

SECTION 15400

PLUMBING
(Filed Sub Bid Required)

PART 1 - GENERAL

1.01 FILED SUB-BIDS

- A. Section 15400 is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid.
- B. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Drawings and Sections within DIVISION 1 – REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- C. Time, Manner, and Requirements for Submitting Sub-Bids:
1. Sub-Bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Awarding Authority at a time and place as stipulated in the Advertisement.

The following shall appear on the upper left-hand corner of the envelope:

NAME OF SUB-BIDDER:
PROJECT:
SUB-BID FOR SECTION: 15400 – PLUMBING
 2. Each Sub-Bid submitted for work under this Section shall be on forms furnished as required by Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.
 3. Sub-Bids shall be accompanied by a BID BOND or CASH or CERTIFIED CHECK or a TREASURER'S or CASHIER'S CHECK issued by a responsible bank or trust company payable to the Awarding Authority in the amount of five percent (5%) of the Bid. A Sub-Bid accompanied by any other form of Bid Deposit than those specified will be rejected.
- D. Sub-Sub-Bid Requirements: "None required under this Section."
- E. Reference to Drawings: Work to be performed is shown on Drawings numbered P1, P2 and P3.

1.02 SCOPE OF WORK

- A. Work in this Section includes all labor, materials, equipment and services necessary to furnish completely and install all Plumbing Systems as specified herein, and in general as follows:
1. Interior Sanitary (soil, waste, and vent) drainage System.

2. Hazardous waste and vent drainage System and associated signage.
 3. Hot and cold-water distribution System, including piping, hangers, valves, insulation and associated accessories.
 4. Plumbing fixtures, floor drains and associated trim.
 5. Gas piping System.
 6. Indirect-fired water heater.
 7. Testing and sterilization.
 8. Operating instructions, maintenance manuals, and Record Drawings.
 9. Demolition of existing systems as required to accommodate new work.
 10. Obtain and pay for all inspections, licenses, permits, and approvals required by Governing Authorities and install all work in compliance thereof.
- B. Examine all Project Documents for any Requirements that affect Work of this Section, whether or not such Work is specifically mentioned in this Section.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following Work is not included in this Section but is to be performed by other Trades as specified within the other Sections.
1. Cutting and patching shall be performed by Trades specializing in the specific surfaces affected, i.e.: carpentry, masonry, metals, etc., in accordance with requirements of:

Section 03300 – Cast-in-Place Concrete
Section 05120 – Structural Steel
Section 05400 – Cold Formed Metal Framing
Section 06100 – Rough Carpentry
 2. Firestopping of fire-rated assembly through penetrations in accordance with requirements of Section 07841.
 3. Painting of piping, fittings, coverings, hangers, supports, and all equipment not specifically specified to be painted by this Trade Contractor in accordance with requirements of Section 09900.
 4. Excavation and backfill in accordance with requirements of Section 02221 Earthwork.
 5. Storm drainage system in accordance with requirements of Section 02630 Storm Drainage Systems.

6. Flashing of all Plumbing System roof penetrations in accordance with requirements of Section 07600 Flashing and Sheet Metal.
7. Underground domestic water supply to and including meter in accordance with requirements of Section 02510 Water Distribution.
8. Underground gas service to and including meter/regulator in accordance with requirements of Section 02711 Gas Systems.

1.04 INTENT

- A. All Work shall be in accordance with the arrangement, details, and locations, as indicated on the Contract Drawings, Reference Drawings and any supplemental Addenda, Bulletins or Drawings issued by the Architect. Layouts are diagrammatic and final arrangement of equipment and piping shall suit field conditions. Install all necessary fittings and equipment offsets required to meet job conditions. Work installed in a manner contrary to that shown on the Drawings, or interfering with the Work of another Trade, shall be removed and reinstalled when so directed by the Architect. Discrepancies and questionable points shall be immediately reported to the Architect for clarification.

1.05 CODES, REGULATIONS, AND STANDARDS

- A. All Work shall be installed in compliance with the governing Codes, Regulations, and Ordinances. It shall be the responsibility of this Trade Contractor to familiarize himself with all governing Codes, Regulations, and Ordinances and report any non-compliance of the Plans and Specifications to the Architect, prior to entering into a Contract. All above Requirements shall take precedence over the Plans and Specifications. These Requirements are minimum criteria and no reductions to the quality or capacity of the Systems that may be permitted by Code will be allowed without written permission of the Architect. Extra compensation will not be given for obvious conflicts apparent at the time of the start of the project.
- B. All workmanship, methods, and materials shall meet the highest standards of the Trade and, in general, shall conform to the standards of the following associations:

American Standards Association (ASA)
American Society of Mechanical Engineers (ASME)
National Board of Fire Underwriters (NBFU)
Standard of Underwriters Laboratories (UL)
American Society of Testing Materials (ASTM)
National Electric Code - NFPA 70 (NEC)
National Fire Protection Association (NFPA)
Occupational Safety and Health Act (OSHA)
American National Standards Institute (ANSI)
Building Officials and Code Administrators (BOCA)
American Society of Sanitary Engineering (ASSE)
American Society of Plumbing Engineers (ASPE)
Massachusetts State Building Code (780CMR)

