constitute a part of the original contract. These drawings will be made to clarify the contract drawings and will not depart materially therefrom.
- G. The A/E specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to an arrangement of these connections.
- H. Special attention is called to the contract drawings and specifications involving general construction, electrical work and details thereon. Bidders are notified to carefully scrutinize these documents for the details affecting the performance of the mechanical trades.
 - 1. Install all supply piping with adequate stops on each supply to all fixtures and or equipment to be connected to distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures and or equipment. Install stops in locations where they can be easily reached for operation.
- I. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture or equipment. Valves are specified in Divisions 22 and 23.

1.6 WORK INCLUDED

- A. These specifications, and accompanying drawings are intended to cover the furnishing by this Contractor of all labor, material, and all equipment of every kind necessary for the complete installation of the various systems, and such other materials and equipment as hereinafter specified, and shall include, but not be limited to the following:
 - 1. Domestic hot water recirculating system within the building as indicated.
 - 2. All piping, valves and fittings for the various systems.
 - 3. All expansion joints, loops, anchors and guides.
 - 4. Steel supports and hangers for all equipment and piping.
 - 5. Insulation for piping and equipment as herein specified.
 - 6. All plumbing fixtures as hereinafter specified, including handicapped fixtures compliance with the handicapped code.
 - 7. Flush all water pipe and disinfect as specified.
 - 8. Setting of all sleeves and inserts in place.
 - 9. Testing, adjusting and placing in service all systems and equipment installed.
 - 10. Domestic hot water system including valves, supply valves, supply piping, and return piping to fixtures and equipment requiring hot water as indicated.
 - 11. Water supply specialties including shock absorbing devices, backflow preventers, wall hydrants, thermometers, etc.
 - 12. All plumbing fixtures, drains, floor drains, equipment, piping, fittings, valves, etc. shall be commercial for schools.
- B. The above is presented for general guidance only and does not necessarily cover the entire requirement of the project as shown on the drawings and/or as specified hereinafter.

1.7 SCHEDULE OF WORK

- A. The Contractor shall schedule all of his work to conform to the Job Progress Schedule as submitted by the General Contractor or Construction Manager, and approved by the A/E.

1.8 RELATED WORK SPECIFIED ELSEWHERE

- A. The following related work items are included in separate Divisions as follow:
 - 1. General Requirements – Division 01
 - 2. Concrete – Division 03
 - 3. Painting – Division 09
 - 4. HVAC – Division 23
 - 5. Electrical – Division 26
- B. The following items of work related to plumbing will be performed by others as follows:
 - 1. The Electrical Contractor shall do all power wiring for plumbing equipment unless otherwise noted.
 - 2. The General Contractor shall install all access panels furnished by the Plumbing Contractor.
 - 3. The HVAC Contractor shall provide drainage piping from his equipment to drains provided by Plumbing Contractor.

1.9 WORK AS A SUBCONTRACTOR

- A. When the plumbing work is subcontracted, the exact scope of work may be limited or added to at the discretion of the General Contractor. A subcontractor shall, therefore, verify the extent of his work with the General Contractor.

1.10 INTERFERENCE WITH THE OWNER'S NORMAL OPERATION

- A. All work shall be performed in such a manner as not to interfere with the normal work operations in adjacent spaces or buildings.
- B. In no way shall the Contractor:
 - 1. Block or restrict the means of egress for adjacent spaces.
 - 2. Decrease the fire rating of walls, partitions, ceilings, doors, or combination thereof of adjacent spaces or of means of egress.
 - 3. Interrupt safety systems or in any way adversely affect the safety of people or materials in adjacent spaces.
- C. The Contractor shall provide acoustical isolation of the work area via temporary doors, partitions, etc., adequate to allow normal work functions.
- D. The Contractor shall provide exhaust fans, dust proof temporary partitions and any containment measure required to prevent dirt, dust, or fumes from reaching adjacent workspaces.
- E. All personal traffic and material delivery shall be routed to absolutely minimize travel through adjacent work area.

1.11 VISIT TO SITE

- A. The Contractor shall visit the site and thoroughly acquaint himself with all existing conditions relative to type and source of service available. He shall verify location and extent of these services and consider routing, interferences and excavation required by the contract and any and all other difficulties that may be encountered.

- B. Submission of a proposal shall be construed as evidence that such an examination has been made.
- C. Failure to visit the site shall not constitute sufficient reason to warrant claims for extra monies for difficulties not apparent in the contract documents.

1.12 MANNING THE PROJECT

- A. The Contractor shall, upon initiation of construction, keep a suitable force of men on the site at all times in order to lace all sleeves, inserts, outlet boxes, fixtures and provide all other openings as are required for the satisfactory installation of equipment.

1.13 FEES AND PERMITS

- A. The Contractor shall secure all permits and pay all fees, required by local and state governing bodies, necessary to complete his phase of the construction. Failure to investigate all applicable payments before the bid submission shall not constitute grounds for additional monies from the Owner. The Owner shall be furnished with all certificates of approval.
- B. The Contractor shall provide insurance and bonding as required by the Building Owner or as stated in the General Conditions.

1.14 CODES AND STANDARDS

- A. The design, construction and installation of all materials and equipment shall be in compliance with the latest edition of all national, state and local codes or standards.
- B. The codes and standards referred to are minimum standards. Where the requirements of these specifications and the accompanying drawings exceed those of the codes and standards, the drawings and specifications shall be followed.

1.15 BASIS OF DESIGN

- A. The layout is based upon the use of particular items of equipment, identified by manufacturer's make and model number. Dimensions, arrangements, and service connections required for these particular items have been considered in making the layout. The contractor may use the equipment of any manufacturer whose name is approved for substitution on that item of equipment after he had ascertained that all provisions of MATERIAL SUBSTITUTIONS will be complied with and that all required service connections will be made at no additional cost to the Owner.
- B. Except where dimensions are shown, the drawings are diagrammatic and shall not be scaled. Exact location of fixtures, apparatus, duct work and piping shall be determined by dimensions on the site. Contractor shall refer to architectural plans and details for exact dimensions.
- C. The drawings indicate the locations of apparatus, fixtures, and piping shall be followed as closely as possible. If before the installation it is found necessary to change the location to accommodate conditions at the building, such changes shall be made at no additional cost to the Owner, and as approved by the Architect/Engineer.
- D. Equipment requiring operation, service, or maintenance during the life of the system shall be made easily accessible.
- E. Piping shall not be run within 48" of switchboards, panelboards, or motor control centers.
- F. Use of open-flame devices in work shall be accompanied by fire extinguishing apparatus within 25 feet of work location. Provide Fire Watch review of the work during each shift.

1.16 QUALITY OF MATERIALS

- A. Where a specific model and manufacturer of equipment is specified, the Contractor shall provide what is specified without substitution. Where specified as "or approved equal", the Contractor may substitute equipment except that the burden is upon the Bidder to prove such equality. If the Bidder elects to prove such equality, he must request the Architect's approval in writing to substitute such item for the specified item, stating the cost difference involved with supporting data, and samples, if required, to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty, and cost.
- B. Where a specific model of equipment is specified along with an approval equal manufacturer, no substitution will be allowed. The Contractor shall submit one of the manufacturers listed.
- C. Final approval of competitive equipment is reserved by the Engineer when, in the Engineer's opinion, the equipment does not correspond to that specified.

1.17 MATERIAL SUBSTITUTIONS

- A. Material substitutions shall be allowed only where "or equal" is stated.
- B. Material substitution submittals shall, include complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance, test data and evidence that the proposed manufacturer or his established representative maintains a qualified service organization including spare parts and is available for competent service on short notice.
- C. Each bidder by submitting his bid represents that the proposal of such article, device, product, material, fixture, form or type of construction by name, make, catalog number of manufacturer which varies with the equipment specified shall be incorporated into the project without claims against the Owner for additional cost. The bidder shall be responsible for all additional costs incurred by others due to the substitutions.
- D. The Architect/Engineer shall have the final approval of all submitted substitutions.

1.18 SUBMITTALS

- A. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- B. All submittals shall bear a stamp or notation indicating that the Contractor has reviewed and approved the submittals.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.
- D. Submittals shall be marked to show specification reference including the section and paragraph numbers.
- E. Submit each section separately and include the following:
 - 1. Information which confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - 2. Submittals on all pumps shall be complete with performance curves marked with the design points.
 - 3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.

4. Vibration isolators shall include operating weight and load distribution at each mounting point.
- F. The Contractor agrees that failure of manufacturer's submittal to conform to the above will result in a manufacturer's disqualification on this project.
- G. Submit samples as directed of items called for in the specifications; samples of the materials which the manufacturer will actually ship shall be submitted for approval after award of contract and properly labeled on this project.

1.19 PRODUCT HANDLING

- A. Following is in addition to Protection of Work and Property, General Requirements:
 1. Responsibility for care and protection of mechanical work rests with the Contractor until it has been tested and accepted.
 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury, and damage from all causes.
 3. Protective covers, skids, plugs, caps and coating shall be provided to protect equipment materials from damage during construction.
 4. All equipment and material shall be stored under cover and off the ground.
 5. For outdoor storage, protective covers of sheet plastic shall be provided. Covers shall be of gauge required for the area involved and shall be reinforced to withstand wind, rain, sleet and snow. Equipment and material shall be set on skids or platforms of sufficient height to avoid deterioration from spattering and ground water.
 6. Plug open ends of pipes when work is stopped to prevent debris from entering the pipes.
 7. Protect plumbing fixtures and other equipment with enamel or glazed surface, from damage by covering and/or coating, as recommended in Bulletin "Handling and Care of Enameled Cast Iron Plumbing Fixtures," issued by Plumbing Fixture Manufacturers' Association.
 8. Coat polished or plated metal parts with Vaseline immediately after installation.
- B. The Contractor shall receive, properly house, handle, hoist, and deliver to proper location, equipment and other materials required for the contract.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.

1.20 COORDINATION DRAWINGS

- A. Detailed layout shop drawings on all systems as required in Division 01 – Project Coordination, Division 22, 23, and 26, must be coordinated with field erection drawings for Architectural, HVAC, Plumbing, Fire Protection, and Electrical Systems by the respective contractors.
- B. Prepare coordination drawings for all areas by building, floor area and/or phase, of the project. Close attention should be implemented where limited space availability necessitates maximum utilization of space for efficient installation of different components.
- C. Mechanical, Electrical and Plumbing Prime Contractors are responsible to prepare coordination drawings to a Scale of 1/4" = 1'-0" or larger, detailing major elements, components, and systems of mechanical and electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including but not limited to the following:
 1. Proposed locations of ductwork, piping, conduit, equipment, and materials.
 2. Clearances for installing and maintaining insulation.

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3. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 4. Equipment connection and support details.
 5. Exterior wall and foundation penetrations.
 6. Fire rated wall, floor, ceiling, and roof penetrations.
 7. Sizes and location of required concrete pads and bases.
 8. Valve stem movement.
 9. Sleeves.
- D. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Clearly define relationships between sleeves, piping, ductwork, conduit, ceiling grid, lighting, fire sprinkler, HVAC equipment and other mechanical, plumbing, and electrical equipment with other components of the building such as beams, columns, ceilings, and walls.
- E. Prepare reflected ceiling plans to coordinate and integrate installations of air outlets and inlets, light fixtures, communication systems components, sprinkler, and other ceiling mounted items.
- F. Resolve conflicts between trades, prepare composite coordination drawings and obtain signatures from all affected Prime Contractors on original composite drawings. Submit coordination drawings to the Architect/Engineer and Construction Manager for approval.
- G. Mechanical, Electrical and Plumbing Prime Contractors are to first submit their respective shop drawings for approval, to the Architect/Engineer, in order to make any necessary changes prior to going through the coordination process.
- H. Coordination drawings to be signed off by affected Contractors within 45 days of Notice to Proceed. A Coordination drawing timeline schedule shall be developed and tracked.
- I. The coordination drawings shall be coordinated with the construction and phasing schedule.
- J. The routing process will begin with the HVAC Contractor who shall take the lead in the coordination of their work with all affected trades.
- K. The HVAC Contractor shall prepare CAD drawings to be used as the basis for coordination drawings in all areas or as determined by the Construction Manager (Scale: 1/4" = 1'-0" or larger). These drawings shall be completed in digital format. All architectural features shall be accounted for in preparation of this drawing, i.e., permanent casework, interior columns, partitions, finish ceiling and height, lighting and roof elevations, etc. The HVAC Contractor will provide CAD files and drawings showing all the approved ductwork. HVAC Contractor is to locate all piping with orange lines. Forward drawings to the Plumbing Contractor.
- L. The Plumbing Contractor is to locate the plumbing lines with blue lines and sprinkler lines and head locations with red lines, and resolve all conflicts and determine locations and elevations, and forward drawing to the Electrical Contractor.
- M. The Electrical Contractor to indicate all lighting fixtures, panels with associated clearances, duct banks, bus duct, conduit racks and all individual conduits 1 1/2" and larger in with green lines and resolve all conflicts and determine locations and elevations and forward to the General Construction Contractor. The General Construction Contractor will have the last coordination review. Provide overlaid coordination drawings for all General Construction work and resolve all conflicts. All architectural features shall be detailed clearly, i.e., permanent casework, interior columns, partitions, finish ceiling and roof elevations, etc. Provide a ceiling layout detailed coordination drawing showing ceilings, lights, diffusers, etc.
- N. Contractors to provide underground coordination drawings for all underground utilities; show exact location of piping stub ups, floor drains, etc. as required.

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- O. Prime Contractors shall be responsible for all costs associated with creating CAD files.
- P. All coordination meetings will be held in the Construction Manager's field office or as required by the Architect/Engineer. As each coordination drawing is completed, Contractors are to meet with the Construction Manager to review and resolve all conflicts on the coordination drawings. Contractors are required to distribute shop drawings, cut sheets and submittals to other Prime Contractors where appropriate. Approved coordination drawings will also be available for reviewing at the Construction Managers field office.
- Q. All Contractors shall provide a hard copy of the coordination drawings for review by the Architect/Engineer.
- R. Once complete and signed off, the HVAC, Plumbing and Electrical Contractors will submit dimensioned wall and slab penetration drawings and housekeeping pad drawings to the appropriate parties.
- S. If the coordination drawing process is not complete, Mechanical, Electrical and Plumbing Contractors will provide wall penetration drawings to the General Construction Contractor no later than five (5) days prior to wall erection.
- T. All Prime Contractors must install the work in accordance with the coordinated drawings at no additional cost to the Owner. No additional compensation will be made for extra ductwork offsets, piping and/or conduit or retrofit work due to improper component location, or lack of Contractor(s) coordination.
- U. All Prime Contractors shall take special care in verifying with the Electrical Contractor that the equipment matches the characteristics of the power being supplied. The Electrical Contractor is similarly bound.
- V. The Mechanical, Electrical and Plumbing Drawings are schematic in nature and are not intended to show every offset and detail. The Mechanical, Electrical and Plumbing Contractors will make adequate provisions in their bid to accommodate the actual conditions, provide all required ductwork, piping and conduit offsets per the coordination drawings, without additional cost to the Owner.
- W. The Mechanical, Electrical and Plumbing Contractors shall hang streamers from all above ceiling equipment that will require access. This is in addition to any specification requirements for tags, labels, etc. Shop drawings should also highlight these areas for Architect/Engineer's review. In addition, the Contractors shall notify the Construction Manager and Architect/Engineer of all areas where equipment maintenance access is difficult. Coordinate architecturally placed access doors with points of mechanical/electrical systems requiring that access.
- X. Specific Requirements – Required Information to be provided on Coordination Drawings:
 - 1. General Construction/Structural Work Information including but not limited to:
 - a. Openings and sleeve locations required in slabs, walls, beams, and other structural elements, including required openings not indicated on the Contract Documents.
 - b. Slab edge locations
 - c. Embed locations, as described above. Note embedded steel angles at edges of sump and sewage ejector pits, to accept basin covers.
 - d. Wall and chase spaces for housing HVAC, Plumbing, or Electrical items.
 - e. Access doors in coordination with the respective contractor systems.
 - f. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
 - 2. HVAC Work Information including but not limited to:
 - a. Sizes and bottom elevations of rectangular ductwork, including angle bracing, flanges, and support systems.

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- b. Sizes and centerline elevations of round ductwork, piping and conduit runs
 - c. Acoustical lining in ductwork.
 - d. Identification of ductwork pressure class.
 - e. Dimensions of major components, such as dampers, valves, diffusers, registers, cleanouts, coils, VAV boxes, HVAC equipment, and electrical distribution equipment.
 - f. Fire-rated enclosures around ductwork.
 - g. Access panels required.
 - h. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination
3. Plumbing and Fire Protection Information including, but not limited to:
- a. Sizes and centerline elevations of piping runs.
 - b. Locations of plumbing valves, equipment, and fixtures.
 - c. Locations of standpipes, floor control assemblies, fire hose valves, mains, piping, branch lines, pipe drops, sprinkler heads, fire pumps/controllers, and jockey pumps.
 - d. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
4. Electrical Work Information including, but not limited to:
- a. Runs of vertical and horizontal conduit, 1 ¼" diameter and larger
 - b. Light fixture locations
 - c. Exit light locations
 - d. Smoke detector and other fire alarm locations
 - e. Panelboards, switchboards, switchgear, transformers, busways, generators and motor control center, exit signs, and emergency battery pack locations.
 - f. Locations of pull boxes and junction boxes, dimensioned from column centerlines
 - g. Access panels required.
 - h. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
5. Ceiling Systems and Plenum Space Information including, but not limited to:
- a. For HVAC, Plumbing, Fire Protection, Fire Alarm, Electrical, Controls and telecommunications Work penetrating acoustical ceilings, show locations of each item (including sprinkler heads, diffusers, grilles, access doors, light fixtures, smoke detectors exit signs, speakers, and other visible ceiling mounted devices) relative to the acoustical ceiling grid.
 - b. Locate components within ceiling plenums to accommodate layout of light fixtures indicated on Drawings. Clearly indicate areas of conflict between light fixtures and other components on Coordination drawings.
 - c. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
- Y. The Sheet Metal Contractor shall prepare his work on reproducibles and submit 1/4" scale CAD drawings of the sheet metal duct field erection shop drawings for the coordination procedures, and each Contractor will supply the necessary qualified personnel for these procedures which will be conducted by the General Contractor. The HVAC, Plumbing and Fire Suppression work to the drawings where conflicts are noted and achieve solutions to any conflicts that may exist.
- Z. The General Contractor will be required to signify his acceptance of the results of the coordination procedures by signing and dating the master coordination print.
- AA. Each Contractor will be required to correct his field erection drawing(s) used as a basis for the coordination procedures to complement the results of the procedures prior to submitting same for approval. No field erection shop drawings will be accepted for approval without having been coordinated.

- BB. As part of the coordination procedures, applicable "Approval" or "Approved as Noted" copies of other trades' shop drawings will be transmitted to the Contractor. It will be each Contractor's responsibility to check these shop drawings to ascertain what effect, if any, these shop drawings have on that portion of the work under his direct responsibility. Each contractor will advise the General Contractor within forty-eight (48) hours of receipt of the shop drawings, in writing, indicating receipt of same and whether or not they have any effect on the work of his contract.

1.21 ELECTRICAL

A. Power Wiring

1. For the purpose of this specification, power wiring shall be defined as follows:
 - a. All wiring from the power source panelboards (or switchboard) to the disconnect switch to the equipment, and final connection to the equipment.
 - b. All wiring to control panels as indicated in the Electrical and Plumbing Contract Documents. (All control panels not indicated on the Electrical Contract Documents as receiving power shall do to by jumpers from other control panels, this wiring shall be considered control wiring as defined below).
2. All power wiring from the power source to the above noted switches and wiring from these switches to the equipment, including final connection to same, shall be provided under Division 26, Electrical.

B. Control Wiring

1. All other wiring required, whether line voltage or low voltage, internal or external to provide for the operation of the equipment shall be considered as control wiring.
2. All control wiring throughout the building, including wiring installed at piping, or as specified shall be provided under this Division 23.

