NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).

PART 1 - GENERAL

1.01 Description: This section includes information related to installation of Potable Water Systems with associated equipment and furnishings, especially water systems associated with exterior Drinking Fountains (installed in park settings) and P-Patch Water Systems (see SPR Design Standard 33 10 00 - P-Patch Water System Design for more information).

1.02 Reference Sections:

Section 32 80 00 - Irrigation Systems
Section 33 10 00 - Water Distribution Systems

1.03 Quality Assurance:

A. Basic Qualifications - The Contractor must be a **Washington State Licensed Plumber** and all testing of the backflow prevention equipment shall be done by a **Washington State Certified Backflow Assembly Tester (BAT)** certified to work in buildings.

B. The Contractor shall also comply with all applicable local codes including but not limited to:

1. Seattle/King County Health Department and Washington State RCW 18.106.020.
2. The requirements of the IBC and the Seattle Building Code as it pertains to plumbing for potable water systems, except as supplemented and/or modified herein.

1.04 Submittals:

A. General: Submit complete materials list prior to performing any work. Submit manufacturer catalog data and full descriptive literature, including current manufacturer's price list.

B. Any equipment or materials installed or furnished without prior approval of the Engineer will be rejected and such materials will be required to be removed and replaced with approved materials at the complete expense of the Contractor.

C. Submit shop drawings for review and approval prior to beginning work.

PART 2 - PRODUCTS

2.01 Pipes and Tubing:

A. General: The application of the following pipe, tube, and fitting materials and joining methods required for plumbing piping systems are indicated in Part 3 Article "Pipe and Fittings Applications."

B. Copper Tubing: ASTM B 88, Type 'K' water tube. For tubing up to 2" diameter, use 'soft' copper (annealed temper). For tubing with diameters larger than 2", use 'hard' copper.

2.02 Pipe and Tubing Fittings:

A. Cast-Copper-Alloy, Solder-Joint Pressure Fittings: ASME B16.18.

B. Copper Unions: ASME B16.18, cast-copper-alloy body, hexagonal stock, with ball-and-socket joint, metal-to-metal seating surfaces, and solder-joint, threaded, or solder-joint and threaded ends.

C. Threaded Ends: Threads conforming to ASME B1.20.1.

2.03 Pipe and Fittings Application:

A. General: Use pipe, tubing, fittings, and joining methods for piping systems according to the following applications.

B. Water Distribution Piping below Ground: Use the following:

1. Copper Pipe/Tubing:
   a. Copper pipe/tubing (2 inches and smaller) shall be Type K, cast-copper alloy solder-joint pressure fittings, and soldered joints with Alloy Sn95 solder.
   b. Any copper pipe/tubing installed under concrete slabs must be braised at each joint, per UPC Building Codes.

2.03 Gate Valves: All gate valves shall be Class 150 rated at 150 psi (min.) for steam - 300 psi (min.) for water, oil, or gas. ***Ohio Brass, Nibco, Wolverine***, or approved equal.

2.04 Drinking Fountains: The SPR Standards for Drinking Fountains shall be one of the following depending on site conditions:

A. ADA Free Standing Models:

1. Haws Model #3300 (New SPR Standard, preferred for new projects) ADA Drinking Fountain, preferred color: Powder coated Dark Green.

2. Haws Model #3380 (Old SPR Standard ADA Drinking Fountain, preferred color: Powder coated Dark Green.

3. Haws Model #3511 (Optional for Historic or Olmstead Sites only) ADA Drinking Fountain, preferred color: Powder coated Dark Green.

B. ADA Wall Mounted Models:

1. Haws Model #1025 ADA Drinking Fountain, preferred color: Powder coated Dark Green.

2. Haws Model #1109 ADA Drinking Fountain, preferred color: Stainless Steel.

C. All drinking fountains not located in or attached to building structures shall have waste outlets that must comply with local health codes and be connected thru a CB 15, with trap to a Sanitary Sewer system as shown in SPR Standard Details for Drinking Fountains.

D. All drinking fountains attached to building structures shall be inspected by DPD inspectors per local building codes and shall also be inspected by the SPR Plumbing Shop. All free-standing drinking fountains shall be inspected by the SPR Plumbing Shop. Call for inspections at least two (2) working days in advance by calling the **SPR Inspection Request Line @ (206) 684-7034** or by email at **parksconstruction.inspection@seattle.gov.**

PART 3 - EXECUTION

3.01 Piping Systems - General:

A. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination drawings.