Massachusetts State Plumbing and Gas Codes (248CMR)
Barnstable Building Regulations and Ordinances

1.06 DRAWINGS AND CONFLICTS IN THE WORK

- A. The Drawings and Specifications are intended to be complementary. Any materials shown or specified in one, but not in the other, reasonably implied and usually included under good industry practice and/or required by applicable Codes and Regulations for the proper and safe completion and operation of the Work described herein, shall be furnished and installed by this Trade Contractor at no additional cost to the Owner. Drawings show general arrangement of equipment and are not intended to indicate the exact installation dimensions.
- B. Any conflicts and/or non-compliance of the Plans and Specifications apparent at the time of the start of the project shall be brought to the attention of the Architect and/or Engineer prior to entering into a contract. Extra compensation will not be given for conflicts which were apparent at the time of entering into a Contract.

1.07 EXCHANGE OF INFORMATION AND COORDINATION

- A. All Systems and equipment covered by this Section of the Specifications shall not be installed in congested and problem areas without first coordinating the installation of same with the other Trades and the General Contractor. This Trade Contractor shall, at his own expense, relocate all equipment installed in congested or problem areas should they interfere with the proper installation of the equipment to be installed by other Trades and by the General Contractor.
- B. Particular attention shall be directed to the coordination of Systems with all equipment of other Trades installed in the ceiling areas. Coordinate, with other Trades, the elevations of all equipment in hung ceiling areas to insure adequate space for the installation of all equipment before said equipment is installed. Coordination with all Trades will require that this Trade Contractor attend on-site coordination meetings being directed by the General Contractor. This Trade Contractor will be required to develop coordination Drawings for all congested areas so as to insure that all Trades will be provided with adequate space to install their Systems.
- C. Furnish to the General Contractor, and all other Trade Contractors, all information relative to the portion of the installation specified in this Section that will affect them, sufficiently in advance, so that they may plan their Work and installation accordingly.
- D. In the case of failure on the part of this Trade Contractor to give proper information, as indicated above, sufficiently in advance, this Trade Contractor will pay for all back-charges incurred by the General Contractor and other Trade Contractors for the modification and/or relocation of any portion of the Work already performed by them in conjunction with this Contract due to this Trade Contractor's delay or for having given incorrect information.

- E. Obtain from the other Trades, all information relative to the Work covered by this Section of the Specifications, which this Trade Contractor is to execute in conjunction with the installation of their respective equipment.
- F. In the event that conflicts, if any, cannot be settled rapidly and amicably between the affected Trades, with Work proceeding in a skillful and competent manner, the Architect shall decide which Work is to be relocated and his judgment shall be final and binding.

1.08 WORKMANSHIP

- A. The entire Work provided in this Specification shall be constructed and finished, in every respect, in a skillful, competent, and substantial manner. It is not intended that the Drawings shall show every component, pipe, and detail, but this Trade Contractor shall furnish and install all such parts as may be necessary to complete the Work in accordance with governing Codes and Regulations, the best Trade practices, and to the satisfaction of the Architect, Engineer and the Owner, at no additional cost to the Owner.

1.09 SUBMITTALS

- A. Submit complete Shop Drawings on all materials and equipment intended to be used in the construction of the Systems in accordance with provisions of Section 01300, Submittals, and Record Documents.
- B. The approval of equipment and materials does not relieve this Trade Contractor from the responsibility of Shop Drawing errors in details, sizes, quantities, and dimensions which deviate from the Specifications, Contract Drawings, and/or job conditions, as they exist.
- C. The Architect's permission to make substitutions shall not relieve this Trade Contractor from full responsibility for the Work.
- D. Changes to Work already performed, made necessary by delays in Shop Drawing approval, are the responsibility of this Trade Contractor.

1.10 EQUIPMENT ACCESS REQUIREMENTS

- A. All Work shall be installed so that all parts requiring inspection, operation, maintenance and repair are readily accessible. Minor deviations from the Drawings may be made to accomplish this, but changes of magnitude shall not be made prior to written approval from the Architect.

1.11 WIRING DIAGRAMS

- A. This Trade Contractor shall provide to the General Contractor wiring diagrams for all equipment furnished under this Section for which wiring is to be installed by the Electrical Contractor.

PART 2 - PRODUCTS

2.00 PRODUCT APPROVAL

- A. All piping, fittings, materials, equipment and appurtenances to be installed under this Section of the Work shall be approved for use in Massachusetts in accordance with 248CMR.
- B. Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish the standard of desired quality and style and shall not be construed as fulfilling the requirements of 248CMR.
- C. It shall be the responsibility of this Trade Contractor to ensure that all items submitted to the Engineer to be installed in association with this Work comply with all requirements of 248CMR.
- D. Approval by the Engineer of items submitted does not relieve this Trade Contractor from the responsibility of complying with the requirements of 248CMR.
- E. Installed items which do not meet the requirements of 248CMR shall be removed and replaced with approved products by this Trade Contractor at no additional cost.

