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SECTION 4 - WATER SYSTEMS

PERFORMANCE STANDARDS

Design Water distribution systems to meet Oregon Administrative Rules Chapter 333 and Oregon Revised Statutes 448, AWWA Standards, and guidelines of the current Newport Water System Master Plan.

Water system design shall provide adequate flow for fire protection and ultimate water system demand. Meet required water system demands by maintaining the minimum operating pressures required by the City. For single-family residential areas, the minimum pressure shall be twenty (20) PSI measured at the meter, and the minimum fire flow shall be 1,000 GPM with a twenty (20) PSI residual. For all other developments, the required fire flow shall be as determined by the Fire Marshall.

Water system design shall meet distribution needs for ultimate water system demand within a given service area. New water systems shall allow for future extensions beyond present development that are consistent with the Master Plan.

All waterlines shall be located within the public right-of-way (ROW) or as directed by the City Engineer. Place waterlines within the public ROW for ease of maintenance and access, control of the facility, operation of the facility, and to permit required replacement and/or repair. See Standard Drawing G-051 for pipe location standards within the ROW. The City Engineer, under special conditions, may allow a public waterline to be located within a public water easement.

Do not place utility infrastructure within one foot of a survey monument location noted on a subdivision or partition plat, per ORS 92.044 (7).

Refer to Newport Municipal Code 5.10 Water for information about City water codes.

CONFLICTS AND OBSTRUCTIONS

- **Utility Notification:** The contractor shall comply with the rules and regulations of the Oregon Utility Notification Center: OAR 952-001-0010 through 952-001-0090 and ORS 757.993. Provide at least forty-eight (48) hours' notice to all utility offices affected by the construction operation.
- **General:** Contractor may encounter various obstructions during the course of the work. Obtain maps and information regarding underground utilities from the utility owning and operating such utilities, but the City does not guarantee the location of such utilities. If the contractor interrupts the utility services because of the construction operation, the contractor shall notify the utility owner and the City authorized representative immediately.
- **Protection:** The contractor shall exercise all due care in protecting existing underground and surface facilities and property along the route of the project. This protection shall include, but not be limited to, trees, yards, fences, drainage lines, mailboxes, driveways, shrubs, and lawns. Any existing facilities not specifically designated for alteration or removal that are damaged during construction shall be restored or replaced to an "in kind" or better condition, at the expense of the contractor.
- **Access:** The contractor shall maintain access to all property, including normal delivery service, mail service, and emergency services.
- **Abandoned Utilities:** Properly remove, grout, or plug all abandoned utilities at the discretion of

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the City authorized representative.

- Asbestos Concrete pipes shall be removed and disposed of according to Oregon Health Standards.

PUMP STATIONS

Pumps stations would be design in close partnership with the City Engineer. The City uses Integrator of Record to integrate all pump stations to our water treatment system to ensure pump stations interact with our water distribution system.

Pumps

- Grundfoss systems

Pressure Release Valves

- Cla-Val

PLC/SCADA Equipment

- Programmable Logic Controller (PLC)
 - o Small Systems
 - Allen Bradley Compact Logix 1769-L24ER-QBFC1B
 - o Large Systems
 - Allen Bradley Compact Logix 1769-L3Xer
- Operator Interface Terminals
 - o 10" Minimum size
 - Allen Bradley Panelview Plus 7
- UPS System
 - o Small Systems
 - APC 1000 w/Smart Slot and relay card and network/Ethernet Card
 - o Large Systems
 - APC 1500 w/Smart Slot and relay card and network/Ethernet Card
- Connection to SCADA
 - o 6 port Fiber patch panel (City provides the Fiber Network Switch)

Instrumentation

- Flow Meters
 - o E&H Promag W400 w/Ethernet IP Comms (Zero Lay length style)
 - Remote transmitter
- Pressure Transducers
 - o E&H Ceraphant PTP31B
- Level Transducers
 - E&H FMX21 Water Pilot w/breather box

Variable Frequency Drives

- Small Drives
 - o Power Flex 525

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- Large Drives
 - o Power Flex 753 w/2 Port Ethernet card

PRIVATE SYSTEMS

Private systems start at the back of a master meter. Private systems shall be maintained by property owner. The owner shall provide the required backflow prevention device to separate the private system from the City main line system. Maintenance of the backflow device will be the responsibility of the property owners.

Once plans have been approved, the City will purchase a master meter, if meter is larger than those kept in inventory. Developer shall buy and place infrastructure and vault in preparation for meter placement. When Contractor is ready for meter installation, contact the City Water Dept to arrange payment of installation costs and schedule meter installation. City will install the master meter after infrastructure is in place. Meter and vault shall be installed in the ROW. The master meter, like all meters, will remain property of the City. See Standard Drawings W-610 and W-611 for design specifications.

MAIN LINE

Design the City's water distribution system to meet peak hour demands, seasonal demands, and all fire flow requirements with minimal impacts to City of Newport water customers. Where constructing new water infrastructure, water systems shall be looped into existing water pipes in the project vicinity or as directed by the City Engineer.

Contractor shall completely remove abandoned City water mains and services in the City's ROW. Where decommissioning water mains and services within a City utility easement (outside of public ROW) on private property, it is preferred to have all pipes removed, however with the City Engineer's approval, they can be abandoned in place when the easement is extinguished and the City releases liability of the abandoned pipeline to the property owner. Abandoned pipe shall be filled with flowable material if they are twelve (12) inch or more in diameter or required by City Engineer or their designee.

Construct City of Newport water pipe in a trench with Class B compacted backfill within the pipe zone in conformance with the Standard Drawings G-100. Do not construct water mains on blocks.

