This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”). Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 331116 - SITE WATER UTILITY DISTRIBUTION PLUMBING

1. GENERAL
	* + 1. DESCRIPTION
				1. This section includes the work necessary for relocating an existing water main and installing a new water main and temporary fire main, including all valves, fittings, blocking, tie rods, and other appurtenances.
			2. RELATED WORK SPECIFIED ELSEWHERE
				1. Section 312300, Trenching, Backfilling, and Compacting
				2. Section 033000, Cast‑In‑Place Concrete
			3. REFERENCES
				1. ANSI: American National Standards Institute.

ANSI A21.4: Cement-Mortar Lining/Cast and Ductile-Iron Pipe and Fittings

ANSI A21.6: Cast-Iron Pipe Centrifugaly Cast in Metal Molds

ANSI A21.11: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

ANSI A21.51: Ductile-Iron Pipe, Centrifugally Cast, in Metal Molds

* + - * 1. ASTM: American Society for Testing and Materials.

ASTM B88: Standard Specification for Seamless Copper Water Tube

* + - * 1. AWWA: American Waterworks Association.

AWWA C104: Cement–Mortar Lining for Ductile Iron Pipe and Fittings for Water

AWWA C106: American National Standard for Cast-Iron Pipe Centrifugally Cast in Metal Molds, for Water and Other Liquids

AWWA C110: Ductile-Iron and Gray-Iron Fittings

AWWA C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

AWWA C151: Ductile Iron Pipe, Centrifugally Cast, for Water

AWWA C502: Dry-Barrel Fire Hydrants

AWWA C504: Rubber-Seated Butterfly Valves, 3 In. (75 mm) Through 72 In. (1,800 mm)

AWWA C509: Resilient-Seated Gate Valves for Water Supply Service

AWWA C550: Protective Interior Coatings for Valves and Hydrants

AWWA C600: Installation of Ductile Iron Water Mains and Their Appurtenances

* + - * 1. COP: City of Portland
				2. Oregon State Department of Health
			1. SUBMITTALS
				1. Submit an acceptable certificate of water quality to the Port.
1. PRODUCTS
	* + 1. GASKETS FOR USED PIPE
				1. Provide new gaskets for each section of pipe, fitting and valve for the Port‑furnished 12‑inch ductile iron pipe and for the existing 16‑inch water main reconstruction.
			2. PIPE
				1. Ductile Iron Pipe: Conform to the following:

Class 52 minimum, ANSI A21.51 (AWWA C151).

Cement‑mortar lined and sealcoated, ANSI A21.4 (AWWA C104).

Rubber gasket joints, ANSI A21.11.

* + - * 1. Cast Iron Pipe: Conform to the following:

Class 22, ANSI A21.6 (AWWA C106).

Cement‑mortar lined, ANSI A21.4 (AWWA C104).

Rubber gasket joints, ANSI A21.11.

* + - * 1. Copper Tubing: Type “K” or “L,” conforming to ASTM B88.
				2. PVC: 4-inch Schedule 40 plastic pipe.
			1. FITTINGS
				1. Mechanical joint cast iron conforming to AWWA C110, or push‑on joints conforming to ANSI A21.11 (AWWA C111‑87).
				2. Mortar lining is required.
				3. Furnish conforming joint accessories for each joint fitting.
				4. Design working pressure shall be:

On‑Site: 200 psi.

Off‑Site: 150 psi.

* + - 1. VALVES
				1. Butterfly Valves: Meet the following requirements:

AWWA C504, Class 150‑B. FM approved.

Tight closing, rubber seat type with seats bonded to the valve body; no metal‑to‑metal surfaces.

Bubbletight at 150 psi rated pressures with flow in either direction.

Discs shall rotate 90 degrees from full‑open to tight‑shut position.

Operate satisfactorily after long periods of inactivity.

Buried valves shall be “groundhog” as manufactured by Henry Pratt, or equal.

Buried valve accessories (box, operating nut, removable cover, etc.) shall be supplied by equipment manufacturer.

Valves shall open counterclockwise.

Valves shall be provided with 2‑inch square operating nuts.

* + - * 1. Gate Valves: Meet the following requirements:

Sizes as indicated on the drawings.

Applicable provisions of AWWA C‑509. UL and FM approved.

Cast iron bodies with valve ends required for connections as indicated.

Bronze‑mounted, resilient-seated wedge type with non‑rising stem; operation shall provide full withdrawal of discs from waterway for unrestricted passage.

Two “O” ring stem seals.

Gate valves shall be of the same manufacturer, or equal.

Meet working pressures of 200 psi.

Open counterclockwise.

Valves shall be provided with 2‑inch square operating nuts.

Epoxy coated inside and out per AWWA C550.

Valves with indicator post shall be Mueller A2073‑6, or equal.

* + - * 1. OS&Y Valves: Outside screw and yoke gate valve shall be Mueller A2073‑6, or equal.
			1. VALVE BOXES
				1. Valve boxes shall be No. 2 (8 1/2‑inch I.D.). C.I. Valve Box and cover per City of Portland Standard Plan No. 5‑603.
			2. HYDRANTS
				1. Contractor‑furnished fire hydrants shall be in accordance with the following:

Corey type.