2.01 PIPE AND FITTINGS

- A. Soil, Waste, and Vent Piping
 - 1. Piping materials for sanitary piping systems inside the building above the floor slab including soil, waste, and vent piping, unless otherwise noted, shall be standard weight, coated, hubless cast iron equal to "no-hub" system. Pipefittings, couplings, and gaskets shall be manufactured in strict accordance with the Cast Iron Soil Pipe Institute's Standard No. 301 and approved for use in Massachusetts. The pipe shall be cast in one piece with gasket positioning lugs, and shall be legibly marked on the barrel with the manufacturer's name and/or trademark.
 - 2. Piping material for sanitary below the floor slab and/or outside the building shall be service weight cast iron soil pipe with hub joints, coated with tar or asphaltum.
 - 3. Waste and vent pipe above ground, except for urinals, two inches (2") and smaller, may be Type "DWV" copper tubing with solder joint sweat drainage fittings, Schedule 40 galvanized steel or wrought iron pipe.
- B. Hazardous Waste and Vent Piping
 - 1. Piping materials for hazardous waste piping systems including waste and vent piping, unless otherwise noted, shall be schedule 40 polypropylene

with heat fused joints. Above ground piping shall be flame retardant. All piping shall be installed in accordance with the manufacturer's requirements.

C. Domestic Water Piping

1. All domestic water piping inside the building, except as hereinafter specified, shall be Type "L" hard-drawn copper tubing, with cast brass or wrought copper fittings.
2. Piping for connections between valves and fixtures shall be chrome-plated seamless red brass pipe, iron pipe size, containing not less than 85% copper.
3. All domestic water piping located below the floor slab shall be type "K" seamless soft drawn copper with factory installed insulation. Fittings shall not be allowed underground.

D. Gas Piping

1. Gas piping shall be Schedule 40 steel or wrought iron complying with ANSI Standard B36.10, or ASTM Standards A53 or A106. All gas pipe 3" and larger shall be welded. A condensate/sediment trap shall be installed at all points in accordance with the requirements of all applicable Codes, and at the gas inlet of each piece of gas-fired equipment.

2.02 VALVES

A. General

1. Furnish and install valves, where indicated on Drawings or specified, so located that they may be operated, repaired or replaced with a minimum effort and repacked under pressure.
2. The basic system of valves (i.e., gate, ball, check for water service) shall be of one manufacturer.

B. Domestic Water System Valves

1. Shut-off valves (gate) shall be furnished and installed on connections to each group of fixtures, fixtures fed separately from mains and where shown on the Drawings. All valves shall be of 300 C.W.P. design.
2. All fixture supplies and supplies to equipment not already furnished as such shall have angle or straight compression stops, unless otherwise specified.
3. Drain valves shall be installed to drain the water from all sections of the hot and cold piping. Furnish and install ½" brass ball valves with hose connection and cap with chain on each drain.

C. Gas System Valves

1. Gas cocks shall be furnished and installed at connection to each piece of equipment, at each riser and where shown on the Drawings.
2. Gas cocks shall be brass body tee handle types with threaded ends manufactured in accordance with AGA Requirements.

2.03 PIPE HANGERS, SUPPORTS, AND CHANNELS

- A. All piping shall be rigidly supported from the building structure by means of approved hangers and supports. Pipes shall be supported so as to maintain the required grading and pitching of lines, to prevent vibration and to secure piping in place; they shall be arranged so as to provide for proper expansion and contraction of pipe.
- B. Spacing of hangers for horizontal piping shall be in accordance with the Code and the following:
- | | | | |
|----|----------------|------------------|-------------|
| 1. | Cast Iron: | < 10'-0" length | 5'-0" o.c. |
| | | ≥ 10'-0" lengths | 10'-0" o.c. |
| 2. | Copper: | 1¼" and smaller | 6'-0" o.c. |
| | | 1½" and larger | 10'-0" o.c. |
| 3. | Steel: | ¾" or 1" | 8'-0" o.c. |
| | | 1¼" and larger | 10'-0" o.c. |
| 4. | Polypropylene: | 1½" and smaller | 3'-0" o.c. |
| | | 2" and larger | 4'-0" o.c. |
- C. If Codes having jurisdiction require closer spacing, the hanger spacing shall be as required by Code in lieu of the foregoing. Provide hangers at all changes in direction and on both sides of concentrated loads (pumps, valves, strainers, regulators, etc.).
- D. All horizontal piping 2" and smaller shall be supported with adjustable band hangers. All piping 2½" and larger shall be supported by adjustable clevis hangers. Vertical piping shall be supported by extension type split ring hangers along the wall, and riser clamps where passing through floors. Hangers and clamps for uncovered (un-insulated) copper and brass piping shall be factory applied plastic coated steel or copper hangers. Hanger rods shall have machine threads.
- E. All hangers on insulated lines shall be sized to fit the outside diameter of the pipe insulation. Provide pipe covering protection saddles at all hangers on insulated lines of sheet metal 18 gauge and twelve inches (12"), minimum length, and shall cover 180 degrees of arc (lower quadrants) on the covering at all hangers on insulated piping systems.
- F. Remove rust from all ferrous hanger equipment immediately after erection.