- C. The Contractor shall furnish all motors, mounts, motor starters and remote mounted push-button controls for all electrically operated equipment furnished as part of the contract. The Contractor shall furnish all safety disconnects where described hereinafter. The Contractor shall furnish all speed control switches for all multi-speed motors. All motors shall have copper windings. (Aluminum windings will not be acceptable).

- D. This Contractor is completely responsible for the coordination with all other trades as to the correct voltage for all equipment requiring power. Equipment and or changes required to meet the project voltages will be the responsibility of this contractor.

- E. All push-button switches and starters shall be mounted under Division 26, Electrical.

- F. The Contractor shall provide all controls and control devices, all mounting for controls and all other electrical devices as specified and necessary for the complete installation and satisfactory operation of all electrically operated controls furnished under this Division.

- G. All locally mounted starters shall be furnished under Division 22, except as noted below. Where indicated hereinafter, starters shall be furnished as an integral part of equipment. Starters furnished in motor control centers shall be provided in Division 26, Electrical (refer to Electrical Drawings). Control of starters in motor control centers feeding plumbing equipment shall be provided under Division 23.

- H. Starting equipment of each motor shall be of the proper voltage and HP rated for the motor it is to serve. All starters shall be of the enclosed type; NEMA Type 1, for general-purpose enclosures; NEMA Type 4 for watertight enclosures, and NEMA Type 12 for the dust-tight enclosures. Location of motor shall determine type of enclosure to be used.

- I. Manual motor starters for single-phase motors shall be one or two poles as required, consisting of a snap switch combined with a thermal overload device. It shall be impossible for the switch to be held in a closed position under a sustained motor overload. For resetting the overload mechanism, the switch lever shall be of a design where it has to be moved to the "off" position. Starter shall be enclosed in type of enclosure for area in which it is to be used.
- J. Magnetic starters for 3-phase motors shall be furnished with 110 volt holding coils, 120-volt fused transformers, normally open and normally closed auxiliary contact and overload relay heater elements in all three phases. Provide hand/off/auto selector switch along with running status lights and external reset button.
- K. Locate starters and associated starter controls in accessible locations wherever possible. Location of starters for roof mounted equipment above ceilings shall be located at accessible locations above ceiling. Locations shall be coordinated with furniture and equipment layouts for the optimum accessible location for installation and maintenance means
- L. The Contractor shall be completely responsible for the coordination control system with control interlocks between various items of plumbing equipment.

1.22 SCAFFOLDING

- A. The Contractor shall furnish and install scaffolding, ladders and runways required in connection with his work.

1.23 TEMPORARY OPENINGS

- A. Temporary openings not indicated, which may be required for purpose of bringing equipment into building, shall be as approved. General Contractor will perform work of providing and maintaining openings, and of restoring structure; but Contractor for whom temporary openings are provided shall bear costs thereof, and for restoring structure. Ample notice shall be given of size and location of such openings by Contractor requiring same.
- B. Holes provided in General Construction work to permit installation of lines for temporary services will, after removal of such lines, be patched as specified under Division 01.

1.24 TEMPORARY SERVICE

- A. Temporary services are specified under Division 01, "General Requirements"

1.25 CUTTING AND PATCHING

- A. The Contractor shall provide all floor and wall cuts as required for piping penetrations of existing construction.
- B. No cutting of bearing walls, beams, etc., shall be done without the approval of the Architect. All patching and finishing, etc., shall match the surroundings. All cutting and patching shall be done by workmen skilled in the trades and in the employ of the General Contractor for the project. All cutting shall be done with saw type edges to give a neat and workmanlike appearance. All pipe holes shall be core drilled unless specified otherwise.
- C. Should it be necessary to do any cutting and patching due to the failure of this Contractor to give proper information to the General Contractor, it shall be done at the expense of the Plumbing Contractor.

1.26 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Plumbing Work within the building shall be as specified under Division 09.

1.27 CONCRETE WORK

- A. Concrete work shall be in accordance with Division 03.
- B. Provide 4" high concrete pads for floor mounted plumbing equipment as indicated on drawings.

1.28 SUSPENSION SUPPORT FOR EQUIPMENT

- A. All pipes and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- B. Pipes and ducts shall not be supported from other pipes, ducts, or equipment.
- C. Hangers from joists shall be attached at the panel points. Pipes and ducts with weights of 50 pound per foot (total for single or multiple runs) routed parallel with bar joists shall be supported from a minimum of 3 joists at each hanger point (channel members between joists).

1.29 ACCESS PANELS – BUILDING

- A. Valves and equipment located concealed in walls or above ceilings, and are otherwise inaccessible shall be furnished with an access panel for each location. A hinged inconspicuous type access panel complete with frame, of such size and so located as to provide proper access for service and maintenance.
- B. The minimum size of each access panel shall be 18" x 18" unless physical restraints require a smaller door.
- C. Where such equipment is located above removable concealed spline push up type acoustical tile or metal pan ceilings, it shall be considered as accessible if the acoustical material is arranged for access to the space above the ceilings.
- D. Access panels shall be Milcor "DW", or equal, for drywall locations and Milcor "K", or equal, elsewhere.
- E. Panels and frames shall be prime painted.
- F. Panels shall be furnished under this Division and installed under another Division of this Specification.
- G. Panel material shall be steel except that construction shall be all aluminum in bathroom applications.
- H. When access panels or doors are installed in fire rated construction, they shall be fire rated to match the construction.

1.30 FIRESTOP PENETRATION PROTECTION SEALING SYSTEM

- A. Where pipes pass through fire partitions, firewalls, floors, or ceilings, install a firestop that provides an effective barrier against the spread of fire, smoke, gases, and water. Fire-stop material shall be packed tight, and completely fill clearances between pipe, sleeves, and structure. All crack voids or holes (up to 4" diameter) shall be sealed using 3M brand Fire Barrier Caulk CP25 or putty 303 or an approved equal. Larger diameter or square holes, 3M system 7902, 7904, 7902R or 7904R or approved equal shall be in accordance with manufacturer's instructions
- B. Fire-stopping material shall maintain its integrity while preventing the passage of flame, smoke, gases, or water. Fire-stopping material shall be a one-part, intumescent elastomer noncombustible, noncorrosive, and compatible with synthetic cable jackets as defined by ASTM E814 (UL 1479); and in addition, for insulation materials, melting points shall be a minimum of 1700 degrees F for one-hour protection and 1850 degrees F for 2-hour protection.

1.31 RECORD DRAWINGS

- A. The Contractor shall furnish record as-built drawings to the Architect at completion and acceptance of the job. Transparencies of the original drawings with corrections shall be submitted as specified in the General Requirements.
- B. Record all changes from installation originally indicated. Record final location of underground lines by depth from finished grade and by offset distances in feet and tenths to surface improvement such as buildings, curb, or edges of walks. Where work appears on two or more drawings, Contractor shall mark changes on all drawings. Contractor shall mark changes on all drawings. At completion, furnish the above required transparencies to the A/E for approval and record. Drawings shall be certified to be record of work installed and signed by the Contractor. Work shall not be accepted until such drawings have been delivered to the A/E.

1.32 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee all equipment, materials, and appurtenances installed by him to be free from all defects for a period of one year from date of final acceptance.
- B. Upon written notice from the A/E, the Contractor shall promptly correct all defects without additional cost to the Owner. This Contractor shall adjust each part of the entire installation for proper working order. Reports are to be submitted to the A/E and adjustments repeated until the entire system is satisfactory. This Contractor must make good at his own expense, any defects in materials or workmanship that may appear.

1.33 CLEAN UP

- A. The Contractor shall be held responsible for the general clean-up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.
- B. All stickers, rust, stains, labels, and temporary covers shall be removed before final acceptance.
- C. Foreign matter shall be blown, vacuumed, or flushed out of piping, pumps, fans, motors, devices, switches, panels, and equipment.
- D. Identification plates on equipment shall be free of excess paint and shall be polished.

1.34 OPERATION AND MAINTENANCE MANUALS

- A. Submit to the Engineer for approval three manuals covering details of operation maintenance for all apparatus requiring service. The Contractor shall arrange formal instruction sessions by competent representatives of the manufacturer for the Owner's operating personnel to cover the following:
1. Plumbing Fixtures, equipment (all)
 2. Service telephone number, fax number, websites, email addresses, business and service addresses and mobile telephone numbers of the installing contractor, and manufacturer and supplier and parts counters of pumps, water heaters, backflow preventers, and other components comprising the systems.
 3. Manufacturer's operating and maintenance manuals, including detailed parts lists with numbers, power and wiring diagrams for each piece of equipment and accessory requiring services or maintenance, the guarantee period and the name, address and phone number of the nearest sales and service organization for each item. Both on print and CD's (min 3 copies) form (PDF/MS Word).
 4. Cross out options that are not used on equipment sheets, highlight options selected.
 5. Step-by-step procedure for starting, stopping, setpoint adjustment, monitoring and alarm enunciation for each system.
 6. Copies of inspection certificates provided by the City, County, State and insurance companies.
 7. Routine maintenance procedures for all plumbing equipment.
- B. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of the manuals.

1.35 INSTRUCTION TO OPERATIONAL PERSONNEL

- A. Plumbing Fixtures (all)
- B. Furnish the services of competent instructors to give full instruction to the designated Facilities personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system on the Contract Documents. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.
- C. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Owner for regular operation. Provide 8 man-hours each of instruction for, pumps, water heaters, compressors, air dryers, vacuum pumps, and other equipment required by the Owner's personnel.
- D. Instruction shall cover routine maintenance, wiring and power wiring diagrams and component analysis, preventative maintenance and scheduling, starting and stopping, alarm resets, trend-logging, setpoint adjustment, emergency and normal shutdown/startup, relative pressure control system for the morgue, alarm date stamping and all else required by the Owner for complete usage/maintenance/adjustment of equipment in their intended systems.
- E. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of instructions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Materials and equipment shall be in accordance with the specifications as outlined in each specification section describing plumbing components, fixture valves, piping, etc.
- B. All components shall be according to ASTM, ANSI, CISPI, NFPA and Code standards.
- C. Electrical equipment shall bear the underwriter label.

3.2 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.3 PROJECT MANAGEMENT AND COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specification to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule
 - 2. Preparation of the Schedule of Values

3. Installation and removal of temporary facilities and controls
4. Delivery and processing of submittals
5. Progress meetings
6. Pre-installation conferences
7. Project closeout activities
8. Startup and adjustment of systems
9. Project closeout activities

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into the work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

3.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequenced.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Number of Copies: Submit three opaque copies of each submittal. Architect, through Construction Manager, will return one copy.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect and Construction Manager will retain two copies; remainder will be returned. Markup and retain one returned copy as a Project Record Drawing.
3. Refer to individual Sections for Coordination Drawing requirements for work in those Sections.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project Site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

3.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project Superintendent, provide other administrative and supervisory personnel as required for proper performance of the work.

3.6 PROJECT MEETINGS

- A. General: Attend meetings and conferences at Project Site, unless otherwise indicated.
 - 1. Agenda: Be prepared for the meeting agenda. Distribute the agenda to all invited attendees.
 - 2. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Attend a preconstruction conference before starting construction, at a time convenient to Owner, Construction Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule
 - b. Phasing
 - c. Critical work sequencing and long-lead items
 - d. Procedures for processing field decisions and Change Orders
 - e. Procedures for requests for interpretations (RFIs)
 - f. Procedures for testing and inspecting
 - g. Procedures for processing Applications for Payment
 - h. Submittal procedures
 - i. Preparation of Record Documents
 - j. Use of the premises and existing building
 - k. Work restrictions
 - l. Owner's occupancy requirements
 - m. Responsibility for temporary facilities and controls
 - n. Construction waste management and recycling
 - o. Parking availability
 - p. Office, work, and storage areas
 - q. Equipment deliveries and priorities
 - r. First aid
 - s. Security
 - t. Progress cleaning
 - u. Working hours
 - 3. Minutes: Record and distribute meeting minutes.
- C. Pre-installation Conferences: Attend a pre-installation conference at Project Site before each construction activity that requires coordination with other construction.

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1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents
 - b. Deliveries
 - c. Review of mockups
 - d. Possible conflicts
 - e. Time schedules
 - f. Manufacturer's written recommendations
 - g. Acceptability of substrates
 - h. Temporary facilities and controls
 - i. Coordination with other work
 - j. Protection of construction and personnel
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Attend progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements
 - 2) Status of submittals
 - 3) Off-site fabrication
 - 4) Site utilization

- 5) Hazards and risks
 - 6) Progress cleaning
 - 7) Status of correction of deficient items
 - 8) Requests for interpretations (RFIs)
 - 9) Status of proposal requests
 - 10) Pending changes
 - 11) Status of Change Orders
 - 12) Pending claims and disputes
 - 13) Documentation of information for payment requests
3. Minutes: Record the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Equipment locations: All plumbing equipment shall be located to provide for manufacturer's recommended clearances, clearance for routine maintenance, clearance per code requirements and locations/clearances required for removal/replacement in the future.
1. Manufacturer's recommended clearances shall include space for proper airflow and non-short circuiting airflow pathway (plumbing equipment, etc), clearance for pumps (18" minimum around pumps), 30" clearance or complete access door swings clearances for tube pulls (heat exchangers, coil pulls, etc); locate piping to be clear of these locations.
 2. Provide minimum 36" clearance around water heaters, heat exchangers and other pressure vessels; note this is a minimum requirement, provide excess wherever possible. Provide minimum 48" clearance from power panels per the latest edition NEC having jurisdiction; include requirements for piping and ductwork at such locations.
 3. Locate equipment in mechanical rooms to allow for future removal and replacement. Include heights to overhead piping where applicable. Wherever possible, clearances shall include removal/replacement as a whole entity without knock-down.
 4. Access platforms with metal grating shall be provided for equipment located outdoors such for power and control panels for equipment located on dunnage. This access system shall provide for maintenance and requirements per codes having jurisdiction. Platforms shall include stairs and handrails per OSHA regulations.
 5. Locate roof mounted equipment minimum 10' away from edges of roof. Where equipment is located closer, provide handrail system at roof edge as required per codes having jurisdiction. Maintain clearances from handrail system to power panels.
 6. Locate air intakes 25' away from exhaust outlets and plumbing vents for healthcare facilities.
 7. Locate air intakes for kitchen air intakes min 10' away from exhaust outlets and plumbing vents from kitchen exhaust fans.

3.7 CONNECTION TO EXISTING UTILITIES

- A. If connecting to an existing piping system (water, gas, oil, sewer, steam, condensate, etc.). It shall be the responsibility of this contractor to verify the integrity of the piping system being connected. Coordinate all system shutdowns with the owner. All applicable testing and acceptance will apply.

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- B. Existing Pipe Testing: The contractor shall remove a section of piping at the point of connection between new and existing. The contractor shall determine the integrity of the existing piping after analysis of the piping section for tube wall thickness, scaling and corrosion. The analysis shall determine the ability for tie-in, pressure testing ability and remaining useful life. The contractor shall guarantee the piping integrity at the point of tie-in and subsequent acceptance. For existing piping not currently being used; the contractor shall pressure test in order to determine integrity and subsequent acceptance. Report all results in writing to the Architect/Engineer.

END OF SECTION

SECTION 23 0500
COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 STIPULATIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Sections, apply to this Section.

1.2 EXECUTION OF THE WORK

- A. These specifications call out certain duties of the HVAC Contractor and any Subcontractors. They are not intended as a material list of items required by the Contract. Any reference in these specifications and on the accompanying drawings to the Contractor, Mechanical Contractor, ATC Contractor, Mechanical HVAC Subcontractor, Subcontractor or abbreviation "M.C.", shall be construed to mean the Contractor responsible for all mechanical construction (Division 23) work for this project.
- B. This division of the specifications covers the HVAC systems of the project. It includes work performed by the mechanical trades as well as trades not normally considered as mechanical trades.
- C. Provide all items and work indicated on the Drawings and all items and work called for in this division of the specifications in accordance with the conditions of Contract (Division 01 General Requirements Documents). This includes all incidentals, equipment, appliances services, hoisting, scaffolding, supports, tools supervision, labor consumable items, fees licenses, etc., necessary to provide complete systems. Perform start-up and checkout on each item and system to provide fully operable systems.
- D. Comply with all provisions of the Contract Documents including the General Conditions, and Division 01 General Requirements of the specifications.
- E. Certain terms such as "shall, provide, install, complete, start-up" are not used in some parts of these specifications. This does not indicate that the items shall be less than completely installed or that systems shall be less than complete.
- F. Examine and compare the HVAC Drawings with these specifications and report any discrepancies between them to the Architect/Engineer and obtain from him written instructions for changes necessary in the work. At time of bid the most stringent requirements must be included in said bid.
- G. Examine and compare the HVAC Drawings and Specifications with the Drawings and Specifications of other trades, and report any discrepancies between them to the
 - a. Architect/Engineer and obtain from him written instructions for changes necessary in the work.
 - b. At time of bid, the most stringent requirements must be included in said bid.
- H. Install and coordinate the HVAC work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner approved by the Architect/Engineer. All changes required in the work of the Contractor, caused by his neglect to do so, shall be made by him at his own expense.
- I. It is the intent of the Drawings and Specifications to provide a complete code compliant workable system ready for the Owner's operation. Any item not specifically shown on the Drawings or called for in the Specifications, but normally required to conform with the intent, are to be considered a part of the Contract.
- J. These specifications are basically equipment, installation, and performance Specifications. Some installation details are indicated on the Drawings. Where these differ from the Specifications, apply the more stringent at time of bid. Upon award of bid, contact Architect/Engineer for definite instructions.

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- K. All materials furnished by the Contractor shall be new and unused (temporary services are excluded) and free from defects.
- L. All products and materials shall be new, clean, free of defects and free of damage and corrosion.
- M. The exclusion from, or limitation in, the symbolism used on the Drawings or the language used in the Specifications for HVAC work shall not be interpreted as a reason for omitting the accessories necessary to complete any required system or item of equipment.
- N. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.
- O. All items of equipment or material shall be the product of one manufacturer throughout. Multiple manufacturers will not be permitted.
- P. Receive, inspect, store, and install Owner-furnished equipment where Owner furnished equipment is supplied.

1.3 COORDINATION OF THE WORK

- A. Certain materials will be provided by other trades. Examine the Contract Documents to ascertain these requirements.
- B. Carefully check space requirements with other trades and the physical confines of the area to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings and the spaces within the existing building. Make modifications thereto as required and approved.
- C. No items foreign to the electrical system shall be run in the dedicated space of the electrical equipment. Dedicated space shall be defined as the width and depth of the equipment from the floor to the bottom of the structural ceiling. Foreign systems include but are not limited to piping, sprinklers, drip trays, etc. Contractor shall be responsible to coordinate the locations of the dedicated spaces with electrical and other trades as required.
- D. Transmit to other trades all information required for work to be provided under their respective Sections in ample time for installation.
- E. Wherever work interconnects with work of other trades, coordinate with other trades to insure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the ceiling trade will know where to install access doors and panels.
- F. Due to the type of installation, a fixed sequence of operation is required to properly install the complete systems. Coordinate, project and schedule work with other trades in accordance with the construction sequence.
- G. The locations of piping, control panels, and other equipment indicated on the Drawings are approximately correct, but they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in consequence of increase or reduction of the number of outlets, or in order to meet field conditions or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.
- H. The Drawings show only the general run of piping and approximate location of termination. Any significant changes in location of routing, necessary in order to meet field conditions shall be brought to the immediate attention of the Architect/Engineer and receive his approval before such alterations are made. All such modifications shall be made without additional cost to the Owner.
- I. Wherever the work is of sufficient complexity, prepare additional Detail Drawings to scale similar to that of the bidding Drawings, prepared on tracing medium of the same size as Contract Drawings. With these

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layouts, coordinate the work with the work of other trades. Such detailed work shall be clearly identified on the Drawings as to the area to which it applies. Submit for review Drawings clearly showing the work and its relation to the work of other trades before commencing shop fabrication or erection in the field.