Materials

Construct all public water distribution systems with C-900 unless conditions call for ductile iron pipe. If ductile iron pipe is used: all such pipe shall be cement mortar lined pipe with push-on or mechanical type joints meeting manufacturer and AWWA standards. HDPE pipe preferred in geologically unstable areas where ground shifting is possible.

Minimum Pipe Size

Water distribution main sizes shall generally conform to the following:

- Six (6) inch, eight (8) inch or twelve (12) inches in diameter
Minimum size for permanently dead ended mains supplying fire hydrants with a fire flow minimum of 1,000 GPM and for primary feeder mains in residential subdivisions.
- Twelve (12) inch and larger
For distribution mains and primary feeder lines in larger subdivisions, industrial areas, and commercial areas. Design shall include trench protection to impede ground water from travelling trench line after pipe is installed.

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- Fire hydrant lines shall be six (6) inches in diameter and have a four hundred (400) foot maximum running length from main. All mainline extensions and system designs shall meet required minimum fire flow for that zoning

Alignment and Cover

- Grid System
The distribution system mains shall be looped at all possible locations. City requires all development designs to extend mains across existing or proposed streets to allow for future extensions of other developments. Plan all terminations and locate such that new or existing pavement will not have to be cut in the future when the main is extended. City does not permit the installation of permanent dead end mains greater than two-hundred-fifty (250) feet when fire protection and a relatively large area of single mains depends on the dead end main.
- Dead End Mains
 - Provide dead end mains placed for future extension with end of line gate valve and a properly sized blow-off (see Standard Drawing W-405) assembly. Permanent dead end mains shall terminate with a standard blow-off assembly.
 - New lines that are connecting to existing lines at both ends will require a temporary blow-off for chlorination purposes. Design shall address how to prevent water from blow-off and flushing from causing erosion or landscape damage.
- ROW Location
Water systems shall be located north and west from the ROW centerline as defined in Standard Drawing G-051.
- Air Release Valves
Make all abrupt changes in vertical or horizontal alignment with a fitting and secured with Megalugs and/or Bell and Spigot restraints. Concrete thrust blocks and joint restraints shall conform to Standard Drawing W-700. Vertical shifts may require an air release valve.
- Minimum Cover
The standard minimum cover over buried water mains within the street ROW shall be thirty-six (36) inches from finish grade.
 - The minimum cover for mains in easements across private property shall be thirty (30) inches from finish grade.
- Finish grade shall normally mean the existing or proposed pavement elevation. Where the main is located in the cut or fill side slope or where mains are located in easements, finish grade shall mean final ground elevation at the water main alignment.

The City Engineer will consider a deviation from the above standards on a case-by-case basis. When there is underlying rock strata that prohibits placement of the water main thirty-six (36) inches below finish grade, a written request must be submitted to the City Engineer for consideration, together with submission of a soils report, with a plan and profile certifying that bed rock exists less than three (3) feet below the undisturbed ground surface.

Separation with Wastewater and Other Utilities (Standard Drawing G-051)

Water mains shall be installed a minimum clear distance of ten (10) feet horizontally from wastewater sewers and shall be installed to go over the top of such sewers with a minimum of eighteen (18) inches of clearance at intersections of these pipes (in accordance with the requirements of OAR Chapter 333, Public Water Systems). The City Engineer shall approve any exceptions. In all instances, measure the distances edge to edge. The minimum spacing between water mains and storm drains, gas lines, and

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other underground utilities, excepting wastewater sewers, shall be three (3) feet horizontally when unable to maintain the standard utility locations. See Standard Drawing G-051.

Where designing water mains for installation parallel with other water mains, utility pipe, or conduit lines, the clear zone around the main shall be twelve (12) inches on all sides with parallel utilities. Placement in such a manner which will permit future side connections of mains, hydrants, or services and avoid conflicts with parallel utilities without abrupt changes in vertical grade of the above mentioned main, hydrant, or service. Where perpendicular crossing of utilities are required, the minimum vertical clearance shall be six (6) inches. Pot hole all crossings to avoid conflicts. See Standard Drawing G-052 for perpendicular clearance requirements. Water lines crossing sewer mains may require flowable fill material placed between to meet safe potable water requirements.

Easements

Any water main placed within a water main easement will be permanently marked with blue delineators at blow-off locations, in overgrown areas, and at valves. In addition, place such posts and signs where the waterline intersects the public ROW at the easement location.

Submit all easements to the City for review and approval prior to recording. The City Engineer shall approve public easements across private property prior to construction. Any public water lines (domestic water services, fire services, or private water mains) entering into private property requires premise isolation (backflow devices) at the ROW. The location of the premise isolation shall be on private property, unless otherwise approved by the City Engineer. City permits backflow devices within a building on a case-by-case basis. See Standard Drawings W-900 and W-905.

Relation to Watercourses

New water mains may cross over or under existing streams, ponds, rivers, or other bodies of water as follows:

- Above Water Crossings
 - Design the pipe to provide support, anchorage, and protection from freezing and damage, yet remain accessible for repair and maintenance. All above water crossings will require review and approval by the City Engineer.
- Underwater Crossings
 - Design mains crossing stream or drainage channels to cross as nearly perpendicular to the channel as possible.
 - Provide valves at both ends of the water crossing so that the section can be isolated for testing and repair. The valves shall be easily accessible and not subject to flooding. The valve nearest to the supply source shall be in a vault. Provide permanent taps on each side of the valve within the vault to allow insertion of a small meter for testing, to determine leakage, and for sampling.
 - The following surface water crossings will be treated on a case-by-case basis:
 - Stream or drainage channel crossing for pipes twelve (12) inches inside diameter and greater.
 - River or creek crossing requiring special approval from the Division of State Lands.
- The minimum cover from the bottom of the streambed or drainage channel to the top of pipe shall be thirty-six (36) inches.