- G. All piping installed under this Section of the Specifications shall be independently supported from the building structure and not from piping, ductwork, or conduit of other Trades. All supplementary steel, including factory-fabricated channels required to meet the Requirements specified herein, shall be furnished and installed by this Trade Contractor.
- H. All Work of this Section shall be installed in accordance with the seismic Requirements of 780 CMR. It shall be the responsibility of this Trade Contractor to coordinate the installation of his Work with said Requirements.

2.04 VENTS THROUGH THE ROOF

- A. All pipes extending through the roof for the sanitary system shall be the same material as the piping system. Vents shall be of size indicated on the Drawings and extend at least 18 inches (18") above the roof, ending in the top of pipe, which will be flashed by the Roofing Contractor.
- B. Do not locate vent terminals closer than 25 feet from HVAC fresh air intakes. This Trade Contractor shall relocate and resize vent terminals from where shown on the Drawings or extend to the height as required by Code, if required after Coordination with all other Trades.
- C. Offset all vents so as not to be visible from the front of the facility, whether or not indicated as such on the Drawings.

2.05 PIPE SLEEVE

- A. All pipe sleeves shall be furnished and set by this Trade Contractor. Their location and setting shall be carefully coordinated with the Requirements or limitations of the structural member they are passing through. Any conflict arising shall be solved by utilizing the best Trade practices.
- B. Sleeves and plates shall be black steel, Schedule 40, in accordance with A.S.T.M. Specifications A-120.
- C. They shall be provided at all joints where pipes pass through concrete or masonry. They shall be sized so as to provide for piping covering and for lateral expansion.
- D. The ends shall be flush with the surfaces, except in floors, where it is possible for water to accumulate, such as toilets, janitor's closets, etc., in which case they shall terminate one inch (1") above the finished floor.
- E. Where pipes pass through partitions, ceilings and furring (plaster and glazed tile), furnish and install No. 24 gauge galvanized iron sleeves, over which furnish and install cast metal floor plates of the escutcheon type, designed to cover the sleeves and to remain in permanent position.
- F. Space between all pipes and sleeves shall be packed with graphite packing and Fire-Rated sealant.

- G. Furnish labor to set and fasten all sleeves before the floors and walls are finally constructed.
- H. Provide chromium-plated escutcheon plates at all exposed locations in finished rooms where pipes pass through walls, floors, and ceilings.

2.06 INSULATION

- A. All hot water piping shall be insulated with one-inch (1") thick fiberglass insulation with factory applied, all-purpose, vinyl-coated and embossed vapor barrier laminate with pressure sealing lap adhesive seam.
- B. All cold-water piping shall be insulated with half-inch ($\frac{1}{2}$ ") thick fiberglass insulation with factory-applied, all purpose, vinyl-coated and embossed vapor barrier laminate with pressure sealing lap adhesive seam.
- C. Insulate all fittings, flanges, valves, etc., for the services requiring insulation, same as specified for their respective piping, with white PVC fitting covers as manufactured by Zeston or approved equal, installed in accordance with the manufacturer's instructions.
- D. All joints between adjacent sections of insulation shall be butt tightly together, lapping joints with vapor barrier cement and stapled nine inches (9") on center.
- E. Plain ends shall be sealed with vapor barrier cement.

2.07 CLEANOUTS

- A. Clean-outs shall be installed where indicated on the Drawings and/or where required in soil and waste pipes. Clean-outs shall be installed at the base of all risers and at each change of direction.
- B. Clean-out plugs shall be heavy cast brass of the screwed type, full size up to and including four inches (4").
- C. Clean-outs shall be same size as pipe for piping up to four inches (4") in size and not less than four inches (4") for piping larger than four inches (4").
- D. For piping running under floor slab, clean-outs shall be brought up flush with the finished floor slab level.
- E. Access cover type shall be equal to J.R. Smith 4023 round bronze top for concrete and carpeted floors, or J.R. Smith 4163 square bronze top for tiled floors.
- F. Access to clean-outs in walls shall be provided by an access cover.
- G. All clean-out access covers shall be manufactured by J.R. Smith, Zurn, or Josam.

2.08 SHOCK ABSORBERS

- A. Furnish and install a shock absorber on the cold-water feed to each quick-acting valve installed on the domestic water system in accordance with the Plumbing and Drainage Institute "Standard P.D.I. WH201". These units shall be equal to Zurn "Shoktrols".
- B. All shock absorbers shall be located in readily accessible areas.
- C. The size and installation of shock absorbers shall conform to manufacturer's recommendations.

2.09 MIXING VALVES

- A. Furnish and install a mixing valve at each shower and/or public lavatory to limit the outlet temperature to a maximum of 110°F. Mixing valves shall be installed in accordance with ASSE Standards 1016, 1017, 1069, 1070, and/or 1071 as applicable. Mixing valves shall be combination thermostatic and pressure balancing type.
- B. All mixing valves shall be located in readily accessible areas.
- C. The size and installation of mixing valves shall conform to the manufacturer's recommendations.