- J. Contractor shall furnish services of an experienced Superintendent, who shall be in constant charge of all work, and who shall coordinate his work with the work of other trades. No work shall be installed before coordinating with other trades.
- K. Coordinate with contractors for work under other Divisions of this specification for all work necessary to accomplish this contractor's work.
- L. Where service connections are required, to equipment provided by the Owner or by other trades, this Contractor shall verify the exact requirements for these connections prior to ordering any materials or laying out any work. Where there is a discrepancy between the equipment being furnished and that shown on the Contract Drawings, the Contractor shall notify the Architect/Engineer for direction. Failure to comply with this coordination shall not constitute a reason for extra monies for equipment ordered or installed. Restocking charges will not be paid.

1.4 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.5 SUMMARY

- A. This section includes the general requirements that apply to the Mechanical and HVAC Contractor. Fire Protection and the Controls Contractor or Sub-Contractor.
- B. The following work is specified under other Divisions, unless otherwise noted or specified hereinafter:
 - 1. Concrete, Division 03.
 - 2. Roof, Division 07.
 - 3. Plumbing, Division 22.
 - 4. Electrical, Division 26.
 - 5. Installation of starters, contactors, thermal overload switches and remote push buttons, and connection of power wiring to motors, Division 26.

1.6 INTENT

- A. Requirements specified herein shall govern applicable portions of Heating, Ventilation and Air Conditioning.
- B. It is the intent of this specification and accompanying drawings to describe and indicate the general manufacture, erection and installation of the equipment and connection to same specified herein and shown on the drawings. It is not intended that the specifications and drawings describe and indicate each piece of equipment required for installation, for where items are intended or required for satisfactory installation and are considered to be the accepted practice of the trade, they shall be considered to be both specified and indicated. Drawings are diagrammatic in nature; for piping systems; water piping is tapped off the bottom of the pipe and steam and steam condensate piping is tapped off the top of the pipe; provide all tees, elbows and swing joints as required for hookup to coils or branch piping as required for this work whether they are indicated on the drawings or not.

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- C. It shall be understood that the Contractor as hereinafter mentioned shall be the Mechanical Contractor unless specifically noted otherwise.
- D. The Contractor shall furnish all plant, labor and material necessary for the complete and satisfactory installation of all Mechanical work for this contract.
- E. The Contractor shall assume the entire responsibility for the materials, workmanship and satisfactory operation of the various mechanical systems, and other work as specified herein and/or as shown on the drawings.
- F. The Contractor shall schedule and coordinate all work in close cooperation with all trades working on this project.

1.7 DEFINITIONS

- A. Following definition of terms and expressions used in this section are in addition to listing given in Supplementary Conditions:
 - 1. "Provide" shall mean "furnish and install" unless otherwise indicated.
 - 2. "Herein" shall mean the contents of a particular section where this term appears.
 - 3. "Indicated" shall mean "Indicated on contract drawings".
 - 4. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
 - 5. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
 - 6. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 - 7. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
 - 8. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
 - 9. The following are industry abbreviations for plastic materials:
 - a. ABS: Acrylonitrile-butadiene-styrene plastic
 - b. CPVC: Chlorinated polyvinyl chloride plastic
 - c. NP: Nylon plastic
 - d. PE: Polyethylene plastic
 - e. PVC: Polyvinyl chloride plastic

1.8 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for establishing grades and elevations, and checking of all interferences, and shall verify all dimensions and locations in the field.
- B. Contract drawings for mechanical work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, ducts, piping and approximate sizes and locations of equipment outlets. Mechanical trades shall follow these drawings in layout of their work, consult general construction, structural and electrical drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed.

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- C. The Contractor shall verify with the A/E before bidding any item of piping or piping arrangement which may be incomplete, incorrect, or indefinite. After contract is let, the A/E's decision shall be final.
- D. All trades shall cooperate and confer with each other as to locations of their materials and equipment before erecting work, so as to avoid interference as much as possible, and in such a manner that will in no way retard progress of construction. In instances where interferences develop, the contractor shall relocate the work as required by the A/E regardless of which work was installed first.
- E. Where job conditions require reasonable changes to indicate locations and arrangement, make such changes without extra cost to Owner. This is not to be construed to permit redesigning of the various systems.
- F. Additional and supplementary drawings may, from time to time, be furnished, and the same, when made, are to constitute a part of the original contract. These drawings will be made to clarify the contract drawings and will not depart materially therefrom.
- G. The A/E specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to an arrangement of these connections.
- H. Special attention is called to the contract drawings and specifications involving general construction, electrical work and details thereon. Bidders are notified to carefully scrutinize these documents for the details affecting the performance of the mechanical trades.

1.9 SCHEDULE OF WORK

- A. The Contractor shall schedule all his work to conform to the Job Progress Schedule as submitted by the General Contractor or Construction Manager and approved by the A/E and school district.

1.10 PREMIUM TIME WORK

- A. The following work shall be performed at night or weekends other than holiday weekends, as directed and coordinated with the Owner:
 - 1. Tie connections to all existing systems.

1.11 PROGRESS OF WORK

- A. The Contractor shall order the progress of his work so as to conform to the progress of the work of other trades and shall complete the entire installation as soon as the conditions of the building will permit. Any cost resulting from the defective or ill-timed work performed under this section shall be borne by the Contractor.

1.12 DELIVERY, STORAGE, PROTECTION AND HANDLING

- A. Deliver, store, protect and handle 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. Any such repairs shall be subject to review and acceptance of the Architect/Engineer.
- B. Delivery of Materials: Delivery materials in manufacturer's unopened container fully identified with manufacturer's name, trade name, type, class, grade, size and color.
- C. Storage of Materials, Equipment and Fixtures: Store materials suitably sheltered from the elements, but readily accessibly for inspection by the Architect/Engineer until installed. Store all items, susceptible to moisture damage, in dry, heated spaces.

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- D. Protect materials and equipment according to the manufacturer's instruction. Protection shall include damage due to fire, water, rust, oxidation, sunlight (for UV sensitive materials), breakage of UV lights, etc.
- E. Following is in addition to Protection of Work and Property, General Requirements:
 - 1. Responsibility for care and protection of mechanical work rests with the Contractor until it has been tested and accepted.
 - 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury and damage from all causes.
 - 3. Protective covers, skids, plugs, caps and coating shall be provided to protect equipment materials from damage during construction.
 - 4. All equipment and material shall be stored under cover and off the ground.
 - 5. For outdoor storage, protective covers of sheet plastic shall be provided. Covers shall be of gauge required for the area involved and shall be reinforced to withstand wind, rain, sleet and snow. Equipment and material shall be set on skids or platforms of sufficient height to avoid deterioration from spattering and ground water.
 - 6. Plug open ends of pipes when work is stopped to prevent debris from entering the pipes.
 - 7. Coat polished or plated metal parts with Vaseline immediately after installation.
- F. The Contractor shall receive, properly house, handle, hoist, and deliver to proper location, equipment and other materials required for the contract.
- G. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.

1.13 INTERFERENCE WITH THE OWNER'S NORMAL OPERATION

- A. All work shall be performed in such a manner as not to interfere with the normal work operations in adjacent spaces or buildings.
- B. In no way shall the Contractor:
 - 1. Block or restrict the means of egress for adjacent spaces.
 - 2. Decrease the fire rating of walls, partitions, ceilings, doors or combination thereof of adjacent spaces or of means of egress.
 - 3. Interrupt safety systems or in any way adversely affect the safety of people or materials in adjacent spaces.
- C. The Contractor shall provide acoustical isolation of the work area via temporary doors, partitions, etc., adequate to allow normal work functions.
- D. The Contractor shall provide exhaust fans, dust proof temporary partitions and any containment measure required to prevent dirt, dust, or fumes from reaching adjacent work spaces.
- E. All personal traffic and material delivery shall be routed so as to absolutely minimize travel through adjacent work area.

1.14 VISIT TO SITE

- A. The Contractor shall visit the site and thoroughly acquaint himself with all existing conditions relative to type and source of service available. He shall verify location and extent of these services and consider routing, interferences and excavation required by the contract and any and all other difficulties that may be encountered.

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- B. Submission of a proposal shall be construed as evidence that such an examination has been made.
- C. Failure to visit the site shall not constitute sufficient reason to warrant claims for extra monies for difficulties not apparent in the contract documents.

1.15 MANNING THE PROJECT

- A. The Contractor shall, upon initiation of construction, keep a suitable force of men on the site at all times in order to lace all sleeves, inserts, outlet boxes, fixtures and provide all other openings as are required for the satisfactory installation of equipment.

1.16 FEES AND PERMITS

- A. The Contractor shall secure all permits and pay all fees, required by local and state governing bodies, necessary to complete his phase of the construction. Failure to investigate all applicable payments before the bid submission shall not constitute grounds for additional monies from the Owner. The Owner shall be furnished with all certificates of approval.
- B. The Contractor shall provide insurance and bonding as required by the Building Owner or as stated in the General Conditions.

1.17 CODES AND STANDARDS

- A. The design, construction and installation of all materials and equipment shall be in compliance with the latest edition of all national, state and local codes or standards.
- B. The codes and standards referred to are minimum standards. Where the requirements of these specifications and the accompanying drawings exceed those of the codes and standards, the drawings and specifications shall be followed.

1.18 BASIS OF DESIGN

- A. The layout is based upon the use of particular items of equipment, identified by manufacturer's make and model number. Dimensions, arrangements and service connections required for these particular items have been considered in making the layout. The contractor may use the equipment of any manufacturer whose name is approved for substitution on that item of equipment after he had ascertained that all provisions of MATERIAL SUBSTITUTIONS will be complied with and that all required service connections will be made at no additional cost to the Owner.
- B. Manufacturers are listed for a quality assurance level only. Although a manufacturer is listed does not constitute compliance with the specification size, weight, functionality, capacity, noise, or performance levels. It is this contractor's responsibility to assure the proposed manufacturer has complete compliance with the Contract Documents, **prior to bidding**.
- C. Except where dimensions are shown, the drawings are diagrammatic and shall not be scaled. Exact location of fixtures, apparatus, duct work and piping shall be determined by dimensions on the site. Contractor shall refer to architectural plans and details for exact dimensions.
- D. The drawings indicate the locations of apparatus and piping shall be followed as closely as possible. If before the installation it is found necessary to change the location to accommodate conditions at the building, such changes shall be made at no additional cost to the Owner, and as approved by the Architect/Engineer.
- E. Equipment requiring operation, service or maintenance during the life of the system shall be made easily accessible.

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- F. Ductwork or piping shall not be run within 48" of switchboards, panelboards or motor control centers.
- G. No piping to other HVAC items shall be run in the dedicated equipment space as defined in the N.E.C. (NFPA 70). The dedicated equipment space is the space equal to the width and depth of the equipment and extending from the floor to a height of 6ft. Refer to the National Electrical Code section 11 0. 26 (E) for further information. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone. It is this contractor's responsibility to coordinate with the electrical contractor for all phases of this project.
- H. Use of open-flame devices in work shall be accompanied by fire extinguishing apparatus within 25 feet of work location. All work shall be done in accordance with the general construction requirements and fire watch procedures.

1.19 QUALITY OF MATERIALS

- A. Where a specific model and manufacturer of equipment is specified, the Contractor shall provide what is specified without substitution. Where specified as "or approved equal", the Contractor may substitute equipment except that the burden is upon the Bidder to prove such equality. If the Bidder elects to prove such equality, he must request the Architect's approval in writing to substitute such item for the specified item, stating the cost difference involved with supporting data, and samples, if required, to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty and cost.
- B. Where a specific model of equipment is specified along with an approval equal manufacturer, no substitution will be allowed. The Contractor shall submit one of the manufacturers listed.
- C. Final approval of competitive equipment is reserved by the Engineer when, in the Engineer's opinion, the equipment does not correspond to that specified.

1.20 MATERIAL SUBSTITUTIONS

- A. Material substitutions shall be allowed only where "or equivalent" is stated.
- B. Material substitution submittals shall, include complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance, test data and evidence that the proposed manufacturer or his established representative maintains a qualified service organization including spare parts and is available for competent service on short notice.
- C. Each bidder by submitting his bid represents that the proposal of such article, device, product, material, fixture, form or type of construction by name, make, catalog number of manufacturer which varies with the equipment specified shall be incorporated into the project without claims against the Owner for additional cost. The bidder shall be responsible for all additional costs incurred by others due to the substitutions.
- D. The Architect/Engineer shall have the final approval of all submitted substitutions.
- E. Manufacturers are listed for a quality assurance level only. Although a manufacturer is listed does not constitute compliance with the specification size, weight, functionality, capacity, noise, or performance levels. It is this contractor's responsibility to assure the proposed manufacturer has complete compliance with the Contract Documents, **prior to bidding**.

1.21 SUBMITTALS

- A. Product Data, Shop Drawings: Submit for approval by the authority having jurisdiction and the Owner's insurance underwriter.

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B. Product Shop Drawing Submittal List:

1. Within thirty (30) days after date of execution of the Owner/Contractor Agreement, submit for review and acceptance, a list of all material and equipment manufacturers whose products are proposed, as well as names of all subcontractors whom this trade proposes to employ.
2. Any requests for substitutions of equipment or materials must be submitted and returned prior to submitting the Submittal List. Only specified or accepted manufacturers or suppliers shall appear on the Submittal List.
3. The complete Submittal List must be reviewed and accepted by the Architect/Engineer prior to submittal of Shop Drawings. No Shop Drawings will be processed without an accepted Submittal List.
4. The Submittal List shall include all material, systems, and equipment specified herein.

C. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

D. All submittals shall bear a stamp or notation indicating that the Contractor has reviewed and approved the submittals.

E. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.

F. Submittals shall be marked to show specification reference including the section and paragraph numbers.

G. Submit each section separately and include the following:

1. Information which confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Submittals on all pumps and fans shall be complete with performance curves marked with the design points.
3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.
4. Vibration isolators shall include operating weight and load distribution at each mounting point.

H. The Contractor agrees that failure of manufacturer's submittal to conform to the above will result in a manufacturer's disqualification on this project.

I. Submit samples as directed of items called for in the specifications; samples of the materials which the manufacturer will actually ship shall be submitted for approval after award of contract and properly labeled on this project.

1.22 ELECTRICAL

A. Power Wiring

1. For the purpose of this specification, power wiring shall be defined as follows:

- a. All wiring from the power source panelboards (or switchboard) to the disconnect switch to the equipment, and final connection to the equipment.
- b. All wiring to control panels as indicated in the Electrical and Mechanical Contract Documents. (All control panels not indicated on the Electrical Contract Documents as receiving power shall do so by jumpers from other control panels, this wiring shall be considered control wiring as defined below).

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2. All power wiring from the power source to the above noted switches and wiring from these switches to the equipment, including final connection to same, shall be provided under Division 26, Electrical.
- B. Control Wiring
1. All other wiring required, whether line voltage or low voltage, internal or external to provide for the operation of the equipment shall be considered as control wiring. This shall include power wiring from transformers serving dampers at exhaust fans; wire to damper and fan end switch to starter.
 2. All control wiring throughout the building, including wiring installed at piping, in ductwork, or as specified shall be provided under this Division.
- C. The Contractor shall furnish all motors, mounts, motor starters and remote mounted push-button controls for all electrically operated equipment furnished as part of the contract. The Contractor shall furnish all safety disconnects. The Contractor shall furnish all speed control switches for all multi-speed motors. All motors shall have copper windings. (Aluminum windings will not be acceptable).
- D. This Contractor is completely responsible for the coordination with all other trades as to the correct voltage for all equipment requiring power. Equipment and or changes required to meet the project voltages will be the responsibility of this contractor.
- E. All push-button switches and starters shall be mounted under Division 26, Electrical.
- F. The Contractor shall provide all controls and control devices, all mounting for controls and all other electrical devices as specified and necessary for the complete installation and satisfactory operation of all electrically operated controls furnished under this Division.
- G. All locally mounted starters shall be furnished under Division 23, except as noted below. Where indicated hereinafter, starters shall be furnished as an integral part of equipment. Starters furnished in motor control centers shall be provided in Division 26, Electrical (refer to Electrical Drawings). Control of starters in motor control centers feeding mechanical equipment shall be provided under Division 23.
- H. Starting equipment of each motor shall be of the proper voltage and HP rated for the motor it is to serve. All starters shall be of the enclosed type; NEMA Type 1, for general-purpose enclosures; NEMA Type 4 for watertight enclosures, and NEMA Type 12 for the dust-tight enclosures. Location of motor shall determine type of enclosure to be used.
- I. Manual motor starters for single-phase motors shall be one or two poles as required, consisting of a snap switch combined with a thermal overload device. It shall be impossible for the switch to be held in a closed position under a sustained motor overload. For resetting the overload mechanism, the switch lever shall be of a design where it has to be moved to the "off" position. Starter shall be enclosed in type of enclosure for area in which it is to be used.
- J. Magnetic starters for 3-phase motors shall be furnished with 110 volt holding coils, 120 volt fused transformers, normally open and normally closed auxiliary contact and overload relay heater elements in all three phases. Provide hand/off/auto selector switch along with running status lights and external reset button.
- K. Locate starters and associated starter controls in accessible locations wherever possible. Location of starters for roof mounted exhaust fans and mechanical equipment above ceilings shall be located at accessible locations above ceiling. Locations shall be coordinated with furniture and equipment layouts for the optimum accessible location for installation and maintenance means.
- L. The Contractor shall be completely responsible for the coordination of automatic temperature control system with control interlocks between various items of mechanical equipment.

1.23 SCAFFOLDING

- A. The Contractor shall furnish and install scaffolding, ladders and runways required in connection with his work.

1.24 TEMPORARY OPENINGS

- A. Temporary openings not indicated, which may be required for purpose of bringing equipment into building, shall be as approved. General Contractor will perform work of providing and maintaining openings, and of restoring structure; but Contractor for whom temporary openings are provided shall bear costs thereof, and for restoring structure. Ample notice shall be given of size and location of such openings by Contractor requiring same.
- B. Holes provided in General Construction work to permit installation of lines for temporary mechanical services will, after removal of such lines, be patched as specified under Division 01.

1.25 TEMPORARY SERVICE

- A. Temporary services are specified under Division 01, “General Requirements”.

1.26 CUTTING AND PATCHING

- A. The Contractor shall provide all floor and wall cuts as required for ductwork and piping penetrations of existing construction.
- B. No cutting of bearing walls, beams, etc., shall be done without the approval of the Architect. All patching and finishing, etc., shall match the surroundings. All cutting and patching shall be done by workmen skilled in the trades and in the employ of the General Contractor for the project. All cuttings shall be done with saw type edges to give a neat and workmanlike appearance. All pipe holes shall be core drilled unless specified otherwise.
- C. Should it be necessary to do any cutting and patching due to the failure of this Contractor to give proper information to the General Contractor, it shall be done at the expense of the Mechanical Contractor.

1.27 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Mechanical Work within the building and on the roof shall be as specified under Division 09.
- B. All mechanical equipment shall have a factory-applied prime and finish coat of paint. Galvanized surfaces shall be considered as finished surfaces for equipment rooms and items concealed from view. Plastic products shall be acceptable without a finish coat of paint. All items of equipment marred or rusted, even though factory finished, shall be repainted; steel angles and steel supports for ductwork, piping or miscellaneous equipment shall have a prime coat of paint before installation.
- C. General Contractor to paint all exposed piping, equipment, and trim that does not have a factory applied finish. Refer to Division 09 "Painting" for paint materials, surface preparation and application of paint. Paint shall be semi-gloss, acrylic-enamel paint. Coat components with two (2) coats of finish paint over two (2) coats of rust inhibitive metal primer or approved equivalent based on component type.

1.28 CONCRETE WORK

- A. Concrete work shall be in accordance with Division 03.

1.29 SUSPENSION SUPPORT FOR PIPES & EQUIPMENT

- A. All pipes and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- B. Pipes shall not be supported from other pipes, ducts, or equipment.
- C. Hangers from joists shall be attached at the panel points. Pipes with weights of 50 pound per foot (total for single or multiple runs) routed parallel with bar joists shall be supported from a minimum of 3 joists at each hanger point (channel members between joists).