Pressures and Flow Calculations

The City of Newport has numerous pressure zones around the City, each with unique pressures. City

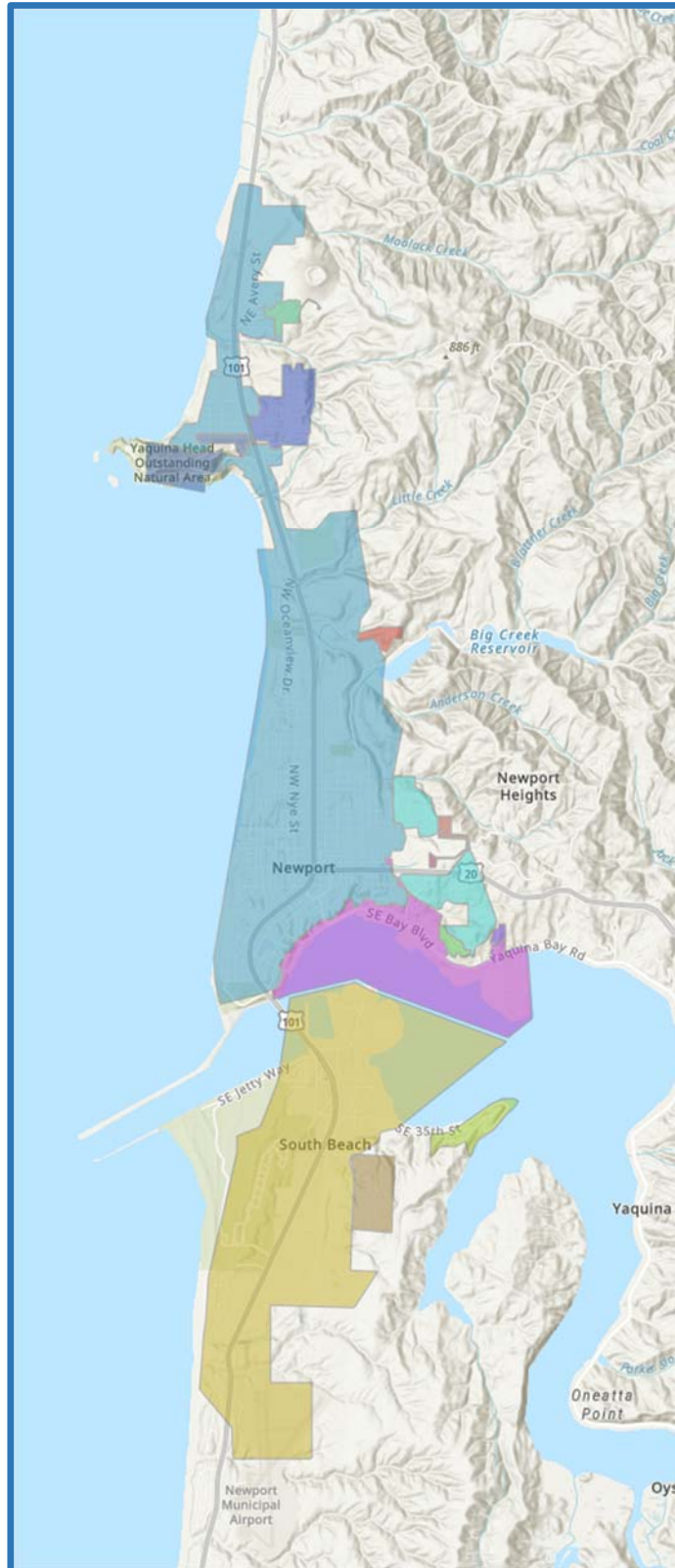


Figure 1: City of Newport Water Pressure Zones

Pressures below forty (40) PSI in most zones typically generate complaints. To avoid complaints, the

strongly recommends Design Engineer understand the pressure zone in which work is taking place and the specific requirements associated with that zone (e.g. pressure reducing values, etc).

- PRESSURE ZONES**
- Bayfront
 - Idaho Point
 - Lakewood Hills PS
 - Main Tanks
 - NE 54th St PS
 - NE 71st St PS (aka Salmon Run)
 - NE Yaquina Heights Dr
 - SE 40th St PS
 - SE Running Springs St
 - SE Vista Dr
 - Smith Tank
 - South Beach Tank
 - Yaquina Heights PS
 - Yaquina Heights Tank

The following table identifies the City of Newport requirements for pressures:

CONDITION	PRESSURE (PSI)
Minimum Service Pressure Under Fire Flow	20
Maximum Service Pressure Residential without PRV	75
Maximum Service Pressure with PRV	120

The City of Newport is required to ensure required fire flows of twenty (20) PSI. City does not guarantee pressures higher than twenty (20) PSI, and the designer should consider how pressure changes over time as additional development is added beyond any proposed tie-in or extension of the existing water distribution system.

The City defines normal service pressures static pressures on peak day demand.

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designer is required to design facilities to obtain this goal. If design engineer cannot meet normal service pressures, each service line will require an individual and private pressure pump located a minimum of six feet past the City premise isolation and shall not be located on City Right-of-Way, and/or the property title for lot containing low-pressure service line modified to state:

“Known low water pressure area. The City of Newport is not responsible for inadequate service pressures associated with this property. If pressures are unsatisfactory to the property owner, the property owner at their discretion can install a pressure pump on the downstream side of the City Meter at the owner’s expense. The pump shall be located at a minimum of six feet past the premise isolation and shall not be located on City ROW. In no situation is the City responsible for maintenance, service, replacement, of this pump.”

The City strongly suggests that service lines, within ten (10) percent of maximum pressure as determined by plumbing code, have individual pressure reducing valves installed on service line. Maximum service pressures that are, or exceed, eighty (80) PSI on City owned mainlines will require a pressure reducing valve and vault. The designer will need to meet with the City Engineer, or designee, to determine installation information such as exact location, orientation, size, and valve type. Water service lines past the City owned meter must meet plumbing code requirements for maximum pressure.