2.10 DRAINS

- A. Floor drains shall be installed where shown on the Drawings and where required by Code.
- B. Floor drains in waterproofed floors and areas shall have galvanized iron clamping rings with six (6lb) pound lead flashing to bond nine inches (9") in all directions. Drains shall be checked with Architect's Drawings to determine depth of the flashing collar. Brass extension pieces shall be provided if necessary.
- C. Floor drain "FD" shall be equal to Watts Drainage Products model FD-200 on-grade epoxy coated cast iron floor drain with anchor flange, weep holes, adjustable 8", 1/4" thick nickel-bronze strainer, and no-hub outlet with trap primer tapping. Outlet size shall be as shown on the Drawings

2.11 TRAP PRIMERS

- A. Trap primers serving multiple floor drain traps shall be equal to Precision Plumbing Products model PR-500. Furnish and install with distribution units and supply tubes as required.
- B. Trap primers serving single floor drain traps shall be equal to Precision Plumbing Products model PR-500. Furnish with supply tube as required.

2.12 PLUMBING FIXTURES

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- A. Furnish and install all fixtures including supports, connections, fittings, and any incidentals to make a complete installation.
 - B. Supply escutcheons that are not furnished with plumbing fixtures.
 - C. Faucets and all exposed fittings shall be commercial grade and shall be chromium-plated brass.
 - D. Fixtures shall bear manufacturer's guarantee label or trademark indicating "first quality". Acid-resisting enameled ware shall bear the manufacturer's symbol signifying acid-resisting material.
 - E. Fixtures shall be installed in conformance with the manufacturer's instructions, architect's plans and elevations, and as required by governing Codes and Regulations.
 - F. Architect shall be final judge as to whether fixtures fulfill the Requirements of the Specifications and as to whether they are of suitable quality.
 - G. Manufacturer - Fixtures shall be as specified below. Toilet seats to be Church, Beneke, or Bemis. Carriers and drainage fittings to be J. R. Smith, Zurn, or Josam.
 - H. Color of all fixtures shall be white.
 - I. Laboratory fixtures shall be specified and supplied by others. This Trade Contractor shall provided all piping, traps, cleanouts, valves, and accessories as required for a complete installation.
 - J. Fixtures shall be in accordance with the following schedule:
 - 1. Water Closet (P-1) - Shall be equal to American Standard model 2377.100, vitreous china, elongated-rim, floor mounted, close-coupled two-piece toilet with pressure-assisted siphon jet bowl.
 - 2. Lavatory (P-2) - Shall be equal to American Standard model 3420.403 americast self-rimming oval lavatory. Furnish with Chicago Faucets model 802-VE2805-317CP faucet with vandal resistant ADA wrist blade handles, 0.5gpm econo-flo spray outlet, open grid waste, 1¼" tailpiece, 1¼" cast brass "P" trap, and brass escutcheons with polished chrome finish. Each fixture shall be furnished with chrome plated angle key stops, riser tubes, and Powers model e480 tempering valve. Furnish with offset open grid waste and insulate exposed waste and supplies with ADA approved pre-molded cell vinyl where required. Refer to Architect's plans.
 - 3. Janitor Sink (P-3) – Shall be equal to Fiat model MSB-2424, single compartment, molded stone, floor outlet mop service basin. Furnish with a Chicago Faucets model 814-VBCP two-handle cast brass wall mount faucet with rigid pail hook spout, color index elbow blade handles and angle vacuum breaker on threaded spout. Accessories shall include a stainless steel strainer and drain body, mop bracket, hose, hose bracket,

and stainless steel wall guards. , strainer drain, 2" tailpiece, 2" cast brass "P" trap, and brass escutcheons with polished chrome finish.

4. Emergency Station (P-6) – Shall be equal to Guardian model G1950P combination eye/face wash and shower safety station with stay-open shower valve with pull rod, stay-open eye/face wash valve, and ABS shower head and eye/face wash bowl. Unit shall be of schedule 40 galvanized steel with orange polyethylene cover. Furnish with Powers model ES200RB tempering valve with dual internal cold water bypass, integral checkstops and strainers, and outlet thermometer.
5. Emergency Station (P-7) – Shall be equal to Guardian model GBF2170 combination eye/face wash and shower recessed safety station with stay-open shower valve with panic bar actuator, stay-open eye/face wash valve, and stainless steel shower head, and combination cover and eye/face wash drain pan. Unit shall be of 16 gauge stainless steel with flanged rim for recessed mounting in wall. Drain pan shall discharge to the floor. Furnish with Powers model ES200RB tempering valve with dual internal cold water bypass, integral checkstops and strainers, and outlet thermometer.

2.13 WALL HYDRANT AND HOSE BIBB

- A. Hose bibbs shall be installed where shown on the Drawings and where required by Code.
- B. Hose bibbs shall be brass body with anti-siphon vacuum breaker and wheel handle. Hose connection shall be ½".

2.14 INDIRECT FIRED WATER HEATER

- A. Furnish and install, in accordance with Manufacturer's instructions and in compliance with all Rules and Regulations of Authorities Having Jurisdiction, one (1) 119-gallon indirect-fired domestic water heater.
- B. The storage tank shall be constructed of stainless steel with a stainless steel heat exchanger, designed specifically for the production of domestic water. The tank shall have a working pressure of 150 psi and shall be equipped with a T&P relief valve and fast-acting immersion aquastat for temperature control.
- C. The tank shall be insulated with 2" thick rigid polyurethane foam and equipped with a steel exterior jacket.
- D. Hot water production data for the tank assembly shall be as follows:

Tank volume	119 Gallons
Boiler input	160 Mbh
Boiler water supply temperature	180°F
H.W. production @ 135°F	234 Gallons/Hour
- F. The tank shall be equal to Bradford-White model RTV-119-L.