1.30 ACCESS PANELS – BUILDING

- A. Access plates and valves located concealed in walls or above ceilings, and are otherwise inaccessible shall be furnished with an access panel for each location. A hinged inconspicuous type access panel complete with frame, of such size and so located as to provide proper access for service and maintenance.
- B. The minimum size of each access panel shall be 18" x 18" unless physical restraints require a smaller door.
- C. Panels shall be furnished under this Division and installed under another Division of the Specification.
- D. When access panels or doors are installed in fire rated construction, they shall be fire rated to match the construction.

1.31 FIRESTOP PENETRATION PROTECTION SEALING SYSTEM

- A. Where pipes pass through fire partitions, firewalls, floors or ceilings, install a firestop that provides an effective barrier against the spread of fire, smoke, gases and water. Fire-stop material shall be packed tight, and completely fill clearances between pipe, sleeves and structure. All crack voids or holes (up to 4" diameter) shall be sealed using 3M brand Fire Barrier Caulk CP25 or putty 303 or an approved equal. Larger diameter or square holes, 3M system 7902, 7904, 7902R or 7904R or approved equal shall be in accordance with manufacturer's instructions.
- B. Fire-stopping material shall maintain its integrity while preventing the passage of flame, smoke, gases or water. Fire-stopping material shall be a one-part, intumescent elastomer noncombustible, noncorrosive and compatible with synthetic cable jackets as defined by ASTM E814 (UL 1479); and in addition for insulation materials, melting points shall be a minimum of 1700 degrees F for one-hour protection and 1850 degrees F for 2-hour protection.

1.32 RECORD DRAWINGS

- A. The Contractor shall furnish record as-built drawings to the Architect at completion and acceptance of the job. Transparencies of the original drawings with corrections shall be submitted as specified in the General Requirements.
- B. Record all changes from installation originally indicated. Record final location of underground lines by depth from finished grade and by offset distances in feet and tenths to surface improvement such as buildings, curb, or edges of walks. Where work appears on two or more drawings, Contractor shall mark changes on all drawings. Contractor shall mark changes on all drawings. At completion, furnish the above required transparencies to the A/E for approval and record. Drawings shall be certified to be record of work installed and signed by the Contractor. Work shall not be accepted until such drawings have been delivered to the A/E.

1.33 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee all equipment, materials, and appurtenances installed by him to be free from all defects for a period of one year from date of final acceptance.
- B. Upon written notice from the A/E, the Contractor shall promptly correct all defects without additional cost to the Owner. This Contractor shall adjust each part of the entire installation for proper working order. Reports are to be submitted to the A/E and adjustments repeated until the entire system is satisfactory. This Contractor must make good, at his own expense, any defects in materials or workmanship that may appear.

1.34 CLEAN UP

- A. The Contractor shall be held responsible for the general clean up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.
- B. All stickers, rust, stains, labels and temporary covers shall be removed before final acceptance.
- C. Foreign matter shall be blown, vacuumed or flushed out of piping, pumps, fans, motors, devices, switches, panels, duct work and equipment.
- D. Identification plates on equipment shall be free of excess paint and shall be polished.

1.35 OPERATION AND MAINTENANCE MANUALS

- A. Submit to the Engineer for approval three manuals covering details of operation maintenance for all apparatus requiring service. The Contractor shall arrange formal instruction sessions by competent representatives of the manufacturer for the Owner's operating personnel to cover the following:
 - 1. Service telephone number, fax number, websites, email addresses, business and service addresses and mobile telephone numbers of the installing contractor, and manufacturer and supplier and parts counters of pumps, fans, air handling units, condensate return units, chillers, CV boxes, fan coil units and other components comprising the systems.
 - 2. Manufacturer's operating and maintenance manuals, including detailed parts lists with numbers, power and control wiring diagrams for each piece of equipment and accessory requiring services or maintenance, the guarantee period and the name, address and phone number of the nearest sales and service organization for each item. Both on print and CD's (min 3 copies) form (PDF/MS Word).
 - 3. Cross out options that are not used on equipment sheets, highlight options selected.
 - 4. Step-by-step procedure for starting, stopping, setpoint adjustment, monitoring and alarm enunciation for each system.
 - 5. Copies of inspection certificates provided by the City, County, State and insurance companies.
 - 6. Provide separate Operation and Maintenance Manuals covering the FMCS and in compliance with this section.
 - 7. Routine maintenance procedures and scheduling for all mechanical equipment.
- B. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of the manuals.

1.36 INSTRUCTION TO OPERATIONAL PERSONNEL

- A. Furnish the services of competent instructors to give full instruction to the designated Facilities personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system on the Contract Documents. Instructors shall be thoroughly familiar with all parts of

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the installation and shall be trained in operating theory as well as practical operation and maintenance work.

- B. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Owner for regular operation. Provide 4 man-hours of instruction for each: chemical treatment/glycol systems, pumps, exhaust and intake fans, heat exchangers, CV boxes, fan coil units, condensate return units; 8 man-hours for the AH-1 air handling unit and components including the UV system, 24 man hours for the CH-1 chiller; and 40 man hours instruction for the FMCS (operational, maintenance, programming instruction for trend logging and charting, setpoint adjustment schemes, alarm functionality and other routine operational commands/functions) required by the Owner's personnel..
- C. Instruction shall cover routine maintenance, control and power wiring diagrams and component analysis, preventative maintenance and scheduling, starting and stopping, alarm resets, trend-logging, setpoint adjustment, emergency and normal shutdown/startup, alarm date stamping and all else required by the Owner for complete usage/maintenance/adjustment of equipment in their intended systems.
- D. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of instructions.

PART 2 - PRODUCTS

2.1 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Acceptable Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Accepted substitute in accordance with Section 01 60 0.
 - 2. Sealing Elements: EPDM interlocking inks, shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
- B. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.2 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239 inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.3 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With hinge and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.4 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000 psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PROJECT MANAGEMENT AND COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specification to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

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1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule
 2. Preparation of the Schedule of Values
 3. Installation and removal of temporary facilities and controls
 4. Delivery and processing of submittals
 5. Progress meetings
 6. Pre-installation conferences
 7. Project closeout activities
 8. Startup and adjustment of systems
 9. Project closeout activities
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into the work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

3.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequenced.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

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2. Number of Copies: Submit three opaque copies of each submittal. Architect, through Construction Manager, will return one copy.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect and Construction Manager will retain two copies; remainder will be returned. Markup and retain one returned copy as a Project Record Drawing.
 3. Refer to individual Sections for Coordination Drawing requirements for work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project Site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

3.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project Superintendent, provide other administrative and supervisory personnel as required for proper performance of the work.

3.5 PROJECT MEETINGS

- A. General: Attend meetings and conferences at Project Site, unless otherwise indicated.
- B. Preconstruction Conference: Attend a preconstruction conference before starting construction, at a time convenient to Owner, Construction Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- C. Pre-installation Conferences: Attend a pre-installation conference at Project Site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents
 - b. Deliveries
 - c. Review of mockups
 - d. Possible conflicts
 - e. Time schedules
 - f. Manufacturer's written recommendations
 - g. Acceptability of substrates
 - h. Temporary facilities and controls
 - i. Coordination with other work
 - j. Protection of construction and personnel

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3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Attend progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 1. Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 1. Interface requirements
 2. Status of submittals
 3. Off-site fabrication
 4. Site utilization
 5. Hazards and risks
 6. Progress cleaning
 7. Status of correction of deficient items
 8. Requests for interpretations (RFIs)
 9. Status of proposal requests
 10. Pending changes
 11. Status of Change Orders
 12. Pending claims and disputes
 13. Documentation of information for payment requests
 3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

3.6 EQUIPMENT LOCATIONS

- A. Equipment locations: All mechanical equipment shall be located to provide for manufacturer's recommended clearances, clearance for routine maintenance, clearance per code requirements and locations/clearances required for removal/replacement in the future.
1. Manufacturer's recommended clearances shall include space for clearance for pumps (18" minimum around pumps), 30" clearance or complete access door swings, clearances for tube pulls (heat exchangers, etc.); locate piping to be clear of these locations.
 2. Provide minimum 36" clearance around heat exchangers and other pressure vessels; note this is a minimum requirement, provide excess wherever possible. Provide minimum 42" clearance from power panels per the latest edition NEC having jurisdiction; include requirements for piping and ductwork at such locations.
 3. Locate equipment in mechanical rooms to allow for future removal and replacement. Include heights to overhead piping where applicable. Wherever possible, clearances shall include removal/replacement as a whole entity without knock-down.
 4. Locate roof mounted equipment minimum 10' away from edges of roof. Where equipment is located closer, provide handrail system at roof edge as required per codes having jurisdiction. Maintain clearances from handrail system to power panels.

3.7 ACCEPTANCE TESTING

- A. An acceptance test of the HVAC system shall be performed by the Contractor in the presence of the Owner's representative and the Local Fire Marshal. Upon completion of the successful test, the Contractor shall so certify in writing to the Owner and General Contractor.
- B. The Contractor shall also utilize all sub-contractors such as balancing, piping, controls and commissioning agent, and other contractors such as electrical, plumbing, fire alarm and communications as required to perform this acceptance test.
- C. The acceptance test shall be performed to determine that the protective measures required as outlined in NFPA 90A and shall function when needed in order to restrict the spread of fire and smoke.
- D. The acceptance test shall include testing the HVAC system to determine its full functionality and in compliance with NFPA 90A and the sequence of operation. All controls and equipment shall be modulated throughout their entire ranges and adjustments shall be made for optimum performance.
1. Portions of control or alarm systems are permitted to have standby power or other emergency modes of operation.
 2. The tests shall be performed to determine that the system operates under the standby power or emergency operation mode as well as under normal conditions.

3.8 CONNECTION TO EXISTING UTILITIES

- A. If connecting to an existing piping system (water, gas, steam, condensate, etc.). It shall be the responsibility of this contractor to verify the integrity of the existing piping system being connected. All applicable testing and acceptance will apply.
- B. Existing Pipe Testing: The contractor shall remove a section of piping at the point of connection between new and existing. The contractor shall determine the integrity of the existing piping after analysis of the piping section for tube wall thickness, scaling and corrosion. The analysis shall determine the ability for tie-in, pressure testing ability and remaining useful life. The contractor shall guarantee the piping integrity at the point of tie-in and subsequent acceptance. For existing piping not currently being used; the contractor shall pressure test in order to determine integrity and subsequent acceptance. Report all results in writing to the Architect/Engineer.

3.9 PIPING SYSTEMS – COMMON REQUIREMENTS

- A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern type.
 - b. Chrome Plated Piping: One piece, cast brass type with polished chrome plated finish.
 - c. Insulated Piping: One piece, stamped steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass type with polished chrome plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, stamped steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Cast brass type with polished chrome plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: Set screw.
 - h. Bare Piping in Unfinished Service Spaces: One piece, cast brass type with finish.
 - i. Bare Piping in Unfinished Service Spaces: One piece, stamped steel type with hinge.
 - j. Bare Piping in Equipment Rooms: One piece, cast brass type.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped steel type.
 1. Bare Piping at Floor Penetrations in Equipment Rooms: One piece, floor plate type.
 2. Existing Piping: Use the following:
 - a. Chrome Plated Piping: Split casting, cast brass type with chrome plated finish.
 - b. Insulated Piping: Split plate, stamped steel type with hinge and spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast brass type with chrome plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split plate, stamped steel type with concealed hinge and spring clips.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: Split casting, cast brass type with chrome plated finish.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split plate, stamped steel type with concealed hinge and set screw.
 - g. Bare Piping in Unfinished Service Spaces: Split casting, cast brass type with finish.
 - h. Bare Piping in Unfinished Service Spaces: Split plate, stamped steel type with hinge and set screw or spring clips.
 - i. Bare Piping in Equipment Rooms: Split casting, cast brass type.
 - j. Bare Piping in Equipment Rooms: Split plate, stamped steel type with set screw or spring clips.
 - k. Bare Piping at Floor Penetrations in Equipment Rooms: Split casting, floor plate type.
- B. Sleeves are not required for core drilled holes, ***except in mechanical and electrical rooms or other wet areas where sleeves shall extend 2 inches above finished floor and shall be made watertight.***
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical and electrical equipment areas or other wet areas 2 inches above finished floor level. Extended cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

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2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide ¼ inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 4. Steel Pipe Sleeves: For pipes smaller than 6 inches.
 - a. Steel Pipe Sleeves: For pipes 6 inches and larger, penetrating gypsum-board partitions.
 - b. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast iron soil pipe to extend sleeve to 2 inches below finished floor level. Refer to Section 076200 – Sheet Metal Flashing and Trim for flashing.
 5. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Joint Seals for materials and installation.
- E. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeves size to allow for 1 inch annular clear space between pipe and sleeves for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast iron “wall pipes” for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- F. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Section 078400 – Firestopping Systems for materials.
- G. Verify final equipment locations for roughing-in.
- H. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

END OF SECTION



MINUTES OF MEETING - PRE BID

DATE: SEPTEMBER 28, 2021
RE: HALDANE CENTRAL SCHOOL DISTRICT
MECHANICAL UPGRADES AND RELATED WORK
F&D PROJECT NO.: 19338.02

PRESENT: SEE ATTACHED SIGN-IN SHEET
TIM WALSH HALDANE CSD
WILLIAM MEANS, RA LEED AP FULLER AND D'ANGELO, P.C

AGENDA

1.1 INTRODUCTION:

- A. Owner's Representative: Tim Walsh, Director of Facilities (914) 804-0174.
- B. Mechanical Engineer: Eisenbach & Ruhnke, Matt Smith.
- C. Fuller and D'Angelo: William J. Means RA LEED AP, project manager.

1.2 BID DUE DATE:

- A. October 12th, 2021 -3:00 P.M.
- B. Location: Haldane District Office, 15 Craigsid Drive, Cold Spring, NY 10516.

1.3 SUMMARY OF PROJECT:

- A. One prime contractor. HVAC Contractor.
- B. HVAC Contractor:
 - 1. Removals, cutting and patching.
 - 2. HVAC equipment, piping and controls.
 - 3. Ductwork and diffusers.
 - 4. EPDM roof modifications.
 - 5. Suspended acoustical ceilings.
 - 6. Concrete pads.
 - 7. Electrical wiring, connections and disconnect switches.
 - 8. Aluminum storefront, insulated metal panels and louvers.
 - 9. Hot water heaters and pumps.

1.4 ALLOWANCE:

- A. Refer to 01 2100.
- B. One (1) Cash Allowance: \$12,000.00.
- C. Allowances are to be included in Total Base Bid.

1.5 ALTERNATES:

- A. Alternate HVAC-1: Main Office A/C.
- B. Alternate HVAC-2: Nurse's Office A/C.
- C. Alternate HVAC-3: Relocate electrical panels.

1.6 BID FORMS:

- A. 00 4401 - Contractors Questionnaire **is required to be** submitted with proposal.
- B. 00 4402 – Hold Harmless Agreement **is required to be** submitted with proposal.
- C. 00 4336 – List of Subcontractors in a separate sealed envelope **is required to be** submitted with proposal.
- D. 00 4460 – Certification of Compliance with Iran Divestment Act, or
- E. 00 4470 – Declaration of Bidders Inability to Provide Certification of Compliance.
- F. 00 4476 – Insurance Certification **is required to be** submitted with proposal.
- G. Be sure to acknowledge all Addenda and dates on Bid Form (if applicable).

1.7 BIDDING REQUIREMENTS SECTION 00 2113:

- 1. RFI form included in documents. Please scan and email to williamm@fullerdangelo.com

RE: PRE-BID MEETING – MECHANICAL UPGRADES

Last date F&D will respond will be **October 5th, 2021**.

1.8 GENERAL CONDITIONS:

- A. Tax Exempt Project.
- B. Bid Bond Required **10%** of Bid.
- C. Performance Bond Requirement **100%** of contract. AIA 312 form – 2010 Edition.
- D. Insurance requirements **Article 11 General Conditions** Review with your Agent.
- E. Article 11 par 11.1.4.6 Umbrella policy \$5,000,000.
- F. OCP Policy required for this project if over \$250,000.00.

1.9 USE OF PREMISE:

- A. Building Availability: 3:30 pm to 10:30 pm, September 1st through June 24th Monday-Friday.
- B. Building Availability: 7:00 am to 4:00 pm, June 27th through August 31st. Monday-Friday.
- C. Weekend and Holiday work at the discretion of the Owner.

1.10 WORK SEQUENCE:

- A. Start Construction: 6 weeks from Letter of Award (second shift).
- B. Completion date: August 31, 2022.

1.11 PAYMENTS:

- A. Prevailing Wage Rates apply.
- B. Certified payrolls required as per DOL.

1.12 TEMPORARY FACILITIES:

- A. Refer to Section 01 5000.
- B. Temporary lights, Waste containers and Temporary Toilets.

1.13 QUALITY CONTROL:

- A. F&D and E&R will perform intermittent inspections.

1.14 GENERAL DISCUSSION:

- A. Protect corridor floors to dumpsters with approved materials.
- B. Any pertinent RFI questions will be answered in addendum if necessary.
- C. Email address on Bidders List will be used to issue addendum if required.

At the conclusion of meeting, a walk-through of the existing building conducted and Base Bid and Alternate work areas identified.

In the event of a discrepancy between these minutes and the contract documents the contract documents shall prevail.

It is assumed that these Minutes are a true summary of the meeting. Any corrections or omissions should be brought to the attention of the writer. If not, they will be considered substantially correct.

Submitted by: 
William J. Means, RA, LEED AP

HALDANE CENTRAL SCHOOL DISTRICT
MECHANICAL UPGRADES AND RELATED WORK

Mengler Mechanical
1689 Route 2
Brewster, NY 10509
845.279.7029
mreuther@menglermech.com

Vamco Sheetmetal, Inc.
3090 Route 9
Coldspring, NY 10516
845.265.4563. Ext. 304
ray@vamcosm.com

Joseph Lombardo Plumbing & Heating of Rockland
321 Spook Rock Road – Suite A-109
Suffern, New York 10901
845.357.6537 Ext. 2989
karen@josephlombardo.com
ghoffman@josephlombardo.com

Southeast Mechanical
568 North Main Street
Brewster, NY 10509
845.279.3793
mtompkins@southeastmech.com

Bertussi Contracting, Inc.
60-70 Dexter Plaza
Pearl River, New York 10965
sweber@bertussis.com
pjoyce@bertussis.com

J&M Heating and A/C, Inc.
395 Adams Street
Bedford Hills, NY 10507
914.632.4433
jrw@jmhac.com

S&L Plumbing and Heating, Corp.
56 Lafayette Avenue, Suite 380
White Plains, NY 10603
914.908.6990
aforshee@slplumbing.net

SECTION 00 2115
RFI FORM

CONTRACTOR'S REQUEST FOR INFORMATION NO. 1

F&D RFI NO: 001
(F&D USE)

NAME OF PROJECT: **Mechanical Upgrades and Related Work**

NAME OF OWNER: **Haldane Central School District**

FACILITY: **Haldane Central School District**

DATE: 9/14/2021

A/E PROJECT NO: **19338.02**

ARCHITECT: **Fuller and D'Angelo, P.C.**

45 Knollwood Road, Elmsford, NY 10523

Tel: 914-592-4444; Fax: 914-592-1717

William Means, RA

WilliamM@fullerdangelo.com

FROM (CO. NAME): Joe Lombardo Plumbing & Heating of Rockland Inc

CONTACT NAME: Karen Panarella

Tel: 845-357-6537

SUBJECT: spec section

DISCIPLINE/TRADE: plumbing

DWG./SPEC. REFERENCE: 22 0500

QUESTION:

please provide spec section#22 0500 common work results for plumbing

FIELD CONDITION

DRAWING/SPEC

DISCREPANCY

OWNER CHANGE

CLARIFICATION

CONTRACTOR'S SUGGESTION (IF APPLICABLE):

ANSWER

See attached specification section.

ARCHITECT'S SIGNATURE: 

DATE: **9/17/2021**

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

**SECTION 22 0500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the general requirements that apply to the Plumbing and Plumbing Controls.
- B. The following work is specified under other Divisions, unless otherwise noted or specified hereinafter:
 - 1. Painting except as herein specified, Division 09.
 - 2. Electrical Power, Division 26.
 - 3. Installation of starters, contractors, thermal overload switches and remote push buttons, Division 26.