Pressure Reducing Vaults

Pressure Reducing Vaults designs shall be coordinated with the City on a case-by-case basis.

Pressure Reducing Valves

Projects requiring a PRV station shall set up a meeting to discuss design requirements.

APPURTENANCES

Valve Location

The City defines transmission mains as lines that: have no other services or distribution connections to them; are typically coming from a water source. All other lines are distribution lines. The maximum distance between valves on a transmission main is eight hundred (800) feet; distribution main valves are a maximum of five hundred (500) feet. The City will have final determination of all valve locations. Main line valves shall be located in the public ROW.

Valve types and materials shall conform to the City of Newport Specifications. Distribution system valves shall be located at the tee or cross fitting. A sufficient number of valves shall be so installed that to affect any one particular shutdown, requires the operation of not more than four (4), and preferably three (3), valves to isolate a section of pipe. The spacing of valves shall be such that the length of any one shutdown in commercial or industrial areas shall not exceed eight hundred (800) feet in other areas. See Standard Drawing W-100.

In general, valves tee intersection in two branches; valve a cross intersection in three branches. Transmission water mains shall have valves with spacing of not more than eight hundred (800) feet. Install valves for creeks, railroad and freeway crossings as hazardous crossings with a valve on each side per Standard Drawing W-100.

Gate Valves

- Valves shall be located in City ROW.

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- Valves two (2) inches to twelve (12) inches shall be a resilient wedge design. The valve shall have a cold water rated working pressure of two-hundred-fifty (250) PSI. All cast ferrous components shall be ductile iron and shall be manufactured in compliance with the latest edition of ANSI/AWWA C515. The valve shall also be UL Listed and FM Approved, in applicable configurations. All valves shall be certified to NSF/ANSI/CAN 61 and NSF/ANSI/CAN 372.
- The valve design shall be lightweight, easy to handle, and constructed with wall thickness per Table 3 of ANSI/AWWA C515. Heavy wall and/or cast gray iron bodies are not acceptable. The valve shall have a smooth and oversize waterway and have the marking "D.I." or "Ductile Iron" cast onto the body. The valve wedge shall be constructed of ductile iron in sizes four (4) inches to twelve (12) inches. All four (4) inch to twelve (12) inch wedges shall be fully encapsulated with EPDM rubber and provided with male type guides and polymer guide covers.
- Valve stems shall be sealed by three O-rings. Two of the O-rings shall reside above the thrust collar. Thrust collar shall be integral to the valve stem. Multi-piece collars that wrap around stem are not acceptable. O-rings set in a cartridge shall not be allowed.
- Valves two (2) inches to twelve (12) inches shall be furnished with a debris seal above the stuffing box O-rings. This seal shall also be capable of sealing against internal or external pressure equal to the valve's rated working pressure.
- The valve shall also be equipped with thrust washers above and below the stem thrust collar for reduced operating torque.
- All exterior valve body bolting shall be stainless steel and shall be provided with hexagonal heads with dimensions conforming to ANSI B18.2.1. Metric size and/or socket head cap screws, or bolts, are not allowed. The operating nut shall be two (2) inch square and shall be constructed of ductile iron fitted to a square tapered stem to help ensure even distribution of input torque. All body gaskets shall be of the pressure energized O-ring style design.
- All internal and external ferrous surfaces of the valve body and bonnet shall have fusion-bonded epoxy coating, complying with ANSI/AWWA C550.
- All valves shall be the AMERICAN Flow Control Series 2500 or 2500-1 Resilient Wedge Gate Valves.
- In four (4) inch to twelve (12) inch distribution lines, where pressure ratings may exceed two-hundred-fifty (250) PSI, a resilient wedge gate valve exhibiting a three-hundred-fifty (350) PSI rating by AWWA, UL and FM shall be furnished. All three-hundred-fifty (350) PSI rated valves shall be the AMERICAN Flow Control Series 3500.

Butterfly Valves

- Butterfly valves shall be the rubber-seated type, suitable for direct-burial service.
- Butterfly valves shall meet the testing requirements as presented in AWWA C-504.

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Valve Types

Gate valves are required on all waterlines eight (8) inches and smaller. At City's required standard depth, butterfly valves shall be used on all waterlines of ten (10) inch diameter or larger. When main lines are deeper than five (5) feet, a gate valve is preferred. Designers may use a butterfly valve on smaller diameter lines when unable to obtain eighteen (18) inches of cover to the top of a gate valve body. Mount butterfly valves with the stem vertical and on the "curb" side of the main.

Air Release Valves and Combination Air/Vacuum Release Valves

When designated by the City Engineer, install air release valves (ARV). Such valves will be required on main lines at all high points in grade. See Standard Drawing W-500. Typically, ARVs will be located at all elevation rises and elevation high points. Typically, a 1-inch Air-Vac valves shall be installed for twelve (12) inch and smaller water mains and two (2) inch Air-Vac/Air Release valves installed for all larger water mains, however the sizing shall be verified against manufacturer's recommendation. All Air-Vac/Air Release valves will be located outside the vehicular roadway as illustrated in Standard Drawing G-051. Insulate all Air-Vac/Air Release valves to protect against a sustained temperature of minus ten (-10) degrees Fahrenheit. Hydrants are not considered Air-Vac or air release.

Extension Stems for Valve Operators

Where the depth of the operating nut is more than six (6) feet, provide operating extensions to bring operating nut to a point eighteen (18) inches below the surface of the ground or pavement (see Standard Drawing W-205).

Construct the extension of solid marine-grade steel rod and approved by the City authorized representative. Cut extensions to the proper length so the valve box does not ride on the extension when set at grade.

Size

In general, valves shall be the same size as the installed mains.