Meet AWWA C502 specifications. FM approved.

Have 6‑inch flanged joint inlet.

Have one 4 1/2‑inch pumper connection and two 2 1/2‑inch hose connections with ANSI B26 standard threads.

Have “O” ring seals on operating stem.

Operating stem nut dimensions conforming to City of Portland Fire Bureau specifications.

Open counterclockwise.

Have break‑off joint located approximately 2 inches above ground surface.

Have drain hole in base.

* + - 1. CORPORATION STOPS
				1. Size indicated on the drawings.
				2. Mueller, or equal.
			2. TAPPING TEE AND GATE VALVE
				1. Tapping tee shall be Mueller H‑615, or equal.
				2. Gate valve shall be Mueller H‑667, or equal.
			3. DOUBLE‑STRAP SERVICE SADDLE (CLAMP)
				1. Double strap with iron pipe threads.
				2. Neoprene gasket cemented in place.
				3. Mueller, or equal.
			4. UNION COUPLING
				1. The copper‑to‑copper union couplings shall be as manufactured by Mueller, or equal.
			5. INDICATOR POSTS
				1. Indicator posts for on‑site gate valves shall be:

Adjustable type.

UL and FM approved device.

1. EXECUTION
	* + 1. TRENCHING, BACKFILLING, AND COMPACTING
				1. See Section 312300.
			2. LAYING PIPE AND FITTINGS
				1. General:

Furnish all fittings, jointing compounds, bolts, rubber rings, and other material necessary for making joints.

Inspect each length of pipe before laying.

Replace defective pieces at no additional cost to the Port.

Carefully clean pipe and fittings before laying.

Use tools and equipment which will not damage pipe.

* + - * 1. Installation:

Prepare trench to give pipe full length support.

Lower and center pipe in final position.

Laying pipe on blocks not permitted.

Dig bell holes at joints to permit proper jointing.

Lay pipe with bell ends in direction of laying, unless directed otherwise.

Cut pipe only to remove defective ends, to insert fittings, or to obtain specified lengths.

Prevent foreign material from entering pipe (including clothing, tools, or debris). Block or plug open ends of pipe at all times.

Anchor bends involving unbalanced pressures, as shown or directed.

* + - 1. JOINTING WATER PIPE
				1. Push-On Joints:

Wipe end thoroughly clean with cloth, the inside of the bell, gasket and gasket seat.

Place gasket in bell with large round side toward pipe.

Apply thin film of lubricant to inside surface of gasket.

Bevel the outer edge of cut pipe by grinding or filing to a small taper about 30 degrees so as not to damage gasket when joining.

Wipe plain end of following pipe section clean and firmly insert into the bell up to rubber gasket.

Force plain end into bell using a crowbar, fork tool, or jack assembly.

* + - * 1. Mechanical Joints:

Remove loose rust or foreign material from inside of the bell and outside of the spigot by brushing just prior to assembly.

Brush the cleaned surface with a solution of soap and water before slipping the gasket over the pipe’s spigot end and into the bell.

Centrally locate the plain end in the bell.

Insert spigot the full depth of the bell.

Insert tee‑head bolts and draw up evenly with a uniform torque from 60 to 90 foot‑pounds.

Maintain a uniform distance between gland and face of flange all around while tightening bolts.

Correct leakage by disassembling joint completely and reassembling after thorough cleaning.

Do not overstress bolts to correct leakage.

* + - 1. PIPE ANCHORAGE (THRUST BLOCKS)
				1. Pour concrete of Class 3500‑3/4 against undisturbed earth at all pipe bends, tees, and dead ends.
				2. The bearing area perpendicular to line of resultant thrust is shown on the drawings.
				3. Keep concrete clear of joints and accessories.
				4. In lieu of thrust blocks, provide external or internal joint restraint at the fittings.
			2. CONNECTIONS TO EXISTING PIPES
				1. Make connections to existing pipes in a workmanlike manner. Make with closure pieces after the pipeline has been sterilized and tested.
			3. UTILITY LOCATE WIRE
				1. See Section 312300.
			4. TESTING PIPE
				1. Testing procedures and leakage allowance shall be in accordance with AWWA C‑600, unless noted otherwise.
				2. Testing procedures and equipment shall be approved by the Port.
				3. Perform required testing at no additional cost to the Port.
				4. Necessary repair to stop leaks shall be at no additional cost to the Port.
				5. The final backfilling of the trench shall be completed upon completion of a satisfactory test, and upon approval of the Port.
			5. STERILIZING WATER LINES
				1. The Contractor shall familiarize itself with the Oregon Department of Health recommendations for water main sterilization and follow the directions thereof.
				2. After completion of the pressure tests, flush the pipelines to remove silt or debris and sterilize in conformity with the recommendations of the Oregon State Department of Health. Using either liquid chlorine with an appropriate solution feeder or a solution of calcium or sodium hypochlorite, the pipelines shall be filled with water containing at least 25 parts per million of available chlorine. This solution shall remain in the lines for 24 hours, at which time the chlorine residue shall be measured and shall not be less than 10 parts per million.
				3. No additional payment will be made for sterilizing of lines. The cost thereof shall be included in the unit price bid for pipe in place.

END OF SECTION 331116