1.3 INTENT

- A. Requirements specified herein shall govern applicable portions of Plumbing whether so stated therein or not.
- B. It is the intent of this specification and accompanying drawings to describe and indicate the general manufacture, erection and installation of the equipment and connection to same specified herein and shown on the drawings. It is not intended that the specifications and drawings describe and indicate each piece of equipment required for installation, for where items are intended or required for satisfactory installation and are the accepted practice of the trade, they shall be considered to be both specified and indicated. Drawings are diagrammatic in nature; for piping systems; water piping is tapped off the bottom of the pipe and steam and steam condensate piping is tapped off the top of the pipe; provide all tees, elbows and swing joints as required for hookup to coils or branch piping as required for this work whether they are indicated on the drawings or not.
- C. It shall be understood that the Contractor as hereinafter mentioned shall be the Plumbing Contractor unless specifically noted otherwise.
- D. The Contractor shall furnish all plant, labor and material necessary for the complete and satisfactory installation of all Plumbing work for this contract.
- E. The Contractor shall assume the entire responsibility for the materials, workmanship and satisfactory operation of the various mechanical systems, and other work as specified herein and/or as shown on the drawings.
- F. The Contractor shall schedule and coordinate all work in close cooperation with all trades working on this project.
- G. All drawings and portions of the drawings, all floor plans, risers, details, schematics, and specifications indicated shall apply and are part of the plumbing contract.
- H. Any discrepancy or conflict noted between or within the above referenced documents shall be brought to the attention of the Architect/Engineer, in writing, a minimum of three (3) days prior to submittal of bids. The Architect/Engineer shall resolve issues prior to bid submittal.

- I. This Contractor shall carefully read the above-mentioned documents and study the drawings of all trades. He shall be responsible for neglect to read, or attend to, any paragraph or items contained therein. Failure to bring any conflicts or discrepancies to the attention of the Architect/Engineer, in writing, prior to bid submittal shall not constitute grounds for extras and/or change orders. Costs resultant from this failure shall be borne by this Contractor.

1.4 DEFINITIONS

- A. Following definition of terms and expressions used in this section are in addition to listing given in Supplementary Conditions:
1. "Provide" shall mean "furnish and install" unless otherwise indicated.
 2. "Herein" shall mean the contents of a particular section where this term appears.
 3. "Indicated" shall mean "Indicated on contract drawings".
 4. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
 5. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
 6. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 7. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
 8. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
 9. The following are industry abbreviations for plastic materials:
 - a. ABS: Acrylonitrile-butadiene-styrene plastic
 - b. CPVC: Chlorinated polyvinyl chloride plastic
 - c. NP: Nylon plastic
 - d. PE: Polyethylene Plastic
 - e. PVC: Polyvinyl chloride plastic
 10. The following are industry abbreviations for rubber materials:
 - a. CR: Chlorosulfonated polyethylene synthetic rubber
 - b. EPDM: Ethylene propylene diene terpolymer rubber
 11. For additional abbreviations see the Abbreviations and Symbols Drawings.

1.5 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for establishing grades and elevations, and checking of all interferences, and shall verify all dimensions and locations in the field.
- B. Contract drawings for mechanical work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, ducts, piping and approximate sizes and locations of equipment outlets. Mechanical trades shall follow these drawings in layout of their work, consult general construction, structural and electrical drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed.
- C. The Contractor shall verify with the A/E before bidding any item of piping or piping arrangement which may be incomplete, incorrect, or indefinite. After contract is let, the A/E's decision shall be final.

- D. All trades shall cooperate and confer with each other as to locations of their materials and equipment before erecting work, to avoid interference as much as possible, and in such a manner that will in no way retard progress of construction. In instances where interferences develop, the contractor shall relocate the work as required by the A/E regardless of which work was installed first.
- E. Where job conditions require reasonable changes to indicated locations and arrangement, make such changes without extra cost to Owner. This is not to be construed to permit redesigning of the various systems.
- F. Additional and supplementary drawings may, from time to time, be furnished, and the same, when made, are to constitute a part of the original contract. These drawings will be made to clarify the contract drawings and will not depart materially therefrom.
- G. The A/E specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to an arrangement of these connections.
- H. Special attention is called to the contract drawings and specifications involving general construction, electrical work and details thereon. Bidders are notified to carefully scrutinize these documents for the details affecting the performance of the mechanical trades.
 - 1. Install all supply piping with adequate stops on each supply to all fixtures and or equipment to be connected to distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures and or equipment. Install stops in locations where they can be easily reached for operation.
- I. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture or equipment. Valves are specified in Divisions 22 and 23.

1.6 WORK INCLUDED

- A. These specifications, and accompanying drawings are intended to cover the furnishing by this Contractor of all labor, material, and all equipment of every kind necessary for the complete installation of the various systems, and such other materials and equipment as hereinafter specified, and shall include, but not be limited to the following:
 - 1. Domestic hot water recirculating system within the building as indicated.
 - 2. All piping, valves and fittings for the various systems.
 - 3. All expansion joints, loops, anchors and guides.
 - 4. Steel supports and hangers for all equipment and piping.
 - 5. Insulation for piping and equipment as herein specified.
 - 6. All plumbing fixtures as hereinafter specified, including handicapped fixtures compliance with the handicapped code.
 - 7. Flush all water pipe and disinfect as specified.
 - 8. Setting of all sleeves and inserts in place.
 - 9. Testing, adjusting and placing in service all systems and equipment installed.
 - 10. Domestic hot water system including valves, supply valves, supply piping, and return piping to fixtures and equipment requiring hot water as indicated.
 - 11. Water supply specialties including shock absorbing devices, backflow preventers, wall hydrants, thermometers, etc.
 - 12. All plumbing fixtures, drains, floor drains, equipment, piping, fittings, valves, etc. shall be commercial for schools.
- B. The above is presented for general guidance only and does not necessarily cover the entire requirement of the project as shown on the drawings and/or as specified hereinafter.

1.7 SCHEDULE OF WORK

- A. The Contractor shall schedule all of his work to conform to the Job Progress Schedule as submitted by the General Contractor or Construction Manager, and approved by the A/E.

1.8 RELATED WORK SPECIFIED ELSEWHERE

- A. The following related work items are included in separate Divisions as follow:
 - 1. General Requirements – Division 01
 - 2. Concrete – Division 03
 - 3. Painting – Division 09
 - 4. HVAC – Division 23
 - 5. Electrical – Division 26
- B. The following items of work related to plumbing will be performed by others as follows:
 - 1. The Electrical Contractor shall do all power wiring for plumbing equipment unless otherwise noted.
 - 2. The General Contractor shall install all access panels furnished by the Plumbing Contractor.
 - 3. The HVAC Contractor shall provide drainage piping from his equipment to drains provided by Plumbing Contractor.

1.9 WORK AS A SUBCONTRACTOR

- A. When the plumbing work is subcontracted, the exact scope of work may be limited or added to at the discretion of the General Contractor. A subcontractor shall, therefore, verify the extent of his work with the General Contractor.

1.10 INTERFERENCE WITH THE OWNER'S NORMAL OPERATION

- A. All work shall be performed in such a manner as not to interfere with the normal work operations in adjacent spaces or buildings.
- B. In no way shall the Contractor:
 - 1. Block or restrict the means of egress for adjacent spaces.
 - 2. Decrease the fire rating of walls, partitions, ceilings, doors, or combination thereof of adjacent spaces or of means of egress.
 - 3. Interrupt safety systems or in any way adversely affect the safety of people or materials in adjacent spaces.
- C. The Contractor shall provide acoustical isolation of the work area via temporary doors, partitions, etc., adequate to allow normal work functions.
- D. The Contractor shall provide exhaust fans, dust proof temporary partitions and any containment measure required to prevent dirt, dust, or fumes from reaching adjacent workspaces.
- E. All personal traffic and material delivery shall be routed to absolutely minimize travel through adjacent work area.

1.11 VISIT TO SITE

- A. The Contractor shall visit the site and thoroughly acquaint himself with all existing conditions relative to type and source of service available. He shall verify location and extent of these services and consider routing, interferences and excavation required by the contract and any and all other difficulties that may be encountered.

- B. Submission of a proposal shall be construed as evidence that such an examination has been made.
- C. Failure to visit the site shall not constitute sufficient reason to warrant claims for extra monies for difficulties not apparent in the contract documents.

1.12 MANNING THE PROJECT

- A. The Contractor shall, upon initiation of construction, keep a suitable force of men on the site at all times in order to lace all sleeves, inserts, outlet boxes, fixtures and provide all other openings as are required for the satisfactory installation of equipment.

1.13 FEES AND PERMITS

- A. The Contractor shall secure all permits and pay all fees, required by local and state governing bodies, necessary to complete his phase of the construction. Failure to investigate all applicable payments before the bid submission shall not constitute grounds for additional monies from the Owner. The Owner shall be furnished with all certificates of approval.
- B. The Contractor shall provide insurance and bonding as required by the Building Owner or as stated in the General Conditions.

1.14 CODES AND STANDARDS

- A. The design, construction and installation of all materials and equipment shall be in compliance with the latest edition of all national, state and local codes or standards.
- B. The codes and standards referred to are minimum standards. Where the requirements of these specifications and the accompanying drawings exceed those of the codes and standards, the drawings and specifications shall be followed.

1.15 BASIS OF DESIGN

- A. The layout is based upon the use of particular items of equipment, identified by manufacturer's make and model number. Dimensions, arrangements, and service connections required for these particular items have been considered in making the layout. The contractor may use the equipment of any manufacturer whose name is approved for substitution on that item of equipment after he had ascertained that all provisions of MATERIAL SUBSTITUTIONS will be complied with and that all required service connections will be made at no additional cost to the Owner.
- B. Except where dimensions are shown, the drawings are diagrammatic and shall not be scaled. Exact location of fixtures, apparatus, duct work and piping shall be determined by dimensions on the site. Contractor shall refer to architectural plans and details for exact dimensions.
- C. The drawings indicate the locations of apparatus, fixtures, and piping shall be followed as closely as possible. If before the installation it is found necessary to change the location to accommodate conditions at the building, such changes shall be made at no additional cost to the Owner, and as approved by the Architect/Engineer.
- D. Equipment requiring operation, service, or maintenance during the life of the system shall be made easily accessible.
- E. Piping shall not be run within 48" of switchboards, panelboards, or motor control centers.
- F. Use of open-flame devices in work shall be accompanied by fire extinguishing apparatus within 25 feet of work location. Provide Fire Watch review of the work during each shift.

1.16 QUALITY OF MATERIALS

- A. Where a specific model and manufacturer of equipment is specified, the Contractor shall provide what is specified without substitution. Where specified as "or approved equal", the Contractor may substitute equipment except that the burden is upon the Bidder to prove such equality. If the Bidder elects to prove such equality, he must request the Architect's approval in writing to substitute such item for the specified item, stating the cost difference involved with supporting data, and samples, if required, to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty, and cost.
- B. Where a specific model of equipment is specified along with an approval equal manufacturer, no substitution will be allowed. The Contractor shall submit one of the manufacturers listed.
- C. Final approval of competitive equipment is reserved by the Engineer when, in the Engineer's opinion, the equipment does not correspond to that specified.

1.17 MATERIAL SUBSTITUTIONS

- A. Material substitutions shall be allowed only where "or equal" is stated.
- B. Material substitution submittals shall, include complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance, test data and evidence that the proposed manufacturer or his established representative maintains a qualified service organization including spare parts and is available for competent service on short notice.
- C. Each bidder by submitting his bid represents that the proposal of such article, device, product, material, fixture, form or type of construction by name, make, catalog number of manufacturer which varies with the equipment specified shall be incorporated into the project without claims against the Owner for additional cost. The bidder shall be responsible for all additional costs incurred by others due to the substitutions.
- D. The Architect/Engineer shall have the final approval of all submitted substitutions.

1.18 SUBMITTALS

- A. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- B. All submittals shall bear a stamp or notation indicating that the Contractor has reviewed and approved the submittals.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.
- D. Submittals shall be marked to show specification reference including the section and paragraph numbers.
- E. Submit each section separately and include the following:
 - 1. Information which confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
 - 2. Submittals on all pumps shall be complete with performance curves marked with the design points.
 - 3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.

4. Vibration isolators shall include operating weight and load distribution at each mounting point.
- F. The Contractor agrees that failure of manufacturer's submittal to conform to the above will result in a manufacturer's disqualification on this project.
- G. Submit samples as directed of items called for in the specifications; samples of the materials which the manufacturer will actually ship shall be submitted for approval after award of contract and properly labeled on this project.

1.19 PRODUCT HANDLING

- A. Following is in addition to Protection of Work and Property, General Requirements:
 1. Responsibility for care and protection of mechanical work rests with the Contractor until it has been tested and accepted.
 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury, and damage from all causes.
 3. Protective covers, skids, plugs, caps and coating shall be provided to protect equipment materials from damage during construction.
 4. All equipment and material shall be stored under cover and off the ground.
 5. For outdoor storage, protective covers of sheet plastic shall be provided. Covers shall be of gauge required for the area involved and shall be reinforced to withstand wind, rain, sleet and snow. Equipment and material shall be set on skids or platforms of sufficient height to avoid deterioration from spattering and ground water.
 6. Plug open ends of pipes when work is stopped to prevent debris from entering the pipes.
 7. Protect plumbing fixtures and other equipment with enamel or glazed surface, from damage by covering and/or coating, as recommended in Bulletin "Handling and Care of Enameled Cast Iron Plumbing Fixtures," issued by Plumbing Fixture Manufacturers' Association.
 8. Coat polished or plated metal parts with Vaseline immediately after installation.
- B. The Contractor shall receive, properly house, handle, hoist, and deliver to proper location, equipment and other materials required for the contract.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.

1.20 COORDINATION DRAWINGS

- A. Detailed layout shop drawings on all systems as required in Division 01 – Project Coordination, Division 22, 23, and 26, must be coordinated with field erection drawings for Architectural, HVAC, Plumbing, Fire Protection, and Electrical Systems by the respective contractors.
- B. Prepare coordination drawings for all areas by building, floor area and/or phase, of the project. Close attention should be implemented where limited space availability necessitates maximum utilization of space for efficient installation of different components.
- C. Mechanical, Electrical and Plumbing Prime Contractors are responsible to prepare coordination drawings to a Scale of 1/4" = 1'-0" or larger, detailing major elements, components, and systems of mechanical and electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including but not limited to the following:
 1. Proposed locations of ductwork, piping, conduit, equipment, and materials.
 2. Clearances for installing and maintaining insulation.

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3. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 4. Equipment connection and support details.
 5. Exterior wall and foundation penetrations.
 6. Fire rated wall, floor, ceiling, and roof penetrations.
 7. Sizes and location of required concrete pads and bases.
 8. Valve stem movement.
 9. Sleeves.
- D. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Clearly define relationships between sleeves, piping, ductwork, conduit, ceiling grid, lighting, fire sprinkler, HVAC equipment and other mechanical, plumbing, and electrical equipment with other components of the building such as beams, columns, ceilings, and walls.
- E. Prepare reflected ceiling plans to coordinate and integrate installations of air outlets and inlets, light fixtures, communication systems components, sprinkler, and other ceiling mounted items.
- F. Resolve conflicts between trades, prepare composite coordination drawings and obtain signatures from all affected Prime Contractors on original composite drawings. Submit coordination drawings to the Architect/Engineer and Construction Manager for approval.
- G. Mechanical, Electrical and Plumbing Prime Contractors are to first submit their respective shop drawings for approval, to the Architect/Engineer, in order to make any necessary changes prior to going through the coordination process.
- H. Coordination drawings to be signed off by affected Contractors within 45 days of Notice to Proceed. A Coordination drawing timeline schedule shall be developed and tracked.
- I. The coordination drawings shall be coordinated with the construction and phasing schedule.
- J. The routing process will begin with the HVAC Contractor who shall take the lead in the coordination of their work with all affected trades.
- K. The HVAC Contractor shall prepare CAD drawings to be used as the basis for coordination drawings in all areas or as determined by the Construction Manager (Scale: 1/4" = 1'-0" or larger). These drawings shall be completed in digital format. All architectural features shall be accounted for in preparation of this drawing, i.e., permanent casework, interior columns, partitions, finish ceiling and height, lighting and roof elevations, etc. The HVAC Contractor will provide CAD files and drawings showing all the approved ductwork. HVAC Contractor is to locate all piping with orange lines. Forward drawings to the Plumbing Contractor.
- L. The Plumbing Contractor is to locate the plumbing lines with blue lines and sprinkler lines and head locations with red lines, and resolve all conflicts and determine locations and elevations, and forward drawing to the Electrical Contractor.
- M. The Electrical Contractor to indicate all lighting fixtures, panels with associated clearances, duct banks, bus duct, conduit racks and all individual conduits 1 1/2" and larger in with green lines and resolve all conflicts and determine locations and elevations and forward to the General Construction Contractor. The General Construction Contractor will have the last coordination review. Provide overlaid coordination drawings for all General Construction work and resolve all conflicts. All architectural features shall be detailed clearly, i.e., permanent casework, interior columns, partitions, finish ceiling and roof elevations, etc. Provide a ceiling layout detailed coordination drawing showing ceilings, lights, diffusers, etc.
- N. Contractors to provide underground coordination drawings for all underground utilities; show exact location of piping stub ups, floor drains, etc. as required.

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- O. Prime Contractors shall be responsible for all costs associated with creating CAD files.
- P. All coordination meetings will be held in the Construction Manager's field office or as required by the Architect/Engineer. As each coordination drawing is completed, Contractors are to meet with the Construction Manager to review and resolve all conflicts on the coordination drawings. Contractors are required to distribute shop drawings, cut sheets and submittals to other Prime Contractors where appropriate. Approved coordination drawings will also be available for reviewing at the Construction Managers field office.
- Q. All Contractors shall provide a hard copy of the coordination drawings for review by the Architect/Engineer.
- R. Once complete and signed off, the HVAC, Plumbing and Electrical Contractors will submit dimensioned wall and slab penetration drawings and housekeeping pad drawings to the appropriate parties.
- S. If the coordination drawing process is not complete, Mechanical, Electrical and Plumbing Contractors will provide wall penetration drawings to the General Construction Contractor no later than five (5) days prior to wall erection.
- T. All Prime Contractors must install the work in accordance with the coordinated drawings at no additional cost to the Owner. No additional compensation will be made for extra ductwork offsets, piping and/or conduit or retrofit work due to improper component location, or lack of Contractor(s) coordination.
- U. All Prime Contractors shall take special care in verifying with the Electrical Contractor that the equipment matches the characteristics of the power being supplied. The Electrical Contractor is similarly bound.
- V. The Mechanical, Electrical and Plumbing Drawings are schematic in nature and are not intended to show every offset and detail. The Mechanical, Electrical and Plumbing Contractors will make adequate provisions in their bid to accommodate the actual conditions, provide all required ductwork, piping and conduit offsets per the coordination drawings, without additional cost to the Owner.
- W. The Mechanical, Electrical and Plumbing Contractors shall hang streamers from all above ceiling equipment that will require access. This is in addition to any specification requirements for tags, labels, etc. Shop drawings should also highlight these areas for Architect/Engineer's review. In addition, the Contractors shall notify the Construction Manager and Architect/Engineer of all areas where equipment maintenance access is difficult. Coordinate architecturally placed access doors with points of mechanical/electrical systems requiring that access.
- X. Specific Requirements – Required Information to be provided on Coordination Drawings:
 - 1. General Construction/Structural Work Information including but not limited to:
 - a. Openings and sleeve locations required in slabs, walls, beams, and other structural elements, including required openings not indicated on the Contract Documents.
 - b. Slab edge locations
 - c. Embed locations, as described above. Note embedded steel angles at edges of sump and sewage ejector pits, to accept basin covers.
 - d. Wall and chase spaces for housing HVAC, Plumbing, or Electrical items.
 - e. Access doors in coordination with the respective contractor systems.
 - f. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
 - 2. HVAC Work Information including but not limited to:
 - a. Sizes and bottom elevations of rectangular ductwork, including angle bracing, flanges, and support systems.