2.15 RECIRCULATING PUMP

- A. The circulator shall be all bronze construction equal to Taco Model 007 or approved equal.
- B. The circulator shall have a bronze casing, non-metallic impeller, ceramic shaft, and carbon bearings. The unit shall be rated for a working pressure of 125 psi and a temperature rating of 240°F.
- C. Electrical characteristics shall be 120-volt, single phase, with a 1/25 HP, impedance protected, permanent split capacitor motor.
- D. The pump shall be capable of delivering 3 GPM at a total head of 10 feet.

2.16 SYSTEMS IDENTIFICATION

- A. All systems identification materials shall meet ANSI standard A13.1-1996 and be as manufactured by Seton Name Plate Corporation or approved equal.
- B. Valve tags shall be circular 19 gauge brass, 1½" in diameter, with black filled text Seton No. M4506 with No. 16197 brass hooks, No. 16182 bass jack chain, or No. 6 nickel-plated bead chain. Letter abbreviations shall be 1¼" high above ½" high numbers.
- C. Pipe markers shall be set mark type pre-molded acrylic plastic, snap on markers either 8" or 12" long with overlap. The background, field and legend colors and letter sizes shall be per ANSI A13.1 – 1996 standards.

2.17 ESCUTCHEONS

- A. Install escutcheons around exposed pipe passing through finished floors, walls or ceilings. Escutcheons shall be on piece heavy cast brass, chromium plated, with adjustable set screw and shall be of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe.

2.18 PRESSURE GAUGES

- A. Pressure gauges shall be as manufactured by Ashcroft; Therice; Manning, Maxwell and Moore; or approved equal.
- B. Gauges shall have 2½" diameter case, phosphor bronze bourdon tube, and 1% full-scale accuracy. Gauge range shall be 0 to 60 psi.
- C. All gauges shall be installed with petcocks and pulsation dampers.
- D. Pressure gauges shall be installed on the inlet and discharge of each pump.

2.19 THERMOMETERS

- A. Thermometers shall be as manufactured by Mueller, Taylor, Foxboro, or approved equal.
- B. All thermometers shall have a 9" scale, black scale divisions on white face, perma-colored liquid, union hub, separable brass well, and adjustable base.
- C. Thermometers shall have a temperature range of 30°F to 240°F, and shall have 2°F scale divisions.
- D. All thermometers shall be installed so as to be easily read from the floor.

2.20 REDUCED PRESSURE BACKFLOW PREVENTER

- A. The backflow preventer shall be a reduced pressure principle type, consisting of a differential relief valve located between two independently operated spring loaded check valves, equal to Watts Regulator model CU009QT.
- B. Valve bodies shall be bronze with two full port resilient seated ball valves and four resilient seated ball valve test cocks. Valves shall be ASSE, IAPMO, CSA, UL, and AWWA listed, and shall be approved for use by the Local Water Department and the Massachusetts DEP.
- C. This Trade Contractor shall file for all required permits and shall include in his bid price the associated cost. Valves shall be installed in accordance with the Requirements of DEP and the Local Water Department.

PART 3 - EXECUTION

3.01 OPERATION AND START-UP

- A. Furnish all labor, equipment, materials, and test necessary to place all equipment and Systems into operation, and obtain approval of the entire Plumbing System from the local building department.
- B. Materials, fixtures and fittings shall be properly protected and all pipe openings shall be temporarily closed so as to prevent obstructions and damage.
- C. Prior to final inspection, clean all fixtures and flush all piping and equipment and then place all equipment and fixtures into working order to demonstrate the fitness of the installation.

3.02 CLEANING AND FLUSHING

- A. The potable water system shall be disinfected as per 248 CMR, 2.14 (15), whether or not required by the Authority Having Jurisdiction.

3.03 COORDINATION

- A. The structure and its appurtenances, clearances and the related services, such as plumbing, heating, ventilation, and electric service, have been planned to be adequate and suitable for the installation of equipment specified under this Section. The Owner will not assume any increase in cost caused by differing Requirements peculiar to a particular make or type of equipment, and any such incidental cost shall be borne by this Trade Contractor.
- B. This Trade Contractor shall be responsible for Work and equipment furnished and installed by him or his Subcontractor(s) until the completion and final acceptance of this Contract, and he shall replace any Work that may be damaged, lost, or stolen, without additional cost to the Owner.
- C. Cutting and Patching - It shall be the duty of this Trade Contractor to consult with and give to the General Contractor, the exact location and size of all openings and full information as to cutting and patching necessary for the same.
- D. In the event this Trade Contractor fails to provide sleeves, inserts, and templates or fails to notify other Trade Contractors well in advance of his Requirement, he shall be responsible for paying for all cutting and patching made necessary by his failure to do so.
- E. The location and method of attaching supports for plumbing equipment to the building structure shall be coordinated with the Architect and General Contractor prior to the installation of any equipment. This Trade Contractor shall take necessary precautions to insure the building structure and components are not overstressed by the support of plumbing equipment.