B. At a minimum, all plumbing work on potable water systems shall be executed by a certified journeyman plumber.

3.02 Preparation of Foundation for Buried Piping:

A. Grade trench bottoms to provide smooth, firm, stable, and rock-free foundation throughout length of piping.

B. Remove unstable, soft, and unsuitable materials at surface on which piping is to be laid and backfill with clean sand to indicated level.

C. Lay pipe in irrigation trenches whenever feasible and backfill, per Section 32 80 00 - Irrigation Systems.

3.03 Piping:

A. General:

1. Install components having pressure rating equal to or greater than system operating pressure.
2. Install piping free of sags and bends.
3. Install couplings according to manufacturer's printed instructions.

B. Sleeves: Install sleeves for pipes passing under or through paving and walls, and also where indicated and per Section 32 80 00 - Irrigation Systems.

3.04 Piping Joints:

A. Piping Joint Construction:

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS "Soldering Manual", Chapter 22 "The Soldering of Pipe and Tube".
4. Brazed Joints: Construct joints according to AWS "Brazing Manual, Chapter 28 "Pipe and Tube".
5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:
   a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
   b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
   c. Align threads at point of assembly.
   d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
   e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.05 Connections:

A. Connect to existing drinking fountain valves and fixtures with pipe sizes indicated, but not smaller than required by plumbing code.

B. Inspect condition of existing valves and drinking fountain to determine condition. Notify the Engineer of any conditions that would require replacement of additional equipment or fixtures before making connections.

3.06 Field Quality Control:

A. Inspect water distribution piping:

1. Do not enclose, cover, or put into operation water distribution piping system until it has been inspected and approved by the appropriate authority having jurisdiction.
2. During progress of the installation, notify the plumbing official having jurisdiction at least two (2) working days prior to the time inspection must be made. Perform tests specified below in the presence of the Plumbing Inspector.
   a. Ground work Inspection: Arrange for inspection of all plumbing systems located beneath any poured concrete slabs or foundations.
   b. Roughing-In Inspection: Arrange for inspection of piping system before concealed or closed-in after system roughing-in and prior to setting fixtures.
   c. Final Inspection: Arrange for final inspection by plumbing official to observe tests specified below and to ensure compliance with requirements of plumbing code.
3. Re-inspections: When a Plumbing Inspector finds that piping system will not pass test or inspection, make required corrections and arrange for re-inspection by the Plumbing Inspector.
4. Reports: Prepare and submit inspection reports signed by the Plumbing Inspector.

B. Testing water distribution system:

1. Test for leaks and defects in new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of system tested.
2. Leave uncovered and unconcealed in new, altered, extended, or replaced water distribution piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved for testing.
3. Cap and subject the piping system to a static water pressure of 50 psi above the operating pressure without exceeding pressure rating of piping system materials. Isolate test-source and allow it to stand for 4 hours. Leaks and loss in test pressure constitute defects that must be repaired.

4. Repair leaks and defects with new materials and retest system or portion thereof until satisfactory results are obtained.

3.07 Cleaning:

A. Clean and disinfect water distribution piping:

1. Purge new potable water distribution piping systems and parts of existing potable water systems that have been altered, extended, or repaired prior to use.
2. Use purging and disinfecting procedure prescribed by authority having jurisdiction or, if a method is not prescribed by that authority, the procedure described in either AWWA C651 or AQQA C652 or as described below:
   a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
   b. Fill system or part thereof with water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) and allow it to stand for 24 hours.
   c. Drain system or part thereof of previous solution and refill with water/chlorine solution containing at least 200 parts per million of chlorine. Isolate and allow it to stand for 3 hours.
   d. Flush system with clean, potable water until chlorine does not remain in water coming from system following allowed standing time.
   e. Submit water samples in sterile bottles to authority having jurisdiction. Repeat procedure if biological examination made by authority shows evidence of contamination.

B. Prepare and submit reports for purging and disinfecting activities.

C. Clean interior of piping system. Remove dirt and debris as work progresses.

3.08 Commissioning:

A. Fill water systems.

B. Before operating systems, perform these steps:

1. Close drain valves, hydrants, and hose bibs.
2. Open shutoff valves to full open position.
3. Remove plugs used during testing of piping systems and plugs used for temporary sealing of piping during installation.
4. Check plumbing equipment and verify proper settings, adjustments, and operation.
5. Do not operate water heaters before filling with water.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.
7. Energize pumps and verify proper operation.

END OF SECTION