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- b. Sizes and centerline elevations of round ductwork, piping and conduit runs
 - c. Acoustical lining in ductwork.
 - d. Identification of ductwork pressure class.
 - e. Dimensions of major components, such as dampers, valves, diffusers, registers, cleanouts, coils, VAV boxes, HVAC equipment, and electrical distribution equipment.
 - f. Fire-rated enclosures around ductwork.
 - g. Access panels required.
 - h. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination
3. Plumbing and Fire Protection Information including, but not limited to:
- a. Sizes and centerline elevations of piping runs.
 - b. Locations of plumbing valves, equipment, and fixtures.
 - c. Locations of standpipes, floor control assemblies, fire hose valves, mains, piping, branch lines, pipe drops, sprinkler heads, fire pumps/controllers, and jockey pumps.
 - d. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
4. Electrical Work Information including, but not limited to:
- a. Runs of vertical and horizontal conduit, 1 ¼" diameter and larger
 - b. Light fixture locations
 - c. Exit light locations
 - d. Smoke detector and other fire alarm locations
 - e. Panelboards, switchboards, switchgear, transformers, busways, generators and motor control center, exit signs, and emergency battery pack locations.
 - f. Locations of pull boxes and junction boxes, dimensioned from column centerlines
 - g. Access panels required.
 - h. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
5. Ceiling Systems and Plenum Space Information including, but not limited to:
- a. For HVAC, Plumbing, Fire Protection, Fire Alarm, Electrical, Controls and telecommunications Work penetrating acoustical ceilings, show locations of each item (including sprinkler heads, diffusers, grilles, access doors, light fixtures, smoke detectors exit signs, speakers, and other visible ceiling mounted devices) relative to the acoustical ceiling grid.
 - b. Locate components within ceiling plenums to accommodate layout of light fixtures indicated on Drawings. Clearly indicate areas of conflict between light fixtures and other components on Coordination drawings.
 - c. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
- Y. The Sheet Metal Contractor shall prepare his work on reproducibles and submit 1/4" scale CAD drawings of the sheet metal duct field erection shop drawings for the coordination procedures, and each Contractor will supply the necessary qualified personnel for these procedures which will be conducted by the General Contractor. The HVAC, Plumbing and Fire Suppression work to the drawings where conflicts are noted and achieve solutions to any conflicts that may exist.
- Z. The General Contractor will be required to signify his acceptance of the results of the coordination procedures by signing and dating the master coordination print.
- AA. Each Contractor will be required to correct his field erection drawing(s) used as a basis for the coordination procedures to complement the results of the procedures prior to submitting same for approval. No field erection shop drawings will be accepted for approval without having been coordinated.

- BB. As part of the coordination procedures, applicable "Approval" or "Approved as Noted" copies of other trades' shop drawings will be transmitted to the Contractor. It will be each Contractor's responsibility to check these shop drawings to ascertain what effect, if any, these shop drawings have on that portion of the work under his direct responsibility. Each contractor will advise the General Contractor within forty-eight (48) hours of receipt of the shop drawings, in writing, indicating receipt of same and whether or not they have any effect on the work of his contract.

1.21 ELECTRICAL

A. Power Wiring

1. For the purpose of this specification, power wiring shall be defined as follows:
 - a. All wiring from the power source panelboards (or switchboard) to the disconnect switch to the equipment, and final connection to the equipment.
 - b. All wiring to control panels as indicated in the Electrical and Plumbing Contract Documents. (All control panels not indicated on the Electrical Contract Documents as receiving power shall do to by jumpers from other control panels, this wiring shall be considered control wiring as defined below).
2. All power wiring from the power source to the above noted switches and wiring from these switches to the equipment, including final connection to same, shall be provided under Division 26, Electrical.

B. Control Wiring

1. All other wiring required, whether line voltage or low voltage, internal or external to provide for the operation of the equipment shall be considered as control wiring.
2. All control wiring throughout the building, including wiring installed at piping, or as specified shall be provided under this Division 23.

- C. The Contractor shall furnish all motors, mounts, motor starters and remote mounted push-button controls for all electrically operated equipment furnished as part of the contract. The Contractor shall furnish all safety disconnects where described hereinafter. The Contractor shall furnish all speed control switches for all multi-speed motors. All motors shall have copper windings. (Aluminum windings will not be acceptable).

- D. This Contractor is completely responsible for the coordination with all other trades as to the correct voltage for all equipment requiring power. Equipment and or changes required to meet the project voltages will be the responsibility of this contractor.

- E. All push-button switches and starters shall be mounted under Division 26, Electrical.

- F. The Contractor shall provide all controls and control devices, all mounting for controls and all other electrical devices as specified and necessary for the complete installation and satisfactory operation of all electrically operated controls furnished under this Division.

- G. All locally mounted starters shall be furnished under Division 22, except as noted below. Where indicated hereinafter, starters shall be furnished as an integral part of equipment. Starters furnished in motor control centers shall be provided in Division 26, Electrical (refer to Electrical Drawings). Control of starters in motor control centers feeding plumbing equipment shall be provided under Division 23.

- H. Starting equipment of each motor shall be of the proper voltage and HP rated for the motor it is to serve. All starters shall be of the enclosed type; NEMA Type 1, for general-purpose enclosures; NEMA Type 4 for watertight enclosures, and NEMA Type 12 for the dust-tight enclosures. Location of motor shall determine type of enclosure to be used.

- I. Manual motor starters for single-phase motors shall be one or two poles as required, consisting of a snap switch combined with a thermal overload device. It shall be impossible for the switch to be held in a closed position under a sustained motor overload. For resetting the overload mechanism, the switch lever shall be of a design where it has to be moved to the "off" position. Starter shall be enclosed in type of enclosure for area in which it is to be used.
- J. Magnetic starters for 3-phase motors shall be furnished with 110 volt holding coils, 120-volt fused transformers, normally open and normally closed auxiliary contact and overload relay heater elements in all three phases. Provide hand/off/auto selector switch along with running status lights and external reset button.
- K. Locate starters and associated starter controls in accessible locations wherever possible. Location of starters for roof mounted equipment above ceilings shall be located at accessible locations above ceiling. Locations shall be coordinated with furniture and equipment layouts for the optimum accessible location for installation and maintenance means
- L. The Contractor shall be completely responsible for the coordination control system with control interlocks between various items of plumbing equipment.

1.22 SCAFFOLDING

- A. The Contractor shall furnish and install scaffolding, ladders and runways required in connection with his work.

1.23 TEMPORARY OPENINGS

- A. Temporary openings not indicated, which may be required for purpose of bringing equipment into building, shall be as approved. General Contractor will perform work of providing and maintaining openings, and of restoring structure; but Contractor for whom temporary openings are provided shall bear costs thereof, and for restoring structure. Ample notice shall be given of size and location of such openings by Contractor requiring same.
- B. Holes provided in General Construction work to permit installation of lines for temporary services will, after removal of such lines, be patched as specified under Division 01.

1.24 TEMPORARY SERVICE

- A. Temporary services are specified under Division 01, "General Requirements"

1.25 CUTTING AND PATCHING

- A. The Contractor shall provide all floor and wall cuts as required for piping penetrations of existing construction.
- B. No cutting of bearing walls, beams, etc., shall be done without the approval of the Architect. All patching and finishing, etc., shall match the surroundings. All cutting and patching shall be done by workmen skilled in the trades and in the employ of the General Contractor for the project. All cutting shall be done with saw type edges to give a neat and workmanlike appearance. All pipe holes shall be core drilled unless specified otherwise.
- C. Should it be necessary to do any cutting and patching due to the failure of this Contractor to give proper information to the General Contractor, it shall be done at the expense of the Plumbing Contractor.

1.26 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Plumbing Work within the building shall be as specified under Division 09.

1.27 CONCRETE WORK

- A. Concrete work shall be in accordance with Division 03.
- B. Provide 4" high concrete pads for floor mounted plumbing equipment as indicated on drawings.

1.28 SUSPENSION SUPPORT FOR EQUIPMENT

- A. All pipes and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- B. Pipes and ducts shall not be supported from other pipes, ducts, or equipment.
- C. Hangers from joists shall be attached at the panel points. Pipes and ducts with weights of 50 pound per foot (total for single or multiple runs) routed parallel with bar joists shall be supported from a minimum of 3 joists at each hanger point (channel members between joists).

1.29 ACCESS PANELS – BUILDING

- A. Valves and equipment located concealed in walls or above ceilings, and are otherwise inaccessible shall be furnished with an access panel for each location. A hinged inconspicuous type access panel complete with frame, of such size and so located as to provide proper access for service and maintenance.
- B. The minimum size of each access panel shall be 18" x 18" unless physical restraints require a smaller door.
- C. Where such equipment is located above removable concealed spline push up type acoustical tile or metal pan ceilings, it shall be considered as accessible if the acoustical material is arranged for access to the space above the ceilings.
- D. Access panels shall be Milcor "DW", or equal, for drywall locations and Milcor "K", or equal, elsewhere.
- E. Panels and frames shall be prime painted.
- F. Panels shall be furnished under this Division and installed under another Division of this Specification.
- G. Panel material shall be steel except that construction shall be all aluminum in bathroom applications.
- H. When access panels or doors are installed in fire rated construction, they shall be fire rated to match the construction.

1.30 FIRESTOP PENETRATION PROTECTION SEALING SYSTEM

- A. Where pipes pass through fire partitions, firewalls, floors, or ceilings, install a firestop that provides an effective barrier against the spread of fire, smoke, gases, and water. Fire-stop material shall be packed tight, and completely fill clearances between pipe, sleeves, and structure. All crack voids or holes (up to 4" diameter) shall be sealed using 3M brand Fire Barrier Caulk CP25 or putty 303 or an approved equal. Larger diameter or square holes, 3M system 7902, 7904, 7902R or 7904R or approved equal shall be in accordance with manufacturer's instructions
- B. Fire-stopping material shall maintain its integrity while preventing the passage of flame, smoke, gases, or water. Fire-stopping material shall be a one-part, intumescent elastomer noncombustible, noncorrosive, and compatible with synthetic cable jackets as defined by ASTM E814 (UL 1479); and in addition, for insulation materials, melting points shall be a minimum of 1700 degrees F for one-hour protection and 1850 degrees F for 2-hour protection.

1.31 RECORD DRAWINGS

- A. The Contractor shall furnish record as-built drawings to the Architect at completion and acceptance of the job. Transparencies of the original drawings with corrections shall be submitted as specified in the General Requirements.
- B. Record all changes from installation originally indicated. Record final location of underground lines by depth from finished grade and by offset distances in feet and tenths to surface improvement such as buildings, curb, or edges of walks. Where work appears on two or more drawings, Contractor shall mark changes on all drawings. Contractor shall mark changes on all drawings. At completion, furnish the above required transparencies to the A/E for approval and record. Drawings shall be certified to be record of work installed and signed by the Contractor. Work shall not be accepted until such drawings have been delivered to the A/E.

1.32 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee all equipment, materials, and appurtenances installed by him to be free from all defects for a period of one year from date of final acceptance.
- B. Upon written notice from the A/E, the Contractor shall promptly correct all defects without additional cost to the Owner. This Contractor shall adjust each part of the entire installation for proper working order. Reports are to be submitted to the A/E and adjustments repeated until the entire system is satisfactory. This Contractor must make good at his own expense, any defects in materials or workmanship that may appear.

1.33 CLEAN UP

- A. The Contractor shall be held responsible for the general clean-up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.
- B. All stickers, rust, stains, labels, and temporary covers shall be removed before final acceptance.
- C. Foreign matter shall be blown, vacuumed, or flushed out of piping, pumps, fans, motors, devices, switches, panels, and equipment.
- D. Identification plates on equipment shall be free of excess paint and shall be polished.

1.34 OPERATION AND MAINTENANCE MANUALS

- A. Submit to the Engineer for approval three manuals covering details of operation maintenance for all apparatus requiring service. The Contractor shall arrange formal instruction sessions by competent representatives of the manufacturer for the Owner's operating personnel to cover the following:
1. Plumbing Fixtures, equipment (all)
 2. Service telephone number, fax number, websites, email addresses, business and service addresses and mobile telephone numbers of the installing contractor, and manufacturer and supplier and parts counters of pumps, water heaters, backflow preventers, and other components comprising the systems.
 3. Manufacturer's operating and maintenance manuals, including detailed parts lists with numbers, power and wiring diagrams for each piece of equipment and accessory requiring services or maintenance, the guarantee period and the name, address and phone number of the nearest sales and service organization for each item. Both on print and CD's (min 3 copies) form (PDF/MS Word).
 4. Cross out options that are not used on equipment sheets, highlight options selected.
 5. Step-by-step procedure for starting, stopping, setpoint adjustment, monitoring and alarm enunciation for each system.
 6. Copies of inspection certificates provided by the City, County, State and insurance companies.
 7. Routine maintenance procedures for all plumbing equipment.
- B. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of the manuals.

1.35 INSTRUCTION TO OPERATIONAL PERSONNEL

- A. Plumbing Fixtures (all)
- B. Furnish the services of competent instructors to give full instruction to the designated Facilities personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system on the Contract Documents. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.
- C. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Owner for regular operation. Provide 8 man-hours each of instruction for, pumps, water heaters, compressors, air dryers, vacuum pumps, and other equipment required by the Owner's personnel.
- D. Instruction shall cover routine maintenance, wiring and power wiring diagrams and component analysis, preventative maintenance and scheduling, starting and stopping, alarm resets, trend-logging, setpoint adjustment, emergency and normal shutdown/startup, relative pressure control system for the morgue, alarm date stamping and all else required by the Owner for complete usage/maintenance/adjustment of equipment in their intended systems.
- E. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of instructions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Materials and equipment shall be in accordance with the specifications as outlined in each specification section describing plumbing components, fixture valves, piping, etc.
- B. All components shall be according to ASTM, ANSI, CISPI, NFPA and Code standards.
- C. Electrical equipment shall bear the underwriter label.

3.2 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.3 PROJECT MANAGEMENT AND COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specification to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule
 - 2. Preparation of the Schedule of Values

3. Installation and removal of temporary facilities and controls
4. Delivery and processing of submittals
5. Progress meetings
6. Pre-installation conferences
7. Project closeout activities
8. Startup and adjustment of systems
9. Project closeout activities

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into the work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

3.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequenced.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Number of Copies: Submit three opaque copies of each submittal. Architect, through Construction Manager, will return one copy.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect and Construction Manager will retain two copies; remainder will be returned. Markup and retain one returned copy as a Project Record Drawing.
3. Refer to individual Sections for Coordination Drawing requirements for work in those Sections.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project Site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

3.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project Superintendent, provide other administrative and supervisory personnel as required for proper performance of the work.

3.6 PROJECT MEETINGS

- A. General: Attend meetings and conferences at Project Site, unless otherwise indicated.
 - 1. Agenda: Be prepared for the meeting agenda. Distribute the agenda to all invited attendees.
 - 2. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Attend a preconstruction conference before starting construction, at a time convenient to Owner, Construction Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule
 - b. Phasing
 - c. Critical work sequencing and long-lead items
 - d. Procedures for processing field decisions and Change Orders
 - e. Procedures for requests for interpretations (RFIs)
 - f. Procedures for testing and inspecting
 - g. Procedures for processing Applications for Payment
 - h. Submittal procedures
 - i. Preparation of Record Documents
 - j. Use of the premises and existing building
 - k. Work restrictions
 - l. Owner's occupancy requirements
 - m. Responsibility for temporary facilities and controls
 - n. Construction waste management and recycling
 - o. Parking availability
 - p. Office, work, and storage areas
 - q. Equipment deliveries and priorities
 - r. First aid
 - s. Security
 - t. Progress cleaning
 - u. Working hours
 - 3. Minutes: Record and distribute meeting minutes.
- C. Pre-installation Conferences: Attend a pre-installation conference at Project Site before each construction activity that requires coordination with other construction.

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1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents
 - b. Deliveries
 - c. Review of mockups
 - d. Possible conflicts
 - e. Time schedules
 - f. Manufacturer's written recommendations
 - g. Acceptability of substrates
 - h. Temporary facilities and controls
 - i. Coordination with other work
 - j. Protection of construction and personnel
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Attend progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements
 - 2) Status of submittals
 - 3) Off-site fabrication
 - 4) Site utilization

- 5) Hazards and risks
 - 6) Progress cleaning
 - 7) Status of correction of deficient items
 - 8) Requests for interpretations (RFIs)
 - 9) Status of proposal requests
 - 10) Pending changes
 - 11) Status of Change Orders
 - 12) Pending claims and disputes
 - 13) Documentation of information for payment requests
3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Equipment locations: All plumbing equipment shall be located to provide for manufacturer's recommended clearances, clearance for routine maintenance, clearance per code requirements and locations/clearances required for removal/replacement in the future.
1. Manufacturer's recommended clearances shall include space for proper airflow and non-short circuiting airflow pathway (plumbing equipment, etc), clearance for pumps (18" minimum around pumps), 30" clearance or complete access door swings clearances for tube pulls (heat exchangers, coil pulls, etc); locate piping to be clear of these locations.
 2. Provide minimum 36" clearance around water heaters, heat exchangers and other pressure vessels; note this is a minimum requirement, provide excess wherever possible. Provide minimum 48" clearance from power panels per the latest edition NEC having jurisdiction; include requirements for piping and ductwork at such locations.
 3. Locate equipment in mechanical rooms to allow for future removal and replacement. Include heights to overhead piping where applicable. Wherever possible, clearances shall include removal/replacement as a whole entity without knock-down.
 4. Access platforms with metal grating shall be provided for equipment located outdoors such for power and control panels for equipment located on dunnage. This access system shall provide for maintenance and requirements per codes having jurisdiction. Platforms shall include stairs and handrails per OSHA regulations.
 5. Locate roof mounted equipment minimum 10' away from edges of roof. Where equipment is located closer, provide handrail system at roof edge as required per codes having jurisdiction. Maintain clearances from handrail system to power panels.
 6. Locate air intakes 25' away from exhaust outlets and plumbing vents for healthcare facilities.
 7. Locate air intakes for kitchen air intakes min 10' away from exhaust outlets and plumbing vents from kitchen exhaust fans.

3.7 CONNECTION TO EXISTING UTILITIES

- A. If connecting to an existing piping system (water, gas, oil, sewer, steam, condensate, etc.). It shall be the responsibility of this contractor to verify the integrity of the piping system being connected. Coordinate all system shutdowns with the owner. All applicable testing and acceptance will apply.

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- B. Existing Pipe Testing: The contractor shall remove a section of piping at the point of connection between new and existing. The contractor shall determine the integrity of the existing piping after analysis of the piping section for tube wall thickness, scaling and corrosion. The analysis shall determine the ability for tie-in, pressure testing ability and remaining useful life. The contractor shall guarantee the piping integrity at the point of tie-in and subsequent acceptance. For existing piping not currently being used; the contractor shall pressure test in order to determine integrity and subsequent acceptance. Report all results in writing to the Architect/Engineer.

END OF SECTION

SECTION 00 2115
RFI FORM

CONTRACTOR'S REQUEST FOR INFORMATION NO. 2

F&D RFI NO: 002
(F&D USE)

NAME OF PROJECT: **Mechanical Upgrades and Related Work**

NAME OF OWNER: **Haldane Central School District**

FACILITY: **Haldane Central School District**

DATE: 9/14/2021

A/E PROJECT NO: **19338.02**

ARCHITECT: **Fuller and D'Angelo, P.C.**
45 Knollwood Road, Elmsford, NY 10523

Tel: 914-592-4444; Fax: 914-592-1717

William Means, RA **WilliamM@fullerdangelo.com**

FROM (CO. NAME): Joe Lombardo Plumbing & Heating of Rockland Inc

CONTACT NAME: Karen Panarella Tel: 845-357-6537

SUBJECT: Spec Section

DISCIPLINE/TRADE: HVAC

DWG./SPEC. REFERENCE: 230500 common work results for HVAC

QUESTION: Please provide spec section# 230500 common work for results for HVAC

FIELD CONDITION

DRAWING/SPEC

DISCREPANCY

OWNER CHANGE

CLARIFICATION

CONTRACTOR'S SUGGESTION (IF APPLICABLE):

ANSWER

See attached specification section.