Valve Boxes

Shall be model 910 cast iron per ASTM A48 CL30 or equal (lug less) and placed at finished grade, centering vertically over operating wheel two (2) inch or nut.

Meters

Purchase meter through a City water account. All water meters two (2) inches and smaller shall be installed by the City of Newport.

New meters installed at commercial and industrial properties must be one-inch minimum. Design commercial water systems on residential projects that have three (3) dwelling units or more with one (1) inch meters.

Meters that are three (3) inches or larger will be Neptune meters. All accessories, except the MTU, need to be included to insure the meter functions properly.

All water service lines must have a meter box and assembly placed a minimum of one (1) foot outside of hard surfaces (concrete and asphalt) unless approved by the City Engineer. If not installing sidewalk, place meter in ROW softscape. When locating meter boxes in sidewalks with tree wells, the meter box shall be located a minimum of six (6) feet from the tree well.

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Any service line that is providing water from the City of Newport distribution system for purposes other than fire flow must have the entire amount of water used measured. Fire lines no longer require meters.

Meter Testing

If the City needs to test a meter for potential problems, or if a property owner requests the City perform a test on the meter, the property owner may be asked to pay a testing fee (see NMC for fee schedule). Test and fees are for domestic meters only.

If the meter is discovered to be faulty, the City will install a new meter. Property owner is responsible to arrange for, and pay costs for, a plumber to reconnect the service line at the back of the meter.

All Compound meters tested annually. City bears cost.

HOT TAPS

Water services are to maintain eighteen (18) inches of separation when crossing sewer lines at a perpendicular within the ROW or in a utility easement; ten (10) feet of separation if running parallel to sewer line.

Service taps (all sizes) at the main shall not exceed one tap every eighteen (18) inches and be a minimum two (2) feet from bends or bells on the mainline. Hot taps two (2) inches and smaller shall be installed by City Staff. Hot taps greater than two (2) inches shall be installed by contractor's agent certified to work on potable water distribution lines.

Services two (2) inches and larger shall be hot tapped with a minimum two (2) inch valve, using the appropriate tapping saddle and appurtenances as called out by the Engineer of Record. Service connections to existing pipe shall install a saddle tap and valve.

Place all water service lines perpendicular to the water main.

City personnel shall be on site to oversee all hot taps not installed by the City. Coordinate all taps with City personnel.

AUTOMATIC METER READING SYSTEM

The City is building an automatic meter reading system. All City meters work on an AMI network by Neptune 360. All meter boxes purchased need to accommodate this system. See Standard Drawing W-605 for meter box specifications.

VAULTS AND METER BOXES

The following, or an approved equal, are the only approved meter boxes for services for 2-inch and smaller. All meter boxes must be tier 8 or equal.

Brand	Box	Lid
Armorcast	BOX –17x 30 x 18	LID-1730 Polymer with cast iron meter reader lid
Quazite	Polymer concrete; flared L 17 x 30 x 18	Quazite H20 17 x 30

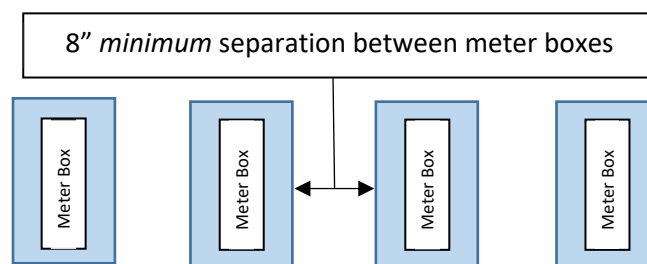
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For all meters three (3) inches and larger, the designer will determine the appropriate meter box or vault. All meter boxes and vaults must be traffic rated. See Standard Detail W-609A & B for three (3) inch meter requirements when designing vault; Standard Drawing W-610 and W-611 for six (3) and eight (8) inch meters requirements.

Install all meter vaults and boxes to the correct finish grade. The City will not activate any meter vaults that do not meet this requirement, including requirements for correct depth of meter stop and service line. The water service crew will lock-off non-compliant boxes with a City of Newport lock.

MANIFOLDS

With approval from the City Engineer, the City may allow meter banks/manifolds, multiple meters placed in close proximity to one another, to provide multiple lot services. See Standard Drawing W-113.



Manifold Layout

RESTRAINED JOINTS

Provide joint restraint (locked joints) to prevent movement of the pipe or fitting at all bends, tees, crosses, plugs, and hydrants. Restrain all MJ fittings.

Mechanical Joint Restraint

Mechanical joint restraint where incorporated into the design of the follower gland shall consist of individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. Maintain the device so that it shall be capable of full mechanical joint deflection during assembly and flexibility of the joint after burial. The joint restraint ring and its wedging components shall be made of grade 60-42-10 to ductile iron conforming to ASTM A-536-84. The wedges shall be ductile iron heat-treated to a minimum hardness of 370 BHN. Dimensions shall be appropriate to match pipe materials used. Rate working pressures for the system of at least three-hundred-fifty (350) PSI for pipes sixteen (16) inches and smaller diameter and two-hundred-fifty (250) PSI for larger sizes. The devices shall be UL listed up through twenty-four (24) inch diameters and FM approved through twelve (12) inch diameters. The restraint systems and devices shall be Series 1100 Megalug restraint, as produced by EBAA Iron Sales, Inc., or approved equal. Contractor shall perform visual inspection of the restraint devices for flaws before installation. Do not use faulty restraint devices. Contractor shall bear all cost of repairing and subsequent retesting to correct the defect.

- Restrained joints by Grip Ring or Mega Lug kits
- Restrained joints on all be twenty-two-and-a-half (22.5) degrees and above
- Use torque limiting twist-off nuts to insure proper actuation of the restraining wedges or grip rings.

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Thrust Blocks

Restrained joints at bends do not replace thrust block requirements.