- F. In the event there is a conflict or inadequate space for the proper installation of plumbing Systems, this Trade Contractor shall prepare a scaled ($\frac{1}{4}'' = 1'-0''$ min.) composite sketch, showing the building structure and all equipment and items affecting the installation, to clearly identify the areas of conflict. This Trade Contractor shall submit four (4) copies of the sketch, along with a written explanation of the problem, to the Engineer for his review and determination on what action to take to resolve the conflict.
- G. It shall be the duty of this Trade Contractor to furnish full information to all Trades relative to the Work they are to do in connection with Work under this Section. This includes data for wiring, including wiring diagrams, equipment foundations, pipe connections, etc., furnished under other Sections.

3.04 PAINTING

- A. This Trade Contractor shall touch up, with spray paint, all scratched or damaged surfaces of equipment with factory finish. Paint shall be the same color and type as factory finish.
- B. All surfaces to be painted shall be free of dirt, scale, rust, grease, and oil. Paint shall be applied in accordance with the Manufacturer's Requirements.

END OF SECTION

PLUMBING ADDENDUM NO. 1

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK CHANGED UNDER THE CONTRACT DOCUMENTS

- A. Project Modifications: The attention of Bidders submitting proposals for the above-mentioned project located in Barnstable, Massachusetts, is called to the following information related to changes in the Contract Documents. The following additions, clarifications, and/or deletions shall hereby be included in their entirety within the scope of the Contract Documents and shall in turn form a part of the Proposal submitted for Bid.