ARCHITECT'S SIGNATURE:  **RA** DATE: **9/17/2021**

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

SECTION 23 0500
COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 STIPULATIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Sections, apply to this Section.

1.2 EXECUTION OF THE WORK

- A. These specifications call out certain duties of the HVAC Contractor and any Subcontractors. They are not intended as a material list of items required by the Contract. Any reference in these specifications and on the accompanying drawings to the Contractor, Mechanical Contractor, ATC Contractor, Mechanical HVAC Subcontractor, Subcontractor or abbreviation "M.C.", shall be construed to mean the Contractor responsible for all mechanical construction (Division 23) work for this project.
- B. This division of the specifications covers the HVAC systems of the project. It includes work performed by the mechanical trades as well as trades not normally considered as mechanical trades.
- C. Provide all items and work indicated on the Drawings and all items and work called for in this division of the specifications in accordance with the conditions of Contract (Division 01 General Requirements Documents). This includes all incidentals, equipment, appliances services, hoisting, scaffolding, supports, tools supervision, labor consumable items, fees licenses, etc., necessary to provide complete systems. Perform start-up and checkout on each item and system to provide fully operable systems.
- D. Comply with all provisions of the Contract Documents including the General Conditions, and Division 01 General Requirements of the specifications.
- E. Certain terms such as "shall, provide, install, complete, start-up" are not used in some parts of these specifications. This does not indicate that the items shall be less than completely installed or that systems shall be less than complete.
- F. Examine and compare the HVAC Drawings with these specifications and report any discrepancies between them to the Architect/Engineer and obtain from him written instructions for changes necessary in the work. At time of bid the most stringent requirements must be included in said bid.
- G. Examine and compare the HVAC Drawings and Specifications with the Drawings and Specifications of other trades, and report any discrepancies between them to the
 - a. Architect/Engineer and obtain from him written instructions for changes necessary in the work.
 - b. At time of bid, the most stringent requirements must be included in said bid.
- H. Install and coordinate the HVAC work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner approved by the Architect/Engineer. All changes required in the work of the Contractor, caused by his neglect to do so, shall be made by him at his own expense.
- I. It is the intent of the Drawings and Specifications to provide a complete code compliant workable system ready for the Owner's operation. Any item not specifically shown on the Drawings or called for in the Specifications, but normally required to conform with the intent, are to be considered a part of the Contract.
- J. These specifications are basically equipment, installation, and performance Specifications. Some installation details are indicated on the Drawings. Where these differ from the Specifications, apply the more stringent at time of bid. Upon award of bid, contact Architect/Engineer for definite instructions.

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- K. All materials furnished by the Contractor shall be new and unused (temporary services are excluded) and free from defects.
- L. All products and materials shall be new, clean, free of defects and free of damage and corrosion.
- M. The exclusion from, or limitation in, the symbolism used on the Drawings or the language used in the Specifications for HVAC work shall not be interpreted as a reason for omitting the accessories necessary to complete any required system or item of equipment.
- N. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.
- O. All items of equipment or material shall be the product of one manufacturer throughout. Multiple manufacturers will not be permitted.
- P. Receive, inspect, store, and install Owner-furnished equipment where Owner furnished equipment is supplied.

1.3 COORDINATION OF THE WORK

- A. Certain materials will be provided by other trades. Examine the Contract Documents to ascertain these requirements.
- B. Carefully check space requirements with other trades and the physical confines of the area to insure that all material can be installed in the spaces allotted thereto including finished suspended ceilings and the spaces within the existing building. Make modifications thereto as required and approved.
- C. No items foreign to the electrical system shall be run in the dedicated space of the electrical equipment. Dedicated space shall be defined as the width and depth of the equipment from the floor to the bottom of the structural ceiling. Foreign systems include but are not limited to piping, sprinklers, drip trays, etc. Contractor shall be responsible to coordinate the locations of the dedicated spaces with electrical and other trades as required.
- D. Transmit to other trades all information required for work to be provided under their respective Sections in ample time for installation.
- E. Wherever work interconnects with work of other trades, coordinate with other trades to insure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the ceiling trade will know where to install access doors and panels.
- F. Due to the type of installation, a fixed sequence of operation is required to properly install the complete systems. Coordinate, project and schedule work with other trades in accordance with the construction sequence.
- G. The locations of piping, control panels, and other equipment indicated on the Drawings are approximately correct, but they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in consequence of increase or reduction of the number of outlets, or in order to meet field conditions or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.
- H. The Drawings show only the general run of piping and approximate location of termination. Any significant changes in location of routing, necessary in order to meet field conditions shall be brought to the immediate attention of the Architect/Engineer and receive his approval before such alterations are made. All such modifications shall be made without additional cost to the Owner.
- I. Wherever the work is of sufficient complexity, prepare additional Detail Drawings to scale similar to that of the bidding Drawings, prepared on tracing medium of the same size as Contract Drawings. With these

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layouts, coordinate the work with the work of other trades. Such detailed work shall be clearly identified on the Drawings as to the area to which it applies. Submit for review Drawings clearly showing the work and its relation to the work of other trades before commencing shop fabrication or erection in the field.

- J. Contractor shall furnish services of an experienced Superintendent, who shall be in constant charge of all work, and who shall coordinate his work with the work of other trades. No work shall be installed before coordinating with other trades.
- K. Coordinate with contractors for work under other Divisions of this specification for all work necessary to accomplish this contractor's work.
- L. Where service connections are required, to equipment provided by the Owner or by other trades, this Contractor shall verify the exact requirements for these connections prior to ordering any materials or laying out any work. Where there is a discrepancy between the equipment being furnished and that shown on the Contract Drawings, the Contractor shall notify the Architect/Engineer for direction. Failure to comply with this coordination shall not constitute a reason for extra monies for equipment ordered or installed. Restocking charges will not be paid.

1.4 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.5 SUMMARY

- A. This section includes the general requirements that apply to the Mechanical and HVAC Contractor. Fire Protection and the Controls Contractor or Sub-Contractor.
- B. The following work is specified under other Divisions, unless otherwise noted or specified hereinafter:
 - 1. Concrete, Division 03.
 - 2. Roof, Division 07.
 - 3. Plumbing, Division 22.
 - 4. Electrical, Division 26.
 - 5. Installation of starters, contactors, thermal overload switches and remote push buttons, and connection of power wiring to motors, Division 26.

1.6 INTENT

- A. Requirements specified herein shall govern applicable portions of Heating, Ventilation and Air Conditioning.
- B. It is the intent of this specification and accompanying drawings to describe and indicate the general manufacture, erection and installation of the equipment and connection to same specified herein and shown on the drawings. It is not intended that the specifications and drawings describe and indicate each piece of equipment required for installation, for where items are intended or required for satisfactory installation and are considered to be the accepted practice of the trade, they shall be considered to be both specified and indicated. Drawings are diagrammatic in nature; for piping systems; water piping is tapped off the bottom of the pipe and steam and steam condensate piping is tapped off the top of the pipe; provide all tees, elbows and swing joints as required for hookup to coils or branch piping as required for this work whether they are indicated on the drawings or not.

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- C. It shall be understood that the Contractor as hereinafter mentioned shall be the Mechanical Contractor unless specifically noted otherwise.
- D. The Contractor shall furnish all plant, labor and material necessary for the complete and satisfactory installation of all Mechanical work for this contract.
- E. The Contractor shall assume the entire responsibility for the materials, workmanship and satisfactory operation of the various mechanical systems, and other work as specified herein and/or as shown on the drawings.
- F. The Contractor shall schedule and coordinate all work in close cooperation with all trades working on this project.

1.7 DEFINITIONS

- A. Following definition of terms and expressions used in this section are in addition to listing given in Supplementary Conditions:
 - 1. "Provide" shall mean "furnish and install" unless otherwise indicated.
 - 2. "Herein" shall mean the contents of a particular section where this term appears.
 - 3. "Indicated" shall mean "Indicated on contract drawings".
 - 4. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
 - 5. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
 - 6. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 - 7. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
 - 8. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
 - 9. The following are industry abbreviations for plastic materials:
 - a. ABS: Acrylonitrile-butadiene-styrene plastic
 - b. CPVC: Chlorinated polyvinyl chloride plastic
 - c. NP: Nylon plastic
 - d. PE: Polyethylene plastic
 - e. PVC: Polyvinyl chloride plastic

1.8 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for establishing grades and elevations, and checking of all interferences, and shall verify all dimensions and locations in the field.
- B. Contract drawings for mechanical work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, ducts, piping and approximate sizes and locations of equipment outlets. Mechanical trades shall follow these drawings in layout of their work, consult general construction, structural and electrical drawings to familiarize themselves with all conditions affecting their work, and shall verify spaces in which their work will be installed.

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- C. The Contractor shall verify with the A/E before bidding any item of piping or piping arrangement which may be incomplete, incorrect, or indefinite. After contract is let, the A/E's decision shall be final.
- D. All trades shall cooperate and confer with each other as to locations of their materials and equipment before erecting work, so as to avoid interference as much as possible, and in such a manner that will in no way retard progress of construction. In instances where interferences develop, the contractor shall relocate the work as required by the A/E regardless of which work was installed first.
- E. Where job conditions require reasonable changes to indicate locations and arrangement, make such changes without extra cost to Owner. This is not to be construed to permit redesigning of the various systems.
- F. Additional and supplementary drawings may, from time to time, be furnished, and the same, when made, are to constitute a part of the original contract. These drawings will be made to clarify the contract drawings and will not depart materially therefrom.
- G. The A/E specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to an arrangement of these connections.
- H. Special attention is called to the contract drawings and specifications involving general construction, electrical work and details thereon. Bidders are notified to carefully scrutinize these documents for the details affecting the performance of the mechanical trades.

1.9 SCHEDULE OF WORK

- A. The Contractor shall schedule all his work to conform to the Job Progress Schedule as submitted by the General Contractor or Construction Manager and approved by the A/E and school district.

1.10 PREMIUM TIME WORK

- A. The following work shall be performed at night or weekends other than holiday weekends, as directed and coordinated with the Owner:
 - 1. Tie connections to all existing systems.

1.11 PROGRESS OF WORK

- A. The Contractor shall order the progress of his work so as to conform to the progress of the work of other trades and shall complete the entire installation as soon as the conditions of the building will permit. Any cost resulting from the defective or ill-timed work performed under this section shall be borne by the Contractor.

1.12 DELIVERY, STORAGE, PROTECTION AND HANDLING

- A. Deliver, store, protect and handle 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. Any such repairs shall be subject to review and acceptance of the Architect/Engineer.
- B. Delivery of Materials: Delivery materials in manufacturer's unopened container fully identified with manufacturer's name, trade name, type, class, grade, size and color.
- C. Storage of Materials, Equipment and Fixtures: Store materials suitably sheltered from the elements, but readily accessibly for inspection by the Architect/Engineer until installed. Store all items, susceptible to moisture damage, in dry, heated spaces.

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- D. Protect materials and equipment according to the manufacturer's instruction. Protection shall include damage due to fire, water, rust, oxidation, sunlight (for UV sensitive materials), breakage of UV lights, etc.
- E. Following is in addition to Protection of Work and Property, General Requirements:
1. Responsibility for care and protection of mechanical work rests with the Contractor until it has been tested and accepted.
 2. After delivery, before, during and after installation, protect equipment and materials against theft, injury and damage from all causes.
 3. Protective covers, skids, plugs, caps and coating shall be provided to protect equipment materials from damage during construction.
 4. All equipment and material shall be stored under cover and off the ground.
 5. For outdoor storage, protective covers of sheet plastic shall be provided. Covers shall be of gauge required for the area involved and shall be reinforced to withstand wind, rain, sleet and snow. Equipment and material shall be set on skids or platforms of sufficient height to avoid deterioration from spattering and ground water.
 6. Plug open ends of pipes when work is stopped to prevent debris from entering the pipes.
 7. Coat polished or plated metal parts with Vaseline immediately after installation.
- F. The Contractor shall receive, properly house, handle, hoist, and deliver to proper location, equipment and other materials required for the contract.
- G. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.

1.13 INTERFERENCE WITH THE OWNER'S NORMAL OPERATION

- A. All work shall be performed in such a manner as not to interfere with the normal work operations in adjacent spaces or buildings.
- B. In no way shall the Contractor:
1. Block or restrict the means of egress for adjacent spaces.
 2. Decrease the fire rating of walls, partitions, ceilings, doors or combination thereof of adjacent spaces or of means of egress.
 3. Interrupt safety systems or in any way adversely affect the safety of people or materials in adjacent spaces.
- C. The Contractor shall provide acoustical isolation of the work area via temporary doors, partitions, etc., adequate to allow normal work functions.
- D. The Contractor shall provide exhaust fans, dust proof temporary partitions and any containment measure required to prevent dirt, dust, or fumes from reaching adjacent work spaces.
- E. All personal traffic and material delivery shall be routed so as to absolutely minimize travel through adjacent work area.

1.14 VISIT TO SITE

- A. The Contractor shall visit the site and thoroughly acquaint himself with all existing conditions relative to type and source of service available. He shall verify location and extent of these services and consider routing, interferences and excavation required by the contract and any and all other difficulties that may be encountered.

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- B. Submission of a proposal shall be construed as evidence that such an examination has been made.
- C. Failure to visit the site shall not constitute sufficient reason to warrant claims for extra monies for difficulties not apparent in the contract documents.

1.15 MANNING THE PROJECT

- A. The Contractor shall, upon initiation of construction, keep a suitable force of men on the site at all times in order to lace all sleeves, inserts, outlet boxes, fixtures and provide all other openings as are required for the satisfactory installation of equipment.

1.16 FEES AND PERMITS

- A. The Contractor shall secure all permits and pay all fees, required by local and state governing bodies, necessary to complete his phase of the construction. Failure to investigate all applicable payments before the bid submission shall not constitute grounds for additional monies from the Owner. The Owner shall be furnished with all certificates of approval.
- B. The Contractor shall provide insurance and bonding as required by the Building Owner or as stated in the General Conditions.

1.17 CODES AND STANDARDS

- A. The design, construction and installation of all materials and equipment shall be in compliance with the latest edition of all national, state and local codes or standards.
- B. The codes and standards referred to are minimum standards. Where the requirements of these specifications and the accompanying drawings exceed those of the codes and standards, the drawings and specifications shall be followed.

1.18 BASIS OF DESIGN

- A. The layout is based upon the use of particular items of equipment, identified by manufacturer's make and model number. Dimensions, arrangements and service connections required for these particular items have been considered in making the layout. The contractor may use the equipment of any manufacturer whose name is approved for substitution on that item of equipment after he had ascertained that all provisions of MATERIAL SUBSTITUTIONS will be complied with and that all required service connections will be made at no additional cost to the Owner.
- B. Manufacturers are listed for a quality assurance level only. Although a manufacturer is listed does not constitute compliance with the specification size, weight, functionality, capacity, noise, or performance levels. It is this contractor's responsibility to assure the proposed manufacturer has complete compliance with the Contract Documents, **prior to bidding**.
- C. Except where dimensions are shown, the drawings are diagrammatic and shall not be scaled. Exact location of fixtures, apparatus, duct work and piping shall be determined by dimensions on the site. Contractor shall refer to architectural plans and details for exact dimensions.
- D. The drawings indicate the locations of apparatus and piping shall be followed as closely as possible. If before the installation it is found necessary to change the location to accommodate conditions at the building, such changes shall be made at no additional cost to the Owner, and as approved by the Architect/Engineer.
- E. Equipment requiring operation, service or maintenance during the life of the system shall be made easily accessible.

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- F. Ductwork or piping shall not be run within 48" of switchboards, panelboards or motor control centers.
- G. No piping to other HVAC items shall be run in the dedicated equipment space as defined in the N.E.C. (NFPA 70). The dedicated equipment space is the space equal to the width and depth of the equipment and extending from the floor to a height of 6ft. Refer to the National Electrical Code section 11 0. 26 (E) for further information. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone. It is this contractor's responsibility to coordinate with the electrical contractor for all phases of this project.
- H. Use of open-flame devices in work shall be accompanied by fire extinguishing apparatus within 25 feet of work location. All work shall be done in accordance with the general construction requirements and fire watch procedures.

1.19 QUALITY OF MATERIALS

- A. Where a specific model and manufacturer of equipment is specified, the Contractor shall provide what is specified without substitution. Where specified as "or approved equal", the Contractor may substitute equipment except that the burden is upon the Bidder to prove such equality. If the Bidder elects to prove such equality, he must request the Architect's approval in writing to substitute such item for the specified item, stating the cost difference involved with supporting data, and samples, if required, to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty and cost.
- B. Where a specific model of equipment is specified along with an approval equal manufacturer, no substitution will be allowed. The Contractor shall submit one of the manufacturers listed.
- C. Final approval of competitive equipment is reserved by the Engineer when, in the Engineer's opinion, the equipment does not correspond to that specified.

1.20 MATERIAL SUBSTITUTIONS

- A. Material substitutions shall be allowed only where "or equivalent" is stated.
- B. Material substitution submittals shall, include complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance, test data and evidence that the proposed manufacturer or his established representative maintains a qualified service organization including spare parts and is available for competent service on short notice.
- C. Each bidder by submitting his bid represents that the proposal of such article, device, product, material, fixture, form or type of construction by name, make, catalog number of manufacturer which varies with the equipment specified shall be incorporated into the project without claims against the Owner for additional cost. The bidder shall be responsible for all additional costs incurred by others due to the substitutions.
- D. The Architect/Engineer shall have the final approval of all submitted substitutions.
- E. Manufacturers are listed for a quality assurance level only. Although a manufacturer is listed does not constitute compliance with the specification size, weight, functionality, capacity, noise, or performance levels. It is this contractor's responsibility to assure the proposed manufacturer has complete compliance with the Contract Documents, **prior to bidding**.

1.21 SUBMITTALS

- A. Product Data, Shop Drawings: Submit for approval by the authority having jurisdiction and the Owner's insurance underwriter.

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B. Product Shop Drawing Submittal List:

1. Within thirty (30) days after date of execution of the Owner/Contractor Agreement, submit for review and acceptance, a list of all material and equipment manufacturers whose products are proposed, as well as names of all subcontractors whom this trade proposes to employ.
2. Any requests for substitutions of equipment or materials must be submitted and returned prior to submitting the Submittal List. Only specified or accepted manufacturers or suppliers shall appear on the Submittal List.
3. The complete Submittal List must be reviewed and accepted by the Architect/Engineer prior to submittal of Shop Drawings. No Shop Drawings will be processed without an accepted Submittal List.
4. The Submittal List shall include all material, systems, and equipment specified herein.

C. Approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

D. All submittals shall bear a stamp or notation indicating that the Contractor has reviewed and approved the submittals.

E. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted.

F. Submittals shall be marked to show specification reference including the section and paragraph numbers.

G. Submit each section separately and include the following:

1. Information which confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Submittals on all pumps and fans shall be complete with performance curves marked with the design points.
3. Submittals on electrical equipment shall be complete with all power and control wiring diagrams.
4. Vibration isolators shall include operating weight and load distribution at each mounting point.

H. The Contractor agrees that failure of manufacturer's submittal to conform to the above will result in a manufacturer's disqualification on this project.

I. Submit samples as directed of items called for in the specifications; samples of the materials which the manufacturer will actually ship shall be submitted for approval after award of contract and properly labeled on this project.

1.22 ELECTRICAL

A. Power Wiring

1. For the purpose of this specification, power wiring shall be defined as follows:

- a. All wiring from the power source panelboards (or switchboard) to the disconnect switch to the equipment, and final connection to the equipment.
- b. All wiring to control panels as indicated in the Electrical and Mechanical Contract Documents. (All control panels not indicated on the Electrical Contract Documents as receiving power shall do so by jumpers from other control panels, this wiring shall be considered control wiring as defined below).