TESTING REQUIREMENTS

All testing shall be done in the presence of a designated City representative or the test shall be considered invalid.

Pressure Testing

Main line testing shall follow OSS latest addition: one-hundred-fifty (150) PSI, held for two (2) hours, with loss of no more than five (5) PSI; unless situation calls for variation from standard test. See OSS, latest edition, Section 01140.51(a)(3).

Chlorination

Chlorination of new lines are overseen by the City Water Crew. See OSS, latest edition, Section 1140.52(b) for process.

Flushing

Contractor shall provide a minimum of 48-hours-notice prior to start of new water system flushing. Contractor shall include a proposed plan for disposal/neutralization of chlorinated water. City requires flushing to run through an energy dissipater. Blow-off/ Evacuation tap shall have a minimum flow velocity of 2.5-fps per the OSS, latest edition, Section 01140.50(a).

Bac-tee Test

Contractor is responsible for arranging delivery and testing at a City approved laboratory. Bacteriological treatments and testing of new water systems shall be conducted by City Water Staff. Acceptable test results from a certified laboratory approved by the Oregon Department of Health Services Water Program shall be provided to City prior to final acceptance of the new water system for public use. See OSS, latest edition, Section 1140.52(h) for procedure.

Test Ports

Test ports shall be one (1) inch.

TIE-INS TO LIVE WATER SYSTEM

All tie-ins between new water lines and the existing system will be overseen by the City Water Crew. No new lines may be connected until all testing has been completed and approved. Any parts needed during the connection process are to be sanitized and approved before installation.

SERVICE LINES

Premise Isolation

For all non-residential potable services, a minimum of a Double Check Valve Assembly (DCVA) shall be required for Premise Isolation. Install the Premise Isolation Assembly in accordance with OAR (Oregon Administrative Rules) 333-061-0071, Oregon Plumbing Specialty Code Chapter 6, and City of Newport standards and Specifications before City of Newport staff set a meter. The City shall identify and verify the degree of hazard of each service connection by City of Newport Safe Drinking Water Program.

Health Hazard connections shall be required to either utilize an approved In- Premise Backflow Prevention Assembly that is commensurate with the degree of hazard, (Air Gap or Reduced Pressure Principle Backflow Prevention Assembly) or install the Health Hazard Assembly as Premise Isolation. A

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Reduced Pressure Backflow Assembly will be required at the service connection when non-potable water services (i.e., COIC irrigation) and City water services exist at the same project site, per State regulations.

Backflow Prevention

Backflow prevention devices shall be required on all irrigation services, fire sprinkler system services and water services one-and-one-half (1½) inch and larger. All backflow prevention shall conform to OAR 333-061-0070 and 333-061-0071. See Standard Drawing W-805.

Double Check Valves

Double detector check assemblies (DDCA) installed to detect low-flow events shall be placed inside ROW if City is to have access. See Standard Drawing W-900 and W-905.

An approved DDCA shall be minimum protection on all fire suppression systems. The DDCA shall be placed in a below ground vault. A detail of the vault shall be included in design drawings for review and approval by City. DDCA vaults shall be pre-cast structures. DDC assemblies shall be within 25 feet of the connection point to the public water system.

City is not responsible to maintain double detector check assemblies. For domestic water services, the City's ownership ends at the meter. City's ownership for fire services ends at the ROW.

Fire Department Connections

Fire Department Connections (FDCs) shall be used on fire suppression systems located on private properties; no fire hydrants will be allowed on private properties. All FDC shall be accessible from the nearest adjacent street. Parking lot access is prohibited due to possibilities of FDC blockage by cars or the limited space of a parking lot.

Between Main and Meter

City determines location of water meter in ROW. City standard is to provide services directly to property with meters and customer shutoff valve installed within the ROW for residential and commercial application.

City is not responsible for maintenance beyond the meter.

In general, individual service connections shall terminate in front of the property being served and shall be located eighteen (18) inches each side of a common side property line. Include all pipe placements on as-built records.

New subdivisions and Planned Unit Developments

Services for created lots shall be installed as part of the required improvements. Services shall be placed in pairs at shared property lines whenever possible

Sizing

The sizes of approved water service lines are one (1), two (2), four (4), six (6), eight (8), ten (10), and twelve (12) inches. City will review water service lines for effects on the distribution system. Service lines shall not be greater in size than the distribution main. Meter box lids shall accommodate installation of radio read pad. For two (2) inch and greater services, a design drawing must be submitted

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showing the vault and fitting requirements with the expected flow (normal and maximum day flow) requirements and proposed usage. City will assess design against water distribution system to verify system flow and design area.

Domestic service lines one (1) inch through two (2) shall normally extend from the main to behind the curb, with a meter curb stop and meter box located at the termination of the service connection, see Standard Drawing W-605 or W-608. City Engineer may approve installation of three (3) inch meter, see Standard Drawing W-609A and B, on request. Developer shall provide meter vault for three (3) inch connection.

The minimum water service line size is one (1) inch diameter to the meter. Design Engineer may reduce this line size through the meter as required for domestic service. The water meter shall be the same size or one size smaller than the water service line. The City does not permit more than one service line per tax lot unless otherwise approved by the City Engineer. Install service lines as shown on the Standard Drawings. All service runs shall be one continuous run of municipex within the City's ROW. All service lines shall have a minimum of three (3) feet of cover.

A separate distribution line shall be required to provide for changes in service. City does not permit connections to transmission lines such as the use of fire hydrant or fire sprinkler lines as domestic service lines. Tap potable water services from the main separate from the fire line.

City requires a Professional Engineer design new service connections *greater* than two (2) inches.

Water services not being used, needing to be upsized, or needing to be relocated within a parcel are required to be removed back to the main and the pipe removed from the ROW. The City requires that line connection be removed at main and the main sealed. Repair method at the main shall be approved by the City Engineer or designee.