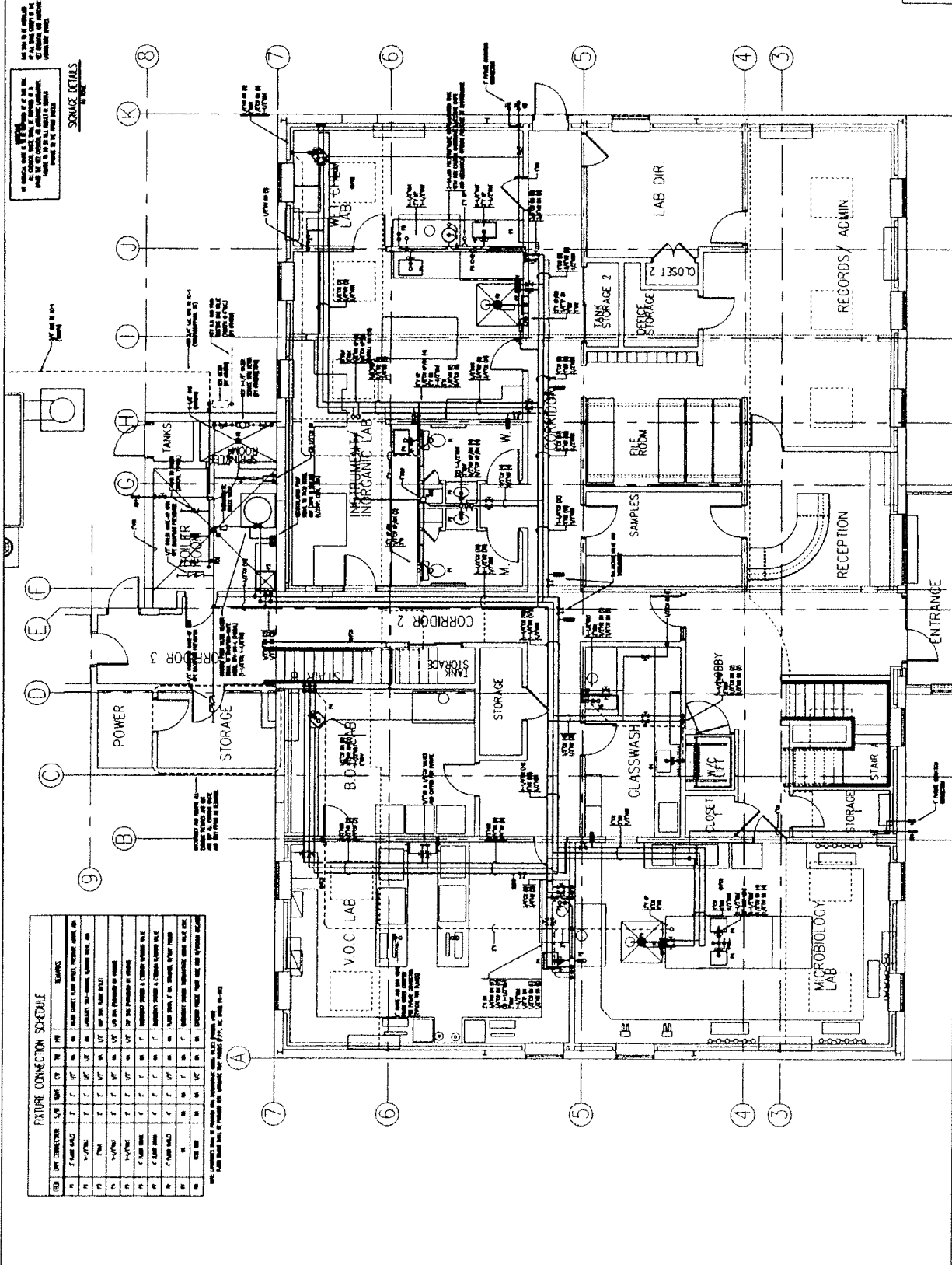
1.3 SPECIFICATIONS

- A. ADD Section 15400 Paragraph 1.02(C) as follows:
 - C. Base Bid: Base Bid work shall include all rough plumbing of the drain, waste and vent systems (above and below ground), domestic water piping, gas piping, floor drains, trap primer connections stubbed above the floor slab, testing and sterilization.
- B. ADD Section 15400 Paragraph 1.02(D) as follows:
 - D. Alternate No.1 Bid: Alternate No.1 Bid work shall include the installation of all plumbing fixtures, associated trim, signage, connections to the rough plumbing installed under the Base Bid, water heater and recirculation pump, connection of rough gas piping to the gas utilization equipment, testing and sterilization.

1.4 CONTRACT DRAWINGS

- A. See attached drawing revision SK8 for changes to the underground sanitary drain routing, exit location and approximate inverts.

END OF PLUMBING ADDENDUM NO. 1



STORAGE DETAILS
SEE SCHEDULE

FIXTURE CONNECTION SCHEDULE

NO.	SYM.	CONNECTION	TYPE	NOTE	REMARKS
1	1"	1"	1"	1"	1"
2	1/2"	1/2"	1/2"	1/2"	1/2"
3	3/4"	3/4"	3/4"	3/4"	3/4"
4	1"	1"	1"	1"	1"
5	1/2"	1/2"	1/2"	1/2"	1/2"
6	3/4"	3/4"	3/4"	3/4"	3/4"
7	1"	1"	1"	1"	1"
8	1/2"	1/2"	1/2"	1/2"	1/2"
9	3/4"	3/4"	3/4"	3/4"	3/4"
10	1"	1"	1"	1"	1"
11	1/2"	1/2"	1/2"	1/2"	1/2"
12	3/4"	3/4"	3/4"	3/4"	3/4"
13	1"	1"	1"	1"	1"
14	1/2"	1/2"	1/2"	1/2"	1/2"
15	3/4"	3/4"	3/4"	3/4"	3/4"
16	1"	1"	1"	1"	1"
17	1/2"	1/2"	1/2"	1/2"	1/2"
18	3/4"	3/4"	3/4"	3/4"	3/4"
19	1"	1"	1"	1"	1"
20	1/2"	1/2"	1/2"	1/2"	1/2"
21	3/4"	3/4"	3/4"	3/4"	3/4"
22	1"	1"	1"	1"	1"
23	1/2"	1/2"	1/2"	1/2"	1/2"
24	3/4"	3/4"	3/4"	3/4"	3/4"
25	1"	1"	1"	1"	1"
26	1/2"	1/2"	1/2"	1/2"	1/2"
27	3/4"	3/4"	3/4"	3/4"	3/4"
28	1"	1"	1"	1"	1"
29	1/2"	1/2"	1/2"	1/2"	1/2"
30	3/4"	3/4"	3/4"	3/4"	3/4"
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32	1/2"	1/2"	1/2"	1/2"	1/2"
33	3/4"	3/4"	3/4"	3/4"	3/4"
34	1"	1"	1"	1"	1"
35	1/2"	1/2"	1/2"	1/2"	1/2"
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37	1"	1"	1"	1"	1"
38	1/2"	1/2"	1/2"	1/2"	1/2"
39	3/4"	3/4"	3/4"	3/4"	3/4"
40	1"	1"	1"	1"	1"
41	1/2"	1/2"	1/2"	1/2"	1/2"
42	3/4"	3/4"	3/4"	3/4"	3/4"
43	1"	1"	1"	1"	1"
44	1/2"	1/2"	1/2"	1/2"	1/2"
45	3/4"	3/4"	3/4"	3/4"	3/4"
46	1"	1"	1"	1"	1"
47	1/2"	1/2"	1/2"	1/2"	1/2"
48	3/4"	3/4"	3/4"	3/4"	3/4"
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50	1/2"	1/2"	1/2"	1/2"	1/2"
51	3/4"	3/4"	3/4"	3/4"	3/4"
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68	1/2"	1/2"	1/2"	1/2"	1/2"
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70	1"	1"	1"	1"	1"
71	1/2"	1/2"	1/2"	1/2"	1/2"
72	3/4"	3/4"	3/4"	3/4"	3/4"
73	1"	1"	1"	1"	1"
74	1/2"	1/2"	1/2"	1/2"	1/2"
75	3/4"	3/4"	3/4"	3/4"	3/4"
76	1"	1"	1"	1"	1"
77	1/2"	1/2"	1/2"	1/2"	1/2"
78	3/4"	3/4"	3/4"	3/4"	3/4"
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81	3/4"	3/4"	3/4"	3/4"	3/4"
82	1"	1"	1"	1"	1"
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