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2. All power wiring from the power source to the above noted switches and wiring from these switches to the equipment, including final connection to same, shall be provided under Division 26, Electrical.
- B. Control Wiring
1. All other wiring required, whether line voltage or low voltage, internal or external to provide for the operation of the equipment shall be considered as control wiring. This shall include power wiring from transformers serving dampers at exhaust fans; wire to damper and fan end switch to starter.
 2. All control wiring throughout the building, including wiring installed at piping, in ductwork, or as specified shall be provided under this Division.
- C. The Contractor shall furnish all motors, mounts, motor starters and remote mounted push-button controls for all electrically operated equipment furnished as part of the contract. The Contractor shall furnish all safety disconnects. The Contractor shall furnish all speed control switches for all multi-speed motors. All motors shall have copper windings. (Aluminum windings will not be acceptable).
- D. This Contractor is completely responsible for the coordination with all other trades as to the correct voltage for all equipment requiring power. Equipment and or changes required to meet the project voltages will be the responsibility of this contractor.
- E. All push-button switches and starters shall be mounted under Division 26, Electrical.
- F. The Contractor shall provide all controls and control devices, all mounting for controls and all other electrical devices as specified and necessary for the complete installation and satisfactory operation of all electrically operated controls furnished under this Division.
- G. All locally mounted starters shall be furnished under Division 23, except as noted below. Where indicated hereinafter, starters shall be furnished as an integral part of equipment. Starters furnished in motor control centers shall be provided in Division 26, Electrical (refer to Electrical Drawings). Control of starters in motor control centers feeding mechanical equipment shall be provided under Division 23.
- H. Starting equipment of each motor shall be of the proper voltage and HP rated for the motor it is to serve. All starters shall be of the enclosed type; NEMA Type 1, for general-purpose enclosures; NEMA Type 4 for watertight enclosures, and NEMA Type 12 for the dust-tight enclosures. Location of motor shall determine type of enclosure to be used.
- I. Manual motor starters for single-phase motors shall be one or two poles as required, consisting of a snap switch combined with a thermal overload device. It shall be impossible for the switch to be held in a closed position under a sustained motor overload. For resetting the overload mechanism, the switch lever shall be of a design where it has to be moved to the "off" position. Starter shall be enclosed in type of enclosure for area in which it is to be used.
- J. Magnetic starters for 3-phase motors shall be furnished with 110 volt holding coils, 120 volt fused transformers, normally open and normally closed auxiliary contact and overload relay heater elements in all three phases. Provide hand/off/auto selector switch along with running status lights and external reset button.
- K. Locate starters and associated starter controls in accessible locations wherever possible. Location of starters for roof mounted exhaust fans and mechanical equipment above ceilings shall be located at accessible locations above ceiling. Locations shall be coordinated with furniture and equipment layouts for the optimum accessible location for installation and maintenance means.
- L. The Contractor shall be completely responsible for the coordination of automatic temperature control system with control interlocks between various items of mechanical equipment.

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1.23 SCAFFOLDING

- A. The Contractor shall furnish and install scaffolding, ladders and runways required in connection with his work.

1.24 TEMPORARY OPENINGS

- A. Temporary openings not indicated, which may be required for purpose of bringing equipment into building, shall be as approved. General Contractor will perform work of providing and maintaining openings, and of restoring structure; but Contractor for whom temporary openings are provided shall bear costs thereof, and for restoring structure. Ample notice shall be given of size and location of such openings by Contractor requiring same.
- B. Holes provided in General Construction work to permit installation of lines for temporary mechanical services will, after removal of such lines, be patched as specified under Division 01.

1.25 TEMPORARY SERVICE

- A. Temporary services are specified under Division 01, “General Requirements”.

1.26 CUTTING AND PATCHING

- A. The Contractor shall provide all floor and wall cuts as required for ductwork and piping penetrations of existing construction.
- B. No cutting of bearing walls, beams, etc., shall be done without the approval of the Architect. All patching and finishing, etc., shall match the surroundings. All cutting and patching shall be done by workmen skilled in the trades and in the employ of the General Contractor for the project. All cuttings shall be done with saw type edges to give a neat and workmanlike appearance. All pipe holes shall be core drilled unless specified otherwise.
- C. Should it be necessary to do any cutting and patching due to the failure of this Contractor to give proper information to the General Contractor, it shall be done at the expense of the Mechanical Contractor.

1.27 PAINTING AND FINISHING

- A. Except as specified herein, the finished painting of Mechanical Work within the building and on the roof shall be as specified under Division 09.
- B. All mechanical equipment shall have a factory-applied prime and finish coat of paint. Galvanized surfaces shall be considered as finished surfaces for equipment rooms and items concealed from view. Plastic products shall be acceptable without a finish coat of paint. All items of equipment marred or rusted, even though factory finished, shall be repainted; steel angles and steel supports for ductwork, piping or miscellaneous equipment shall have a prime coat of paint before installation.
- C. General Contractor to paint all exposed piping, equipment, and trim that does not have a factory applied finish. Refer to Division 09 "Painting" for paint materials, surface preparation and application of paint. Paint shall be semi-gloss, acrylic-enamel paint. Coat components with two (2) coats of finish paint over two (2) coats of rust inhibitive metal primer or approved equivalent based on component type.

1.28 CONCRETE WORK

- A. Concrete work shall be in accordance with Division 03.

1.29 SUSPENSION SUPPORT FOR PIPES & EQUIPMENT

- A. All pipes and equipment that are suspended shall be connected directly to the building steel. Where hangers are required between building steel points, supplementary steel members shall be added by the Contractor as required to adequately support the load.
- B. Pipes shall not be supported from other pipes, ducts, or equipment.
- C. Hangers from joists shall be attached at the panel points. Pipes with weights of 50 pound per foot (total for single or multiple runs) routed parallel with bar joists shall be supported from a minimum of 3 joists at each hanger point (channel members between joists).

1.30 ACCESS PANELS – BUILDING

- A. Access plates and valves located concealed in walls or above ceilings, and are otherwise inaccessible shall be furnished with an access panel for each location. A hinged inconspicuous type access panel complete with frame, of such size and so located as to provide proper access for service and maintenance.
- B. The minimum size of each access panel shall be 18" x 18" unless physical restraints require a smaller door.
- C. Panels shall be furnished under this Division and installed under another Division of the Specification.
- D. When access panels or doors are installed in fire rated construction, they shall be fire rated to match the construction.

1.31 FIRESTOP PENETRATION PROTECTION SEALING SYSTEM

- A. Where pipes pass through fire partitions, firewalls, floors or ceilings, install a firestop that provides an effective barrier against the spread of fire, smoke, gases and water. Fire-stop material shall be packed tight, and completely fill clearances between pipe, sleeves and structure. All crack voids or holes (up to 4" diameter) shall be sealed using 3M brand Fire Barrier Caulk CP25 or putty 303 or an approved equal. Larger diameter or square holes, 3M system 7902, 7904, 7902R or 7904R or approved equal shall be in accordance with manufacturer's instructions.
- B. Fire-stopping material shall maintain its integrity while preventing the passage of flame, smoke, gases or water. Fire-stopping material shall be a one-part, intumescent elastomer noncombustible, noncorrosive and compatible with synthetic cable jackets as defined by ASTM E814 (UL 1479); and in addition for insulation materials, melting points shall be a minimum of 1700 degrees F for one-hour protection and 1850 degrees F for 2-hour protection.

1.32 RECORD DRAWINGS

- A. The Contractor shall furnish record as-built drawings to the Architect at completion and acceptance of the job. Transparencies of the original drawings with corrections shall be submitted as specified in the General Requirements.
- B. Record all changes from installation originally indicated. Record final location of underground lines by depth from finished grade and by offset distances in feet and tenths to surface improvement such as buildings, curb, or edges of walks. Where work appears on two or more drawings, Contractor shall mark changes on all drawings. Contractor shall mark changes on all drawings. At completion, furnish the above required transparencies to the A/E for approval and record. Drawings shall be certified to be record of work installed and signed by the Contractor. Work shall not be accepted until such drawings have been delivered to the A/E.

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1.33 GUARANTEE

- A. In addition to the requirements stated in the specifications, the Contractor must guarantee all equipment, materials, and appurtenances installed by him to be free from all defects for a period of one year from date of final acceptance.
- B. Upon written notice from the A/E, the Contractor shall promptly correct all defects without additional cost to the Owner. This Contractor shall adjust each part of the entire installation for proper working order. Reports are to be submitted to the A/E and adjustments repeated until the entire system is satisfactory. This Contractor must make good, at his own expense, any defects in materials or workmanship that may appear.

1.34 CLEAN UP

- A. The Contractor shall be held responsible for the general clean up of all areas affected by the work in the Contract. All rubbish and accumulative material shall be removed from the premises and the premises left "broom clean" upon completion.
- B. All stickers, rust, stains, labels and temporary covers shall be removed before final acceptance.
- C. Foreign matter shall be blown, vacuumed or flushed out of piping, pumps, fans, motors, devices, switches, panels, duct work and equipment.
- D. Identification plates on equipment shall be free of excess paint and shall be polished.

1.35 OPERATION AND MAINTENANCE MANUALS

- A. Submit to the Engineer for approval three manuals covering details of operation maintenance for all apparatus requiring service. The Contractor shall arrange formal instruction sessions by competent representatives of the manufacturer for the Owner's operating personnel to cover the following:
 - 1. Service telephone number, fax number, websites, email addresses, business and service addresses and mobile telephone numbers of the installing contractor, and manufacturer and supplier and parts counters of pumps, fans, air handling units, condensate return units, chillers, CV boxes, fan coil units and other components comprising the systems.
 - 2. Manufacturer's operating and maintenance manuals, including detailed parts lists with numbers, power and control wiring diagrams for each piece of equipment and accessory requiring services or maintenance, the guarantee period and the name, address and phone number of the nearest sales and service organization for each item. Both on print and CD's (min 3 copies) form (PDF/MS Word).
 - 3. Cross out options that are not used on equipment sheets, highlight options selected.
 - 4. Step-by-step procedure for starting, stopping, setpoint adjustment, monitoring and alarm enunciation for each system.
 - 5. Copies of inspection certificates provided by the City, County, State and insurance companies.
 - 6. Provide separate Operation and Maintenance Manuals covering the FMCS and in compliance with this section.
 - 7. Routine maintenance procedures and scheduling for all mechanical equipment.
- B. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of the manuals.

1.36 INSTRUCTION TO OPERATIONAL PERSONNEL

- A. Furnish the services of competent instructors to give full instruction to the designated Facilities personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system on the Contract Documents. Instructors shall be thoroughly familiar with all parts of

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the installation and shall be trained in operating theory as well as practical operation and maintenance work.

- B. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Owner for regular operation. Provide 4 man-hours of instruction for each: chemical treatment/glycol systems, pumps, exhaust and intake fans, heat exchangers, CV boxes, fan coil units, condensate return units; 8 man-hours for the AH-1 air handling unit and components including the UV system, 24 man hours for the CH-1 chiller; and 40 man hours instruction for the FMCS (operational, maintenance, programming instruction for trend logging and charting, setpoint adjustment schemes, alarm functionality and other routine operational commands/functions) required by the Owner's personnel..
- C. Instruction shall cover routine maintenance, control and power wiring diagrams and component analysis, preventative maintenance and scheduling, starting and stopping, alarm resets, trend-logging, setpoint adjustment, emergency and normal shutdown/startup, alarm date stamping and all else required by the Owner for complete usage/maintenance/adjustment of equipment in their intended systems.
- D. Obtain written statements from the Owner's representative acknowledging satisfactory completion of each item of instructions.

PART 2 - PRODUCTS

2.1 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Acceptable Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Accepted substitute in accordance with Section 01 60 0.
 - 2. Sealing Elements: EPDM interlocking inks, shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
- B. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.2 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239 inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.3 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With hinge and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.4 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000 psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PROJECT MANAGEMENT AND COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specification to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

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1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule
 2. Preparation of the Schedule of Values
 3. Installation and removal of temporary facilities and controls
 4. Delivery and processing of submittals
 5. Progress meetings
 6. Pre-installation conferences
 7. Project closeout activities
 8. Startup and adjustment of systems
 9. Project closeout activities
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into the work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

3.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequenced.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

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2. Number of Copies: Submit three opaque copies of each submittal. Architect, through Construction Manager, will return one copy.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect and Construction Manager will retain two copies; remainder will be returned. Markup and retain one returned copy as a Project Record Drawing.
 3. Refer to individual Sections for Coordination Drawing requirements for work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project Site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

3.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project Superintendent, provide other administrative and supervisory personnel as required for proper performance of the work.

3.5 PROJECT MEETINGS

- A. General: Attend meetings and conferences at Project Site, unless otherwise indicated.
- B. Preconstruction Conference: Attend a preconstruction conference before starting construction, at a time convenient to Owner, Construction Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- C. Pre-installation Conferences: Attend a pre-installation conference at Project Site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents
 - b. Deliveries
 - c. Review of mockups
 - d. Possible conflicts
 - e. Time schedules
 - f. Manufacturer's written recommendations
 - g. Acceptability of substrates
 - h. Temporary facilities and controls
 - i. Coordination with other work
 - j. Protection of construction and personnel

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3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Attend progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 1. Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 1. Interface requirements
 2. Status of submittals
 3. Off-site fabrication
 4. Site utilization
 5. Hazards and risks
 6. Progress cleaning
 7. Status of correction of deficient items
 8. Requests for interpretations (RFIs)
 9. Status of proposal requests
 10. Pending changes
 11. Status of Change Orders
 12. Pending claims and disputes
 13. Documentation of information for payment requests
 3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

3.6 EQUIPMENT LOCATIONS

- A. Equipment locations: All mechanical equipment shall be located to provide for manufacturer's recommended clearances, clearance for routine maintenance, clearance per code requirements and locations/clearances required for removal/replacement in the future.
1. Manufacturer's recommended clearances shall include space for clearance for pumps (18" minimum around pumps), 30" clearance or complete access door swings, clearances for tube pulls (heat exchangers, etc.); locate piping to be clear of these locations.
 2. Provide minimum 36" clearance around heat exchangers and other pressure vessels; note this is a minimum requirement, provide excess wherever possible. Provide minimum 42" clearance from power panels per the latest edition NEC having jurisdiction; include requirements for piping and ductwork at such locations.
 3. Locate equipment in mechanical rooms to allow for future removal and replacement. Include heights to overhead piping where applicable. Wherever possible, clearances shall include removal/replacement as a whole entity without knock-down.
 4. Locate roof mounted equipment minimum 10' away from edges of roof. Where equipment is located closer, provide handrail system at roof edge as required per codes having jurisdiction. Maintain clearances from handrail system to power panels.

3.7 ACCEPTANCE TESTING

- A. An acceptance test of the HVAC system shall be performed by the Contractor in the presence of the Owner's representative and the Local Fire Marshal. Upon completion of the successful test, the Contractor shall so certify in writing to the Owner and General Contractor.
- B. The Contractor shall also utilize all sub-contractors such as balancing, piping, controls and commissioning agent, and other contractors such as electrical, plumbing, fire alarm and communications as required to perform this acceptance test.
- C. The acceptance test shall be performed to determine that the protective measures required as outlined in NFPA 90A and shall function when needed in order to restrict the spread of fire and smoke.
- D. The acceptance test shall include testing the HVAC system to determine its full functionality and in compliance with NFPA 90A and the sequence of operation. All controls and equipment shall be modulated throughout their entire ranges and adjustments shall be made for optimum performance.
1. Portions of control or alarm systems are permitted to have standby power or other emergency modes of operation.
 2. The tests shall be performed to determine that the system operates under the standby power or emergency operation mode as well as under normal conditions.

3.8 CONNECTION TO EXISTING UTILITIES

- A. If connecting to an existing piping system (water, gas, steam, condensate, etc.). It shall be the responsibility of this contractor to verify the integrity of the existing piping system being connected. All applicable testing and acceptance will apply.
- B. Existing Pipe Testing: The contractor shall remove a section of piping at the point of connection between new and existing. The contractor shall determine the integrity of the existing piping after analysis of the piping section for tube wall thickness, scaling and corrosion. The analysis shall determine the ability for tie-in, pressure testing ability and remaining useful life. The contractor shall guarantee the piping integrity at the point of tie-in and subsequent acceptance. For existing piping not currently being used; the contractor shall pressure test in order to determine integrity and subsequent acceptance. Report all results in writing to the Architect/Engineer.

3.9 PIPING SYSTEMS – COMMON REQUIREMENTS

- A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern type.
 - b. Chrome Plated Piping: One piece, cast brass type with polished chrome plated finish.
 - c. Insulated Piping: One piece, stamped steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass type with polished chrome plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, stamped steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Cast brass type with polished chrome plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: Set screw.
 - h. Bare Piping in Unfinished Service Spaces: One piece, cast brass type with finish.
 - i. Bare Piping in Unfinished Service Spaces: One piece, stamped steel type with hinge.
 - j. Bare Piping in Equipment Rooms: One piece, cast brass type.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped steel type.
 1. Bare Piping at Floor Penetrations in Equipment Rooms: One piece, floor plate type.
 2. Existing Piping: Use the following:
 - a. Chrome Plated Piping: Split casting, cast brass type with chrome plated finish.
 - b. Insulated Piping: Split plate, stamped steel type with hinge and spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast brass type with chrome plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split plate, stamped steel type with concealed hinge and spring clips.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: Split casting, cast brass type with chrome plated finish.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split plate, stamped steel type with concealed hinge and set screw.
 - g. Bare Piping in Unfinished Service Spaces: Split casting, cast brass type with finish.
 - h. Bare Piping in Unfinished Service Spaces: Split plate, stamped steel type with hinge and set screw or spring clips.
 - i. Bare Piping in Equipment Rooms: Split casting, cast brass type.
 - j. Bare Piping in Equipment Rooms: Split plate, stamped steel type with set screw or spring clips.
 - k. Bare Piping at Floor Penetrations in Equipment Rooms: Split casting, floor plate type.
- B. Sleeves are not required for core drilled holes, *except in mechanical and electrical rooms or other wet areas where sleeves shall extend 2 inches above finished floor and shall be made watertight.*
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical and electrical equipment areas or other wet areas 2 inches above finished floor level. Extended cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

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COMMON WORK RESULTS FOR ELECTRICAL

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide ¼ inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 4. Steel Pipe Sleeves: For pipes smaller than 6 inches.
 - a. Steel Pipe Sleeves: For pipes 6 inches and larger, penetrating gypsum-board partitions.
 - b. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast iron soil pipe to extend sleeve to 2 inches below finished floor level. Refer to Section 076200 – Sheet Metal Flashing and Trim for flashing.
 5. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Joint Seals for materials and installation.
- E. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeves size to allow for 1 inch annular clear space between pipe and sleeves for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast iron “wall pipes” for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- F. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Section 078400 – Firestopping Systems for materials.
- G. Verify final equipment locations for roughing-in.
- H. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

END OF SECTION

SECTION 00 2115
RFI FORM

CONTRACTOR'S REQUEST FOR INFORMATION NO. 3

F&D RFI NO: 003

(F&D USE)

NAME OF PROJECT: **Mechanical Upgrades and Related Work**

NAME OF OWNER: **Haldane Central School District**

FACILITY: **Haldane Central School District**

DATE: 9/17/2021

A/E PROJECT NO: **19338.02**

ARCHITECT: **Fuller and D'Angelo, P.C.**

45 Knollwood Road, Elmsford, NY 10523

Tel: 914-592-4444; Fax: 914-592-1717

William Means, RA WilliamM@fullerdangelo.com

FROM (CO. NAME): Joe Lombardo Plumbing & Heating of Rockland Inc

CONTACT NAME: Karen Panarella Tel: 845-357-6537

SUBJECT: Planting or Fencing around Condenser Schedule

DISCIPLINE/TRADE: HVAC

DWG./SPEC. REFERENCE: M500

QUESTION: _____

please provide what type of Planting or Fencing

___ FIELD CONDITION _____

___ DRAWING/SPEC _____

___ DISCREPANCY _____

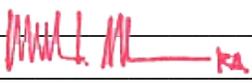
___ OWNER CHANGE _____

___ CLARIFICATION _____

___ CONTRACTOR'S SUGGESTION (IF APPLICABLE): _____

ANSWER

Planting to match existing - "Burning Bush". Quantity 6 (six).

ARCHITECT'S SIGNATURE:  RA DATE: 9/29/2021

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