DEDICATED FIRE LINES

Dedicated fire lines on private property shall be maintained by property owner. The owner shall provide a master meter within the ROW, with required backflow prevention device installed on private property to separate the fire protection system from the City water main. Maintenance of the backflow device will be the responsibility of the property owners.

Once plans have been approved, the City will purchase meter if the meter is larger than those kept in inventory. Developer shall buy and place infrastructure and vault. When Contractor is ready for meter installation, contact the City Water Dept to arrange to pay installation costs and schedule meter installation. City will install meter after infrastructure is in place. Meter and vault shall be installed in the ROW. Master meter, like all meters, will remain City property.

The master meter is to monitor the fire line for leaks and in ensure water is used for fire purposed only. Property owner shall notify the City water utility in writing within 10 days of a fire. See NMC 5.10.040(C) for more information. See Standard Drawings W-610 and W-611 for design requirements.

FIRE SERVICES, FLOWS AND HYDRANTS

Fire Flow Analysis

The City of Newport requires all new developments or extension of existing facilities to have a fire flow analysis performed. Provide all relevant information on the proposed development or extension of

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services.

The fire flow analysis uses a calibrated hydraulic model to determine available flow. The analysis uses the peak day demand in the distribution system with storage tanks at half full to determine the available flow, static pressures, and residual pressures.

Design Engineer cannot substitute any other fire flow analysis for the analysis performed by the City using its calibrated hydraulic model.

Fire Flow Requirements

The following table shows the required fire flows based on land use and development type:

Land Use Code	Development Type	Required Fire Flow (GPM)
AOD	Airport Operations District	2,500
ARID	Aviation Related Industrial District	2,500
ASD	Aviation Support District	2,500
ASDRA	Aviation Support District Reserve Area	2,500
CB	Central Business District (CBD)	3,500
CC	Convenience Commercial District	2,500
CG	General Commercial District	2,500
CL	Commercial Limited	2,500
CN	Commercial Neighborhood	2,500
EFUTRB	Exclusive Farm Use	1,500
IG	General Industrial District	2,500
IL	Light Industrial District	2,500
IP	Industrial Park	2,500
ME	Mixed Employment	2,500
MR	Mixed-use Riverfront	2,500
PF	Public Facilities	2,500
PO	Professional Office	2,500
PO/RM/RS	Mixed Use Office/Residential	2,500
RH	High Density Residential	1,500
RL	Low Density Residential	1,500
RM	Medium Density Residential	1,500
RR	0 Medium-10 Density Residential	1,500
RS	Standard Density Residential	1,500
SM	Surface Mining District	2,500
SR2-1/2	Suburban Low Density Residential	1,500
UAR10	Area Reserve District	1,500

Fire Service

The water fire service line shall normally extend from the main to the property line and end with a vault containing an approved backflow prevention device.

A vault will be required when a development provides fire sprinklers. The vault drawing will be included

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on construction drawings submitted to the City. The vault shall contain all valves, fittings, meters, and appurtenances required for fire service to the development and be located on private property adjacent to the to the public ROW.

Hydrants shall be located such that private maintenance staff has complete access. They shall also be located to minimize the possibility of damage from vehicles or injury to pedestrians, with location preferred near intersections not directly on the corner. Protect hydrants located in parking areas by placing hydrants in a curbed landscape median/island. Hydrants placed on private property shall have a premise isolation valve installed at the ROW line. City considers such a hydrant main and hydrant privately owned and maintained by the property owner beyond the premise isolation.

The City of Newport requires that a registered Professional Engineer design all fire service and submit design through a ROW plan review and approval process. Design the fire service backflow/premise isolation device in accordance to all applicable building/fire/plumbing codes under a building department permit. Install all fire service lines from the nearest water main with a valve located adjacent to the tap/tee. PIV's and FDC's must be located on private property, unless otherwise approved by the City Engineer. If approved by the City Engineer for location within the ROW, the PIVs and FDCs shall be a minimum five (5) feet from roadways/curb. Construction documents shall provide a plan and profile of the fire service installation up to the ROW line. The City of Newport standard detail for fire lines is a minimum standard only.

All fire service lines will require a Double Check Detector Assembly (DCDA) around the backflow preventer.

Backflow Assembly vaults shall comply with the Uniform Plumbing Code requirement for electrical and heat for freeze protection as determined by the Building Department.

New Development Fire Hydrants

Fire hydrants shall be "bagged" (i.e. out of service) until City has accepted the new water system for public use.

Fire Sprinkler Lines

Fire sprinkler lines must have a DCDA installed with leak detection meter. The City's ownership of the fire sprinkler lines terminates at the ROW line with the installation of a gate valve per the standard drawing W-13B. The Building Department shall review all fire sprinkler lines and fire sprinkler vaults when on private property to be in conformance with plumbing and fire code regulations. Fire sprinkler vaults are required at the ROW when the building exceeds twenty (20) feet from the ROW line. In the instance where the building is within twenty (20) feet of the ROW, the developer has the option of installing a fire sprinkler vault or installing the fire sprinkler plumbing (DCDA, Post Indicator Valves, and Fire Department Connections) within the building as approved by the Building Official.

Fire sprinkler services that use any chemical additions shall require an approved Reduced Pressure Principle Detector Assembly (RPDA). Fire services, vaults and backflow prevention assemblies shall be installed in accordance with Oregon Administrative Rules (OAR) 333-061-0071, Oregon Plumbing Specialty Code and City of Newport Standards and Specs.

Fire Hydrants

- Materials

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- Hydrants shall have a nominal five (5) inch main valve opening with 6-inch bottom connections. The main valve shall be equipped with O-ring seals and shall open when turned counterclockwise.
- The operating nut shall be a one-half (½) inch national standard pentagon nut.
- Hydrants shall be equipped with two-and-one-half (2½) inch hose nozzles and one four-and-one-half (4½) inch pumper.
- Hydrants shall conform to AWWA C-502 and have a self-lubricating rising stem. The normal depth of bury shall be four (4) feet. Nozzle threads shall be American National Standard. The inlet connection shall be mechanical joint, restrained by a mechanical joint restraint system such as Megalug® Series 1100 as manufactured by EBAA Iron, Inc., or approved equal.
- Hydrants shall be YELLOW Mueller Centurion, or approved equal and painted Yellow per Standard Drawing W-300.
- Design Requirements
 - Design the public fire hydrant system to provide maximum GPM determined by pressure zone and flow analysis. Design the distribution system in commercial/industrial areas to accommodate fire flows up to 4,500 GPM. Minimum fire flow in single-family residential areas shall be 1,000 GPM with a twenty (20) PSI residual pressure.
 - Base the distribution of hydrants upon the required average fire flow for the area served. Design coverage shall result in hydrant spacing of approximately five hundred (500) feet in residential areas, approximately two-hundred-fifty (250) feet in commercial or industrial subdivisions, or as approved by the Fire Chief and City Engineer. In addition, sufficient hydrants shall be available within one-thousand (1,000) feet of a building in commercial/industrial areas to provide its required fire flow.
 - Residential hydrants shall be located as nearly as possible to the corner of street intersections and not more than six hundred (600) feet from any cul-de-sac radius point.
 - Do not install a fire hydrant on a main of less than eight (8) inches inside diameter unless it is in a looped system of six (6) inch mains. The hydrant lead shall be a minimum six (6) inch inside diameter.
 - All fire hydrants will be located behind the existing or proposed sidewalk or in the planter strip. If any public hydrant encroaches on private property, provide an easement as directed by the City Engineer.
 - Do not install a hydrant within five (5) feet of any existing aboveground utility nor shall any utility install facilities closer than five (5) feet from an existing hydrant.
 - Hydrant installation shall conform to Standard Drawing W-300. Full depth hydrants will be required in all installations. City does not allow Installation of hydrant extensions in new construction, unless approved by the City Engineer.
 - For fire hydrant assembly see Standard Drawing W-300.
 - Do not design hydrants located within twenty (20) feet of any building or blocked by parking. The large hydrant port shall face the road or fire lane.
 - Guard posts, a minimum of three (3) feet high, shall be required for protection from vehicles *when necessary*. Such protection shall consist of four (4) inch diameter steel pipes, six (6) feet long, filled with concrete, and buried a minimum of three (3) feet deep in concrete, and located at the corners of a six (6) foot square with the hydrant located in the center. The City Engineer may approve the use of posts other than at the four corners.

Location

Fire hydrant placement shall be outside the pedestrian path of travel. Hydrants shall be spaced at no

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more than four hundred (400) foot intervals. Any further spacing requires approval of the Newport Fire Department.

OPERATION OF VALVES IN CITY

Contractor shall request City operation of valves at least two (2) business days in advance. At no time shall the contractor undertake to close off, open, or take any other valve action that would affect the operation of the existing water system, unless specifically approved by City authorized representative.

WATER SHUT-OFFS FOR CONSTRUCTION

Water main shut-offs shall be coordinated through city water department representatives. Required shut-offs shall be coordinated with city water department seven (7) days prior to shutoff. Notification to users shall be no later than forty-eight (48) hour in advance for residents and seventy-two (72) hours for commercial or industrial properties. Failure to perform work within the given time will require re-notification.

WATER DESIGN REQUIREMENTS

Typical Water Valve Locations (Minimum)

See Standard Drawing W-100

Standard Water Valve Setting Detail

See Standard Drawing W-200

Valve Operator Extension Detail

See Standard Drawing W-205

Standard Fire Hydrant Assembly Detail

See Standard Drawing W-300

Blow-Off Assembly

See Standard Drawing W-405

2" Combination Air Valve Assembly

See Standard Drawing W-500

Standard 1" Water Service Connection

One inch water lines are installed by City Staff within the ROW. If installed as part of a new development, City staff will oversee installation of pipe, appurtenances, and boxes. See Standard Drawing W-605 for construction requirements.

Standard 2" Water Service Connection

Two inch water lines are installed by City Staff within the ROW. If installed as part of a new development, City staff will oversee installation of pipe, appurtenances, and boxes. See Standard Drawing W-608 for construction specifications.

3" Water Service 3" Meter

Three inch water services must be approved by the City Engineer. City staff will oversee installation of

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pipe, appurtenances, and boxes. Meter owned and installed by City. All other pipe, fittings, and vault installed by developer. See Standard Drawing W-609A/B for construction requirements.

6" Master Meter Connection

The six (6) inch master meter is to separate public water infrastructure from private water infrastructure. Meter owned and installed by City. All other pipe, fittings, and vault installed by developer. Size often determined by fire line. See Standard Drawing W-610 for specifications.

8" Master Meter Connection

The eight (8) inch master meter is to separate public water infrastructure from private water infrastructure. Size often determined by fire line. See Standard Drawing W-611 for specifications.

Concrete Thrust Blocking Details

Restrained joints are required on bends for three (3) joints each side of bend twenty-two-and one-half (22.5) degrees and larger. Vertical and horizontal thrust blocks are also required. See Standard Drawing W-700 for thrust block application.

Reduced Pressure Backflow Assembly (2½" Up)

Backflow devices are required on fire lines and irrigation lines. See Standard Drawing W-805 for construction specifications.

Double Check Valve Assembly (¾" - 2")

See Standard Drawing W-900

Double Check Detector Assembly (2½" Up)

See Standard Drawing W-905

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WATER STANDARD DRAWINGS